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Provincial Foreign Direct Investment Absorptive Capacity of Vietnam

Duong Hoang Vu, Tri Thanh Ho

ABSTRACT

Objective: The objective of the article is to examine the importance of absorptive capacity in the relationship between foreign direct investment and economic performance in 63 Vietnamese provinces from 2007 to 2015.

Research Design & Methods: The absorptive capacity at provincial level includes six components tested by confirmatory factor analysis, which allows for the argument that absorptive capacity of domestic firms is an important component of absorptive capacity of provinces. Besides this one, there are five other components, including financial development, human capital, the level of openness, the absorptive capacity of domestic firms, institutions, and infrastructure. The generalized two-stages least squares (G2SLS) random effect with instrumental variables regression is used with panel data.

Findings: Firstly, foreign direct investment has a positive impact on the development of the 63 provinces in Vietnam. Secondly, among the six components, the four most important ones are infrastructure, the level of openness, human capital, and the absorptive capacity of domestic firms. Moreover, the article finds that foreign direct investment can bring negative impacts to provinces with a low level of trade openness.

Implications & Recommendations: The government should focus on infrastructure, trading policy, human capital and capability of domestic firms.

Contribution & Value Added: There is a lack of connection between absorptive capacity at the firm level and the macro level. Therefore, this article attempts to create this connection by constructing absorptive capacity at the firm level as a component of absorptive capacity at the provincial level.

Article type: research article

Keywords: absorptive capacity; openness; financial development; the absorptive capacity of domestic firms

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INTRODUCTION

Foreign direct investment (FDI) can bring several benefits to the development of host countries. They can be direct benefits, including capital raising, labour creation, trading improvement, or national budget contribution. They can also be indirect effects such as technical transfer or labour turnover. However, FDI can hamper and totally dominate economies by taking advantage of their superior technology and management. Therefore, it seems that if a host nation cannot absorb the benefits from FDI and turn them into domestic strength, sooner or later the market can be dominated by foreign counterparts. It is the reason why this article emphasizes the importance of FDI absorptive capacity. Reflection on absorptive capacity was initiated by Cohen and Levinthal (1989; 1994; 1990). The authors examine the absorptive capacity at the firm level and define it as, "the ability of firms to recognize the value of new, external information, assimilate it, and apply it to commercial ends" (Cohen & Levinthal, 1990, p. 1). After the root concept of Cohen and Levinthal, various researchers examined this field and studied the role of absorptive capacity. Some focused only on the absorptive capacity at the organizational level (Lane, Koka, & Pathak, 2006; Lane & Lubatkin, 1998; Szulanski, 1996; Zahra & George, 2002), while others looked at the macro level of absorptive capacity (Fu, 2008; Lai, Peng, & Bao, 2006; Schillaci, Romano, & Nicotra, 2013). However, according to our knowledge, there is a lack of connection between absorptive capacity at the firm level and the macro level. Therefore, this article attempts to make this connection by constructing absorptive capacity at the firm level as a component of absorptive capacity at the provincial level.

The main concern of the article is the impact of absorptive capacity on the link of foreign direct investment with host nations. It seems true that benefits from FDI to host countries vary depending on absorptive capacity (Alfaro, Chanda, & Kalemli-ozcan, 2004; Borensztein, De Gregorio, & Lee, 1998; Carkovic & Levine, 2005; Durham, 2004; Fu, 2008). However, each researcher scrutinizes absorptive capacity from a different perspective and via different proxies. Some use human capital while others use financial development or the level of openness to represent absorptive capacity. We believe that absorptive capacity should be multidimensional. Therefore, this article attempts to review substantial studies on the topic so as to highlight several dimensions, including institutions, infrastructure, the level of openness, human capital, and financial development. Apart from these, the absorptive capacity of domestic firms is also vital, hence the article uses it as the sixth dimension. The construction of absorptive capacity with six components is tested by applying the single-factor measurement model.

Then, we test the impact of absorptive capacity on the relationship between FDI and economic growth on the case study of Vietnam, where FDI has played an essential role in boosting the development. The article runs a regression with instrumental variables for 63 provinces in Vietnam from 2007 to 2015. The key finding is that among the six dimensions only four play a moderating role in the link between FDI and growth: infrastructure, openness, human capital, and the absorptive capacity of domestic firms.

The article is constructed as follows. The second part contains a literature review of existing studies on the topic of absorptive capacity at provincial or national level. We develop six hypotheses based on the review. The third part describes the techniques used to test the construction of the absorptive capacity of provinces and the method to estimate the effect

of absorptive capacity on the relationship between FDI and provincial development. Furthermore, this part discusses the methodology to construct the absorptive capacity of domestic firms, followed by results and discussion. The article ends with a conclusion.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

It is well known that FDI can impact host countries directly and indirectly, but the potential benefits cannot automatically convert into positive impacts without domestic capability. The term absorptive capacity became widespread after the research by Cohen and Levinthal (1989, 1994, 1990). Therefore, we may consider the concept of those authors as a root definition of absorptive capacity. After that, there appeared substantial studies on the topic of FDI absorptive capacity at all levels. Some authors focused on absorptive at the firm level (Cohen & Levinthal, 1994; Martinkenaite & Breunig, 2015; Szulanski, 1996; Tu, Vonderembse, Ragu-Nathan, & Sharkey, 2006; Vu, 2018; Zahra & George, 2002) by stating that firms need certain levels of absorptive capacity to improve their performance. Other articles looked at absorptive capacity at the provincial or national level. Although we examine the importance of absorptive capacity at the macro level, we still consider the firm aspect by creating the absorptive capacity of firms in provinces as the component of absorptive capacity at the provincial level.

Basically, the approach of this article on the absorptive capacity at the macro level is similar to the approach of Schillaci *et al.* (2013). Schillaci *et al*. (2013) define the absorptive capacity of territory as "the ability of a Region to identify, assimilate, and exploit external knowledge" (p. 109). They develop their definition from that of Cohen and Levinthal who consider the absorptive capacity as "the ability of firms to recognize the value of new, external information, assimilate it, and apply it to commercial ends"(Cohen & Levinthal, 1990, p. 128). In their study, Schillaci *et al.* (2013) claim that the absorptive capacity of territory includes three determinants: human skills, research and development (R&D), expenditure, and knowledge gatekeepers. They partly refer to the importance of firms when discussing knowledge gatekeepers, but the role of absorptive capacity of firms is quite blurred. Therefore, we make a contribution by adding the role of absorptive capacity of firms into the group of absorptive capacity components at the macro level. In fact, our idea bases on the root argument of Cohen and Levinthal (1990). They argue that the absorptive capacity of an organization depends on the absorptive capacity of individuals, but it cannot simply be a sum of individuals' capacity. There are other factors that could determine the absorptive capacity of the organization, including its structure or environment. Consequently, Cohen and Levinthal (1990) claim that the absorptive capacity "depends on the individuals who stand at the interface of either the firm and the external environment or at the interface between subunits within the firm" (Cohen & Levinthal, 1990, p. 132). Based on it, we propose that absorptive capacity of a province depends on the absorptive capacity of firms and other factors, in which the role of firms is similar to the role of individuals in the absorptive capacity of firms.

Firstly, we should begin with how to measure the absorptive capacity of a firm. Several studies examine the internal aspects of absorptive capacity in firms. These articles underline the importance of internal knowledge, prior knowledge and the mechanism of knowledge transfer within a firm (Szulanski, 1996; Tu *et al.*, 2006; Zahra & George, 2002).

From another perspective, some studies focus on the inter-firm aspects of absorptive capacity. Lane and Lubatkin (1998) indicate that the absorptive capacity of firms can be relative, and it depends on whether firms can find good partners or not. Lane and Lubatkin (1998) also believe that if a "student firm" has a chance to cooperate with "teacher firms," which share some common characteristics, this student firm can learn quicker and more effectively. Similarly, Dyer, and Singh (1998) argue that taking full advantage from partnerships with more advanced firms can boost a firm's performance. Vu (2018) argues that the scope of firms' absorptive capacity is broad, and it might be limited only to separate consideration of intra-firm and inter-firm aspects. Therefore, it is better to combine the two aspects. The intra-firm aspect is the internal capability of a firm, while the inter-firm aspect is the gap between this firm and other firms in the same industry. Then, the absorptive capacity of a firm can be measured by the gap in capability between this firm and the best firms in the same industry. Hence, we based on the method of Vu (2018) to measure the capability of a firm by estimating persistent (in)efficiency. Persistent (in)efficiency is a component of technical efficiency and a long-term factor that only changes if there occur big changes in industry policy or management structure of a firm (Kumbhakar, Lien, & Hardaker, 2014). Hence, persistent (in)efficiency is a firm-specific factor that can be a good explanation of internal capacity (Vu, 2018). Noticeably, this measurement is more applicable than other proxies of absorptive capacity, including R&D intensity (Behera, 2015; Tsai, 2001), human capital (Martinkenaite & Breunig, 2015), or R&D expenditure (Girma, Gorg, & Pisu, 2008). The reason is that persistent efficiency is estimated from production function, which only requires basic information including output, labour, capital, and other intermediate goods. This type of information is easier to access than information about related R&D data. Especially in the case of developing countries – including Vietnam – data on R&D is insufficient and unreliable. This article based on the method of Vu (2018) on the measurement of absorptive capacity at the firm level with some amendments. The amendments are discussed in the next section.

Secondly, apart from absorptive capacity at the firm level, we should indicate other components that could determine the absorptive capacity at the provincial level. There are substantial studies on absorptive capacity and, consequently, its various proxies. This article takes from theories of absorptive capacity. Nguyen, Duysters, Patterson, and Sander (2009) put forward the model of FDI photosynthesis, in which they divided FDI absorbability into two stages: "one is to bring FDI projects to practice and the next one is to convert the benefit of FDI into host country's competences" (Nguyen *et al*. 2009, p.5). After attracting FDI, host countries need sufficient absorptive capacity to ensure that the gap between registered capital and disbursement is as small as possible. At this stage, host countries might gain from the direct benefit of FDI, such as physical capital, job creation, or contribution of FDI to national output. These are the direct effects of FDI on host countries, and they are visible. However, it is obvious that recipients expect more than these direct benefits. Host countries certainly expect that foreign investors create spillover effects (indirect effect) through technology or know-how diffusion. And at this point, each country will differ from another in terms of the benefits gained from FDI. Countries with a better absorptive capacity will gain more than countries with weak absorptive capacity. Nguyen *et al*. (2009) identify six determinants of absorptive capacity, including the capacity of firms, human capital, technology level, institutions, infrastructure, and financial sys-

tem. The authors consider six components of a plant-like photosynthesis process, in which institutions and technology are the ground, infrastructure and financial system are the body, while firms and human capital are tree leaves. From another perspective, Schillaci *et al*. (2013) claim that the absorptive capacity of a territory includes three determinants: human skills, R&D expenditure, and knowledge gatekeepers. Schillaci *et al*. (2013) argue that some organizations in one territory have to play a key role as knowledge gatekeepers. These organizations can bridge external knowledge and regional innovation system. Generally, it seems that the absorptive capacity of an entity – a province, region, or country – cannot be captured by a single measurement. Therefore, our study reviews various studies from Scopus and the Web of Science on this topic and reveals that there are five main components of absorptive capacity at provincial or national level.

Institutions

Hodgson (2006) defines institutions "as systems of established and prevalent social rules that structure social interactions" (Hodgson, 2006, p. 2) and this definition can be either inclusive institutions or extractive institutions. Acemoglu, Johnson, and Robinson (2005) argue that institutions might be important for economic outcomes, because they could influence the structure of property rights and the presence of market perfection or economic incentives in society. Acemoglu, Johnson, and Robinson (2005) refer this to an inclusive economic institution, as they believe that institutions can help to allocate production inputs efficiently. On the other hand, exclusive institutions – including political ones – might hamper economic growth of nations by only focusing on the interest of specific political groups (Acemoglu *et al*., 2005). Therefore, institutions can be an influencing factor of development, especially for the international business field. Cantwell, Dunning, and Sarianna (2010) and Dunning and Lundan (2008) agree that institutions are becoming increasingly important in shaping the operation of multinational enterprises (MNCs) and their externalities. In the case of Vietnam, Meyer and Nguyen (2005) argue that institutional conditions are important, as they are a factor that can influence entry strategy and location decisions of foreign investors. More specifically, incumbent state-owned enterprises may impact the institutional framework and then encourage foreign counterparts to cooperate with them. Furthermore, foreign firms tend to locate in provinces where local institutions allow them to access more easily natural resources.

H1: Institutions affect the impact of FDI on economic development.

Infrastructure

Infrastructure refers to public services, including health services, schooling, energy infrastructure, transportation, and telecommunication networks. There is evidence that the positive impact of FDI is contingent on the development of infrastructure of host countries (Yamin & Sinkovics, 2009). The authors argue that inadequate infrastructure in some less-developed countries (LDCs) hampers the potential effect of FDI. In contrast, good infrastructure can increase FDI-related firm productivity by reducing production costs and consequently create more spillovers for host countries (Alsan, Bloom, & Canning, 2006). Similarly, Dunning (2002) and Dunning and Narula (2004) conclude that emerging countries can absorb the benefits of FDI if they possess certain levels of infrastructure. Therefore, we expect that infrastructure can facilitate spillovers from FDI.

H2: Infrastructure affects the impact of FDI on economic development.

Openness

The importance of the level of openness was first discussed by Bhagwati (1978). He hypothesizes that the impact of FDI in host countries varies following the imports or exports strategy. More specifically, if a host country follows the more open policy, she will be more likely to benefit from spillovers of FDI. The main incentive for FDI is that the openness regime may provide a combination of cheap production costs and an export-promoting orientation. Various researchers support the argument of Bhagwati (Balasubramanyam, Salisu, & Sapsford, 1996; Beugelsdijk, Smeets, & Zwinkels, 2008; Carkovic & Levine, 2005; Kohpaiboon, 2003; Lai *et al.*, 2006) and test the "Bhagwati hypothesis" in empirical studies at the national and inter-country level. Generally, the level of openness can impact the relationship between FDI and economic growth of host countries.

H3: The level of openness affects the impact of FDI on economic development.

Human Capital

One of the most important roles of FDI is to create the process of technology diffusion. MNCs are supposed to have more advanced knowledge that allows them to introduce new production inputs at a cheaper price (Borensztein *et al.*, 1998). However, the application process might require a sufficient level of recipients' human capital. If this level is low, it is unlikely that host countries can absorb and apply advanced knowledge into practice. Therefore, human capital can be a detrimental factor of less developed or developing countries (Nelson & Phelps, 1966). Nevertheless, if host countries possess a good level of human capital, it can facilitate the effect from FDI to growth (Baharumshah & Almasaied, 2009; Borensztein *et al*., 1998; Zhang, 2001).

H4: The level of human capital affects the impact of FDI on economic development.

Financial Development

The lack of financial market development can hinder host nations from making use of FDI spillover effects. A well-functioning financial market can lower transaction costs and allocate capital effectively. Moreover, it can provide domestic firms with financial sources to finance their activities. FDI firms are more advanced and they might set specific requirements on technology for their domestic partners. Hence, the domestic firms need support from the financial market because their internal funding may be insufficient to buy new machines or recruit high-skilled workers and managers. Otherwise, they are unable to cooperate with their foreign counterparts, so the market cannot absorb positive spillovers from FDI (Alfaro *et al*., 2004). Many authors share this idea (Baharumshah & Almasaied, 2009; Beugelsdijk *et al*., 2008; Carkovic & Levine, 2005; Durham, 2004; Hermes & Lensink, 2003) and conduct empirical studies to test the role of financial markets, but the results are mixed.

H5: The level of financial development affects the impact of FDI on economic development.

The Absorptive Capacity of Domestic Firms

Bell and Pavitt (1992) state that accumulating technological capacity is essential for developing countries and the firms play a central role in this process. Most technological transfers occur at the firm level, and the level of technological accumulation is a prerequisite for this transfer. The absorptive capacity of domestic firms is examined by substantial studies, due to its moderating role in the relationship between FDI and economic development. It is obvious that the presence of FDI firms can create positive spillovers, but if domestic firms are not capable to learn new knowledge, they might never take advantage of FDI externalities. However, major studies deal with this issue at the firm level, while we believe that it should also be a vital factor at the macro level. Therefore, this factor is constructed at the provincial level and then the study attempts to explore its impact on FDI spillovers.

H6: The absorptive capacity of domestic firms affects the impact of FDI on Vietnamese economic development.

In the case of Vietnam, there are several studies on the topic of the impact of FDI at both firm-level and provincial level. At the firm level, Anwar and Nguyen (2010a) study the importance of FDI-generated spillovers at the firm level in Vietnam between 1995 and 2005 and conclude that these spillovers play a moderating role in the link from backward linkages to the performance of firms in the manufacturing sector. Le and Pomfret (2011) examine how FDI spillovers can affect the productivity of Vietnamese firms. They find that the vertical spillover is positive but the horizontal one is negative. At the provincial level, Vu (2008) focuses on the indirect effect of FDI at the sectoral level and the author finds the positive impact of FDI on labour productivity and economic growth in Vietnam. However, the effect varies across sectors. Vu, Gangnes, and Noy (2008) examine the impact of FDI on growth across the economic sector of Vietnam in comparison with China. The authors find the positive effect of FDI for both nations, but the effect varies in different sectors. Thang, Pham, and Barnes (2016) examine the impact of inter-firm factors on spillovers from foreign firms to domestic firms in Vietnam from 2000 to 2005 and conclude that the gap between foreign and direct firms can negatively affect productivity spillovers. Anwar and Nguyen (2010b) examine the impact of FDI on economic growth in Vietnam from 1996 to 2005. Their study finds that FDI and economic growth mutually affect each other, while the link from FDI to growth can be further facilitated by investing more in education and training. Generally, the impact of FDI and the role of absorptive capacity is not a new topic, but the majority of authors only focuses on this issue at the firm level or the provincial level in separation. Therefore, this article contributes to connecting absorptive capacity at the firm level to absorptive capacity at the provincial level by modifying the method of Vu (2018) and constructing the absorptive capacity of firms within provinces. Moreover, the construction of the absorptive capacity of six components is tested with confirmatory factor analysis.

MATERIAL AND METHODS

Methodology

This article reviews various studies to argue that the absorptive capacity of a province includes six components, which are institutions, financial development, human capital, openness, the absorptive capacity of domestic firms, and infrastructure. Based on this ar-

gument, we must test whether the six components are valid for the construction of absorptive capacity by using confirmatory factor analysis (CFA). In this model, absorptive capacity is a latent unobservable variable, constructed by six observed variables. This method helps to bring the first idea about the significance and impact of each component on absorptive capacity. Moreover, the method tests if the data can be consistent with the hypotheses. The article considers panel data from 2007 to 2015 as one extended cross-sectional data and then apply single-factor measurement model. Then, the estimated model can be presented as follows:

$$\begin{aligned} \ln(HC) &= \alpha_1 + AC * \beta_1 + \varepsilon_1 \\ \ln(FD) &= \alpha_2 + AC * \beta_2 + \varepsilon_2 \\ \ln(INS) &= \alpha_3 + AC * \beta_3 + \varepsilon_3 \\ \ln(OPN) &= \alpha_4 + AC * \beta_4 + \varepsilon_4 \\ \ln(INFR) &= \alpha_5 + AC * \beta_5 + \varepsilon_5 \\ \ln(ACP) &= \alpha_6 + AC * \beta_6 + \varepsilon_6 \end{aligned} \quad (1)$$

Human capital (HC), financial development (FD), institutions (INS), openness (OPN), infrastructure (INFR), and absorptive capacity of domestic firms in provinces (ACP) are six components of absorptive capacity (Table 2), while AC is the latent variable of absorptive capacity, ε is error term, and β is the coefficient that indicates the path from latent variable and its components. The CFA model is used to check the validity of the statement that is absorptive capacity of provinces include six dimensions. Moreover, when conducting CFA, we treated the database as an extended cross-section, so the results from CFA are not included in the next regression.

After evaluating the measurement of the absorptive capacity of provinces, we continue with another regression techniques. The study establishes a production function with FDI as one independent variable to test the hypotheses. The Cobb-Douglas production function at the provincial level is as following:

$$Y_{it} = A_{it}(K_{it})^{\alpha}(L_{it})^{\beta} \quad (2)$$

Where i is province i, t is time t, Y is output of province, K is capital and L is the labour of province. α and β are the elasticity of K and L, while A is total factor productivity (TFP). After dividing both sides by L_it, the author takes a logarithm and then equation (2) becomes:

$$ln(Y\_it/L\_it\ ) = ln(A\_it\ ) + \alpha * ln(K\_it/L\_it\ ) \quad (3)$$

The model assumes that α+β=1.

The interest of this article is in the indirect effect of FDI, so an impact of FDI is examined via TPF. It implies that A is a function of FDI and other factors (Huang, Liu, & Xu, 2012). Consequently, we obtain:

$$A_{it} = f(FDI_{it}, AC_{it}) = {FDI_{it}}^{\beta} * {AC_{it}}^{\theta} * e^{\varepsilon_{it}} \quad (4)$$

Replace (3) into (2), which gives:

$$\ln\left(\frac{Y_{it}}{L_{it}}\right) = \beta * \ln(FDI_{it}) + \alpha * \ln\left(\frac{K_{it}}{L_{it}}\right) + \theta * \ln(AC_{it}) + \varepsilon_{it} \quad (5)$$

Then, we examine the role of absorptive capacity by creating interaction terms between AC and FDI:

$$\ln\left(\frac{Y_{it}}{L_{it}}\right) = \beta \cdot \ln(FDI_{it}) + \alpha \cdot \ln\left(\frac{K_{it}}{L_{it}}\right) + \theta \cdot \ln(AC_{it}) + \\ + \delta \cdot \ln(FDI_{it}) \cdot \ln(AC_{it}) + \varepsilon_{it} \quad (6)$$

in which ε_it is the random disturbance that is normally distributed. Notably, the dimensions of absorptive capacity include infrastructure, institutions, financial development, human capital, and provincial absorptive capacity. All the variables can be considered as endogenous ones. Therefore, the study applies the Instrumental Variables method in which the instrument variables are lag of themselves. The lag level is identified after testing for endogeneity. Furthermore, the use of a fixed effect or random effect model is necessary to test to fit the used model to the database.

Table 1. Dimensions of absorptive capacity

AC determinants	Proxy	Source
HC (Human capital)	Ratio of trained workers over 15 y.o. to labour force	Vietnam General Statistic Office
FD (Financial Development)	Market capitalization	State Securities Commission of Vietnam
INST (Institutions)	Provincial Competitiveness Index	PCI annual report
OPN (Trade Openness)	(Exports + Imports)/GDP	Provincial Statistics Office
INFR (Infrastructure)	Km of road used for freight and passenger transport per cap	Vietnam General Statistic Office
ACP (Absorptive Capacity of Domestic Firms)	Based on the absorptive capacity of domestic firms at firm level	

Source: own study.

Proxies for infrastructure, institutions, financial development, and human capital appear in Table 1. All of them are secondary data provided by the provincial statistics office. Only the proxy for absorptive capacity at the provincial level is constructed based on the method of Vu (2018) with a few slight modifications. Vu (2018) considered the absorptive capacity of a firm to be a gap between its persistent inefficiency and the best FDI firm in the same industry (for details on persistent inefficiency, see Vu, 2018). However, it is better to consider the gap between the persistent inefficiency of a firm and the average one of FDI firms, because the spillover effect not only comes from a top FDI firm but also from other FDI firms in the same industry. Consequently, the absorptive capacity of a single domestic firm is:

$$AC_{qjt} = \frac{DPE_{qjt}}{\overline{FPE_j}} \times 100 \quad (6)$$

in which AC_{qjt} is the absorptive capacity of the domestic firm q in the industry j in time t, and DPE_{qjt} presents the persistent efficiency of the domestic firm q in industry j in time t. $\overline{FPE_j}$ is the mean value of the persistent efficiency of foreign firms in the sector j over the years.

Based on the absorptive capacity of domestic firms, the absorptive capacity of provinces is constructed by taking the mean value of all domestic firms within one territory. It is best if the territory is divided into provinces. However, the database does not cover all provinces in

Vietnam, the study calculates the absorptive capacity at the regional level. There are six regions in Vietnam classified based on geographical and economic proximity. Therefore, the absorptive capacity of provinces is proxied by the absorptive capacity at the regional level.

Notably, we seek to examine the impact of FDI indirect effect (spillover effects). Therefore, it is best if the FDI variable here could measure spillover effects. Unfortunately, the database to calculate spillover effects at the provincial level is unavailable. Therefore, the article uses the stock of FDI in provinces with the expectation to capture both the direct and indirect effect of foreign capital.

Data

The study examines six hypotheses in the case of Vietnam at the provincial level from 2007 to 2015. We selected 63 provinces in Vietnam grouped into six regions. Therefore, there are 504 observations in total. Notably, the study uses lag value as instruments of endogenous variables. It implies that it must trade between the number of observation and the validity of instruments.

In equation (4), Y_{it} is real gross domestic product of province i at time t. L_{it} is total labour of province i at time t. Hereafter Y_{it}/L_{it} is mentioned as GDP of province i. FDI_{it} is stock of FDI capital of province i at time t. This is an accumulation of FDI capital like every year at the end of December. K_{it} is the stock of capital calculated by applying the perpetual inventory method. The method requires the availability of investment of province i, collected from provincial statistic offices. Let us notice that the investment equals the investment of private sector plus the investment of public sector. Hereafter K_{it}/L_{it} is mentioned as the capital stock of province i. All these variables are collected from the annual provincial statistics books.

AC_{it} are dimensions of absorptive capacity of province i at time t, including institutions, financial development, human capital, infrastructure, openness, and the absorptive capacity of domestic firms. Institutions are proxied by the provincial competitiveness index (PCI), developed by the Vietnam Chamber of Commerce and Industry. It measures the quality of provincial governance in creating a business environment (for more, please check the eng.pcivietnam.org/about/about-pci). In fact, the element of institutions make a broad definition, and it is never easy to find a single proxy for it. However, we believe that the PCI can be an acceptable proxy because this is a province-specific index, which differentiates the business environment of each province. It reflects economic governance areas which have an impact on the development of the private sector. It covers several important formal and informal factors in Vietnam including information transparency, land access, and policy bias. More importantly, the PCI has an impact on the policymaking process, because it has been included in the current Governmental Resolution 02/NQ-CP dated 01/01/2019 on the solutions to improve the business environment and national competitiveness in 2019, toward 2021. In fact, this index is used to proxy for institutions of Vietnam provinces in some studies (Malesky & Taussig, 2009; Thang, Pham, & Barnes, 2016). The financial development of a province is represented by the market capitalization of headquarters of listed companies in 63 provinces. In fact, it would be better if we could use other proxies, including the ratio of savings to provincial GDP, the ratio of credit to provincial GDP, and the ratio of Money supply (M2) to provincial GDP. However, these proxies are not publicly available, so we must use market capitalization of listed companies to proxy for the development of the financial market. The argument is that companies

listed in the stock market must meet some requirements and make annual reports about their operations. Therefore, these companies are more transparent than unlisted companies, and they need to access official capital sources rather than sources under the table. Thus, we argue that provinces with more listed companies are more attractive for incoming investors, so are likely to develop more than others. It might be a result of concentration impact. Human capital is measured by the ratio of trained workers over 15 years old to the total labour of a province. By trained workers, we mean those who have been trained to meet minimum requirements of jobs, might have or not have certificates. Infrastructure is proxied by km of road used for freight and passenger transport per capita. Openness is the ratio of imports and exports to GDP. Finally, provincial absorptive capacity is calculated by Vu's (2018) method, with our modification. The monetary variables are real values and in million USD. All variables are in logarithm transformation. The distribution of these variables appear in Appendix B.

RESULTS AND DISCUSSION

First of all, the CFA results show that the hypothesis that the absorptive capacity of a province includes six components is valid. The proposed model of six components of absorptive capacity is confirmed by several tests. The first one is a goodness-of-fit test and the insignificant result implies that the model fits well. The Chi-square (4) is 6.292 and its significant level is 0.1784, so the proposed model fits data well. The second important fit statistic is the root mean squared error of approximation (RMSEA). The value of this test close to zero represents a good fit and the cut-off value is 0.08. The reported RMSEA in this case is 0.032, which indicates a good model. Furthermore, the comparative fit index (CFI) and Tucker-Lewis index of the model is 0.997 and 0.989 respectively which are more than the cut-off value of 0.95. Finally, the value of standardized root mean square residual (SRMR) is 0.017 – which is smaller than the cut-off value of 0.08 – thus confirming that the discrepancy between the sample covariance matric and the model covariance matrix is quite small. Based on the fit tests, we may say that the proposed measurement model of absorptive capacity is valid and fits data well.

Regarding the regression coefficient in the CFA model (Figure 1). All coefficients are statistically significant at 0.1% level, which shows that they certainly contribute to the construction of absorptive capacity. Let us note that all coefficients (factor loadings) are fully standardized and they can be interpreted as correlations. For example, the path from the latent variable to the component Openness is 0.74. It means that a 1% increase in absorptive capacity is associated with 0.74% increase in the Openness component. Differently, the coefficient can be interpreted as variance of a component after taking square. In case of Openness, 54.76% (0.74*0.74) of variance of the Openness component can be explained by the latent variable and, respectively, 46.34% variance of Openness is explained by another factor, not by absorptive capacity. From the CFA regression results, we see that Openness, Financial Development and Infrastructure are the best ones among the six components. Although the loading factors of components are not high and there might be some arguments about the cut-off value of loading factors, the author believes that the key point is the significance of coefficients and the goodness fit of the model. It is because the proposed model is built based on literature review and these components have been widely used. Therefore, it is possible to state that the single factor measurement model

confirms that the construction of absorptive capacity at the provincial level is reliable and, importantly, the absorptive capacity of domestic firms is the component that significantly contributes to the construction of provinces' absorptive capacity.

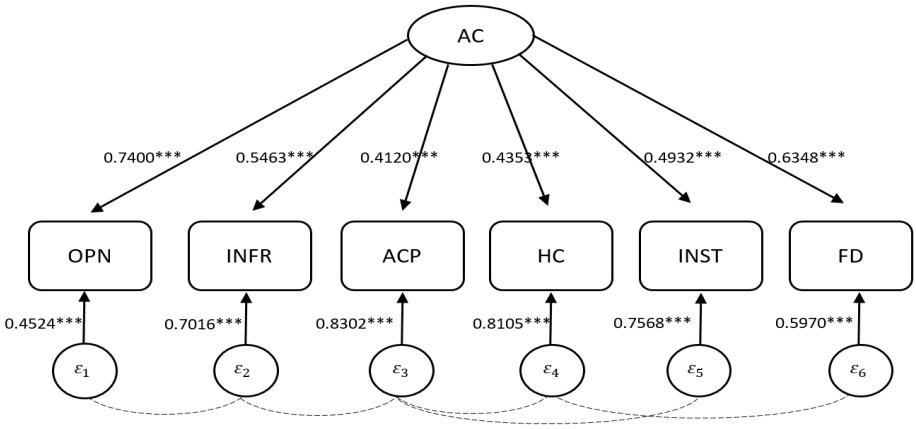


Figure 1. Results from the single-factor measurement model
*** statistically significant at 0.1% level
Source: own elaboration.

Then, the study estimates the impact of absorptive capacity on the link from FDI to the economic performance of 63 provinces in Vietnam. Before running regression, it needs to conduct several tests to identify the validity of the econometric model. The Hausman test shows that – in the case of the database of Vietnam – the random effect model is preferable. It means the assumption is that covariates and error term are not correlated. Due to the potential endogeneity of independent variables, we use their lag at the second level as instrument variables after taking a test on autocorrelation. It seems that autocorrelation occurs at the first level, so the use of lag at the second level is more appropriate (Arellano-Bond test). Next, the robustness and validity of these instrument variables are tested with other methods (the Anderson-Rubin Wald test, the Stock-Wright test, the Sanderson-Windmeijer test). Generally, the necessary tests show that the model is robust and valid (Appendix A).

Consequently, we apply the G2SLS random effect IV regression and clusters for 63 provinces to correct heteroscedasticity and autocorrelation. Firstly, we regress the equation (4) to examine the main effects of FDI and other independent variables on the performance of provinces.

From the first column of Table 2, we can see the key point is that FDI positively influences provincial GDP. A 1% increase in the stock of FDI may lead to a 0.052% increase in GDP per worker. The coefficient of FDI is statistically significant at 5% level. Moreover, the capital stock per worker also has a positive and significant impact on provincial GDP per worker at a 0.1% level. Turning to other variables, all coefficients are positive, which implies that they might have positive effects on the performance of provinces. Nevertheless, in the case of Vietnam, only human capital, openness, infrastructure, and the ab-

sorptive capacity of firms are statistically significant. The impacts of financial development and institutions in Vietnam are unable to be claimed in this study. Among the four significant dimensions of absorptive capacity, the magnitude of ACP is the biggest. It implies that the capability of firms is essential for the development of a province. If the absorptive capacity of domestic firms in one province increases by 1%, GDP per worker of this province can rise by 1.0869%. This finding might be vital for policymakers at the provincial level. The operation and development of domestic firms should be prioritized. Moreover, the level of openness, infrastructure, and human capital also play an important role in boosting provincial economies with coefficients of 0.1097, 0.1791, and 0.0166, respectively. The article takes one more step to see the role of ACP by excluding this dimension from the model and then comparing the explanatory power of the two empirical models. The adjusted R-square of model 1 is 0.7034. Then, the adjusted R-square of the model when excluding ACP is only 0.67881 (we offer model's results without ACP upon request). This implies that the exclusion of ACP may negatively impact the model. Consequently, the role of ACP is confirmed empirically.

However, the main interest of the article is the impact of absorptive capacity dimensions on the link from FDI to provincial GDP. Therefore, the interaction terms between these dimensions and FDI are created. The most important points now are the coefficients of the interaction terms from column 2 to 7. The results show that among the six dimensions of absorptive capacity, only four impacts the relationship between FDI and provincial GDP. In the second column, the coefficient of the interaction term between FDI and infrastructure is 0.0912, statistically significant at 10% level. We may interpret it that infrastructure can affect provincial GDP through the stock of FDI, or that the effect of FDI on provincial GDP depends on the value of infrastructure. Let us note that the main effect of FDI conditional on infrastructure now is 0.0020 + 0.0912*Ln(INFR). The mean value of Ln(INFR) is 0.7447, hence the main effect of FDI is now 0.0020 + 0.0912*0.7447=0.0698. The number of 0.0698 is now interpreted differently. It means that in case a province has a mean level of infrastructure, a 1% increase in FDI leads to a 0.0698% increase in GDP of this province.

The moderating role of the level of openness appears in column 3. The coefficient of the interaction term is positive and statistically significant at 0.1% level. It implies that the provinces which actively participate in trading activities can gain more from FDI spillovers. Noteworthy, the coefficient of Ln(FDI) is not statistically significant at the moment. This does not mean that FDI does not have an impact on provincial GDP. It only indicates that FDI does not influence provincial GDP if the level of openness is zero. Obviously, this rests beyond the interest of our study, hence the insignificance of Ln(FDI) is unimportant. Instead, the main effect of FDI now is 0.0061+0.0426*1.4085=0.0661. The interpretation is that a 1% increase in the stock FDI leads to a 0.0661% increase in GDP of a province with an average level of openness. Similar is the role of human capital in column 4. The statistical significance of the interaction term proves that skilled workers can facilitate the impact of FDI spillover to provincial development. Finally, the absorptive capacity of domestic firms also plays a vital role in the relationship between FDI and provincial growth. The positive and significant coefficient of the interaction term in column 6 confirms this argument. Conversely, although the coefficients of interaction terms between FDI, institutions, and financial development variables are positive, their statistical insignificance shows us that institutions and financial markets seem not so important as other dimensions of absorptive capacity in the case of Vietnam.

Table 2. Regression results

Ln(Y/L)	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
	Coefficient (p-value)	Coefficient (p-value)	Coefficient (p-value)	Coefficient (p-value)	Coefficient (p-value)	Coefficient (p-value)	Coefficient (p-value)
Ln(FDI)	0.0527* (0.0336)	0.0020 (0.9642)	0.0061 (0.7944)	0.0175 (0.5440)	0.0123 (0.7500)	0.0971* (0.0122)	-0.6398 (0.6677)
Ln(INFR)	0.1791+ (0.0671)	-0.4690 (0.1302)	0.1927* (0.0366)	0.1901+ (0.0555)	0.1790+ (0.0506)	0.1867+ (0.0524)	0.3465 (0.3249)
Ln(K/L)	0.2172*** (0.0000)	0.2013+ (0.0761)	0.1974*** (0.0000)	0.1975+ (0.0884)	0.2112*** (0.0000)	0.1826*** (0.0000)	0.3312 (0.5196)
Ln(HC)	0.0166* (0.0277)	0.0095 (0.4197)	0.0139* (0.0442)	0.0112 (0.2229)	-0.0083 (0.6246)	0.0169* (0.0148)	-0.0210 (0.7029)
Ln(ACP)	1.0869+ (0.0694)	1.1424 (0.3114)	1.3874** (0.0090)	0.8828 (0.1903)	0.9053 (0.1484)	-2.5501 (0.1179)	-1.8990 (0.8215)
Ln(INS)	0.2136 (0.7300)	0.1120 (0.9003)	0.3581 (0.5652)	0.4681 (0.5268)	0.3372 (0.5630)	0.4193 (0.5231)	-5.9535 (0.6896)
Ln(OPN)	0.1097* (0.0375)	0.1119 (0.1539)	-0.1309* (0.0450)	0.1161* (0.0317)	0.1108* (0.0384)	0.1540** (0.0015)	0.0349 (0.9547)
Ln(FD)	0.0245 (0.2614)	0.0229 (0.6261)	0.0031 (0.8822)	-0.0668 (0.4040)	0.0156 (0.4578)	0.0174 (0.3480)	0.0765 (0.8790)
Ln(FDI)* Ln(INFR)		0.0912+ (0.0698)					
Ln(FDI)* Ln(OPN)			0.0426*** (0.0001)				
Ln(FDI)* Ln(FD)				0.0128 (0.2130)			
Ln(FDI)* Ln(HC)					0.0032+ (0.0902)		
Ln(FDI)* Ln(ACP)						0.6201* (0.0271)	
Ln(FDI)* Ln(INST)							0.0135 (0.6341)
Constant	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	440	440	440	440	440	440	440
R_square	0.7125	0.7615	0.7460	0.7282	0.7193	0.7260	0.5316
Chi_square	424.5612	368.4655	514.5734	433.4751	387.3147	525.2606	108.4888
Cluster	63	63	63	63	63	63	63

+,*,**,*** statistically significant at 10%, 5%, 1% and 0.1%
Standard errors are autocorrelation and heteroscedasticity corrected.
Source: own elaboration.

It might be more interesting to look at the marginal effect of FDI on provincial GDP, conditional on specific values of absorptive capacity. Therefore, our study examines it by considering three values of each dimension of absorptive capacity: minimal value, medium

value, and maximal value. Table 3 shows the marginal effect of FDI on provincial GDP, which depends on three levels of openness, infrastructure, the absorptive capacity of domestic firms, and human capital. The first column indicates that if a province has a high level of openness, the effect of FDI on provincial growth is 0.2044. If the level of openness is medium, the province still enjoys the benefits of FDI, but the magnitude decreases to 0.0661. However, if the province inactively takes part in trading activities, FDI may hamper its economy. In that case, an 1% increase in FDI stock can decrease 0.1411% in GDP of the province. Importantly, based on the magnitudes, we can see that the negative impact (-0.1411) is higher than the positive impact (0.0661). This situation implies a divergence among provinces witha low level of openness and provinces with the medium level of openness. The pattern of the role of domestic firms' absorptive capacity in column 3 is similar. Provinces with medium and good domestic firms can enjoy FDI spillovers, with coefficients of 0.0423 and 0.1677, respectively. For the provinces with the low level of domestic firms' absorptive capacity, the coefficient is negative, but it is not statistically significant. Therefore, we cannot conclude that FDI negatively impacts provinces with a low level of domestic absorptive capacity. Columns 2 and 4 approve the moderating role of infrastructure and human capital. The better development of infrastructure and the higher level of workers can lead to better effects of FDI on provincial GDP. Generally, the marginal effect analysis ends up with a conclusion that the high level of absorptive capacity – for any dimensions – can help provinces enjoy more benefits from foreign investors. Conversely, the low level of absorptive capacity (the openness dimension) can hinder a province's performance.

Based on the magnitude of coefficients, we partly see that infrastructure can bring the highest impact on the link between FDI and provincial FDI. Next is the level of openness, which nevertheless requires provinces to have from medium to high level of openness. Otherwise, the reverse impact can occur. The role of human capital and the absorptive capacity of domestic firms appear equivalent. Therefore, at first glance, policymakers should pay more attention to the current state of infrastructure, the level of openness, the capacity of workers, and the capability of domestic firms.

Table 3. Marginal effects of FDI with different values of absorptive capacity

Value	dy/dx at values of Ln(OPN)	dy/dx at values of Ln(HC)	dy/dx at values of Ln(ACP)	dy/dx at values of Ln(INFR)
Min	-0.1662**	0.0243	-0.0519	0.0059
Mean	0.0661**	0.0578**	0.0423**	0.0698**
Max	0.2044***	0.1446**	0.1677*	0.3926**

dy/dx: y is Ln(Y/L) and x is Ln(FDI)

***,**,* are statistically significant at 0.1%, 1% and 5%

Source: own study.

CONCLUSIONS

The article scrutinizes the role of absorptive capacity at the provincial level in Vietnam by considering the absorptive capacity of domestic firms in provinces a component of the absorptive capacity of provinces. Although the article offers several findings, it also has some limitations that can be improved in further studies. The main limitation of the article lies in the proxy of institutions and financial development. Regarding institutions, the article uses

the PCI as indices at the provincial level. However, data for each province from the small country where policy is mostly homogenous might be not the best proxy for institutions. Furthermore, although the PCI covers important sectors, it is unlikely to fully cover all institutions. In addition, the proxy for the financial development of provinces seems not the best one. Moreover, at the cross-country level, openness can reflect the differences in trading policy, but at the provincial level, especially in a small country like Vietnam, it may bring different results. Therefore, the study requires a better proxy. Another shortcoming of our article is that we apply a random effect model based on a strict assumption that there are no correlations between error terms and covariates. Technically, the Hausman test confirms that the use of a random model with this database is valid, although such an assumption is quite strict. Therefore, this study has room for improvement.

The importance of absorptive capacity in the link from FDI to economic development examines the case of 63 provinces of Vietnam from 2007 to 2015. The article argues that absorptive capacity includes six components which are: financial development, human capital, the level of openness, the absorptive capacity of domestic firms, institutions, and infrastructure. We connect absorptive capacity at the firm level with absorptive capacity at the provincial level by constructing the former as a component of the latter. The single-factor measurement model of CFA is applied to test the measurement of absorptive capacity, which shows that the construct of absorptive capacity is valid and fits the employed database. We then apply G2SLS random effect IV regression to receive the following findings. Firstly, FDI has a positive and significant effect on the GDP of 63 provinces of Vietnam. Secondly, among six dimensions, only four affect provincial development positively: infrastructure, human capital, the level of openness, and the absorptive capacity of domestic firms. Moreover, the four dimensions also play a moderating role in linking positive externalities from FDI with provinces. Finally, based on the magnitude of coefficients and marginal effect analysis, we suggest that the most important dimensions of absorptive capacity are infrastructure, the level of openness, human capital, and the absorptive capacity of domestic firms. The result of this article contributes to the policymaking process at the national and provincial level. At the provincial level, policymakers can look at the importance of absorptive capacity at each component, and they might prioritize certain factors over others. At the national level, our article offers a foundation for policymakers to decide about the attraction and distribution of FDI projects.

REFERENCES

Acemoglu, D., Johnson, S., & Robinson, J. (2005). Institutions as a Fundamental Cause of Long-Run Growth. *Handbook of Economic Growth*, *1A*, 386-472.

Alfaro, L., Chanda, A., & Kalemli-ozcan, S. (2004). FDI and economic growth : the role of local financial markets. *Journal of International Economics*, *64*, 89-112. https://doi.org/10.1016/S0022-1996(03)00081-3

Bell, M., & Pavitt, K. (1992). Accumulating Technological Capability in Developing Countries. *World Bank Economic Review*, (S), 257-281.

Borensztein, E., De Gregorio, J., & Lee, J.-W. (1998). How does foreign direct investment affect economic growth?. *Journal of International Economics*, *45*, 115-135. https://doi.org/10.1080/10978526.2010.486715

Carkovic, M., & Levine, R. (2005). Does Foreign Direct Investment Accelerate Economic Growth?. In T. Moran, E. Graham, & M. Blomstrom (Eds.), *Does Foreign Direct Investment Promote Development?* (pp. 195-220). Washington DC: Peterson Institute for International Economics.

Cohen, W.M., & Levinthal, D.A. (1989). Innovation and Learning: The Two Faces of R & D. *The Economic Journal*, *99*(397), 569-596. Retrieved from http://www.jstor.org/stable/2233763 on January 20, 2019.

Cohen, W. M., & Levinthal, D.A. (1994). Fortune Favors the Prepared Firm. *Management Science*, *40*(2), 227-251.

Cohen, W.M., & Levinthal, D.A. (1990). Absorptive Capacity: A New Perspective on Learning and Innovation. *Administrative Science Quarterly*, *35*(1), 128-152. Retrieved from http://www.jstor.org/stable/2393553 on May 21, 2019.

Durham, J.B. (2004). Absorptive capacity and the effects of foreign direct investment and equity foreign portfolio investment on economic growth. *European Economic Review*, *48*(2), 285-306. https://doi.org/10.1016/S0014-2921(02)00264-7

Fu, X. (2008). Foreign Direct Investment, Absorptive Capacity and Regional Innovation Capabilities: Evidence from China. *Oxford Development Studies*, *36*(1). https://doi.org/10.1080/13600810701848193

Lai, M., Peng, S., & Bao, Q. (2006). Technology spillovers, absorptive capacity and economic growth. *China Economic Review*, *17*(3), 300-320. https://doi.org/10.1016/j.chieco.2006.04.005

Lane, P.J., Koka, B.R., & Pathak, S. (2006). The reification of absorptive capacity: A critical review and rejuvenation of the construct. *Academy of Management Review*, *31*(4), 833-863. https://doi.org/10.5465/AMR.2006.22527456

Lane, P.J., & Lubatkin, M. (1998). Relative absorptive capacity and interorganizational learning. *Strategic Management Journal*, *19*(5), 461-477. https://doi.org/10.1002/(SICI)1097-0266(199805)19:5<461::AID-SMJ953>3.0.CO;2-L

Malesky, E., & Taussig, M. (2009). Out of the Gray: The Impact of Provincial Institutions on Business Formalization in Vietnam. *Journal of East Asian Studies*, *9*(2), 249-290. Retrieved from http://10.0.3.249/S1598240800003003 on June 21, 2019.

Nguyen, H.T., Duysters, G., Patterson, J.H., & Sander, H. (2009). *Foreign Direct Investment Absorptive Capacity Theory*.

Schillaci, C.E., Romano, M., & Nicotra, M. (2013). Territory's Absorptive Capacity. *Entrepreneurship Research Journal*, *3*(1), 109-126. Retrieved from http://10.0.5.235/erj-2012-0001 on May 21, 2019.

Szulanski, G. (1996). Exploring internal stickiness: Impediments to the transfer of best practice within the firm. *Strategic Management Journal*, *17*(S2), 27-43. https://doi.org/10.1002/smj.4250171105

Thang, T.T., Pham, T.S.H., & Barnes, B.R. (2016). Spatial Spillover Effects from Foreign Direct Investment in Vietnam. *Journal of Development Studies*, *52*(10), 1431-1445. Retrieved from http://www.tandfonline.com/loi/fjds20 on May 21, 2019.

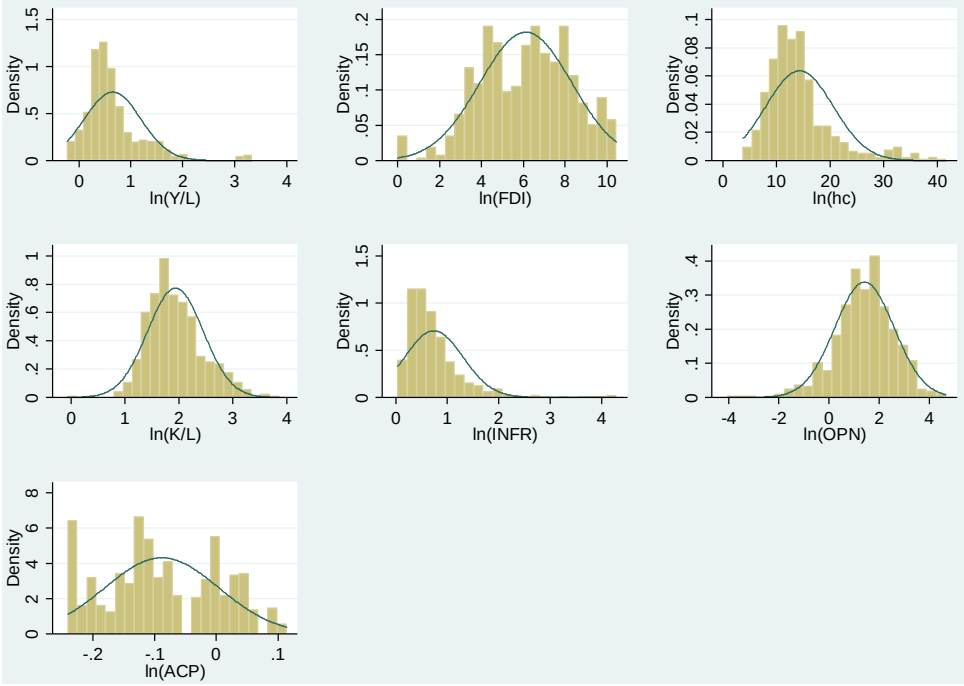
Zahra, S.A., & George, G. (2002). Absorptive Capacity: A Review, Reconceptualization, And Extension. *Academy of Management Review*, *27*(2), 185-203.

Resolution 02/NQ-CP dated 01/01/2019 on Về Tiếp Tục Thực Hiện Những Nhiệm Vụ, Giải Pháp Chủ Yếu Cải Thiện Môi Trường Kinh Doanh, Nâng Cao Năng Lực Cạnh Tranh Quốc Gia Năm 2019 Và Định Hướng Đến Năm 2021 [Solutions to improve business environment and national competitiveness in 2019, toward 2021]. Retrieved from https://thuvienphapluat.vn/ on May 21, 2019.

Appendix A: Model Specification tests

Hypotheses	Test	Test value	Decision
H_0: Random effect model H_1: Fixed effect model	Hausman test	Chi-square = 0.06	Not reject H_0
H_0: Instruments are valid H_1: Instruments are invalid	Hansen test	Chi-square = 48.17	Not reject H_0
H_0: coefficients of endogenous regressors are jointly 0	Anderson-Rubin Wald test	F(8,62)= 30.92	Reject H_0
H_1: coefficients of endogenous regressors not jointly 0	Stock-Wright LM S statistic	Chi-square=27.96	Reject H_0
H_0: Weak identification Ln(FDI) H_1: Not weak	Sanderson-Windmeijer	F(1,62) = 579.89	Reject H_0
H_0: Weak identification ln(INFR) H_1: Not weak		F(1,62) = 663.30	Reject H_0
H_0: Weak identification Ln(HC) H_1: Not weak		F(1,62) = 331.54	Reject H_0
H_0: Weak identification Ln(ACP) H_1: Not weak		F(1,62) = 210.57	Reject H_0
H_0: Weak identification Ln(INST) H_1: Not weak		F(1,62) = 67.87	Reject H_0
H_0: Weak identification Ln(K/L) H_1: Not weak		F(1,62) = 657.27	Reject H_0
H_0: Weak identification Ln(OPN) H_1: Not weak		F(1,62) = 266.15	Reject H_0
H_0: Weak identification Ln(FD) H_1: Not weak		F(1,62) = 106.56	Reject H_0
H_0: No autocorrelation first level H_1: Autocorrelation first level	Arellano -Bond	Z = -2.15	Reject H_0
H_0: No autocorrelation second level H_1: Autocorrelation second level		Z = -0.94	Not reject H_0

Appendix B: The distribution of variables



Source: own elaboration.

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The contribution of Duong Hoang Vu is 55% and the contribution of Tri Thanh Ho is 45%.

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Analysis of Czech Agricultural Exports to Russia Using Mirror Statistics

Sergey Yurik, Nikolay Pushkin, Valentina Yurik, Jaroslav Halík, Luboš Smutka

ABSTRACT

Objective: The objective of the article is to verify the possibilities of mirror statistics of Russian imports for the analysis and identification of problems of Czech agricultural exports to the Russian market.

Research Design & Methods: The supply of agricultural products and foodstuffs (APF) to Russia in 2015-2018 was the focus of the study. We scrutinised the permissibility of using mirror statistics for analysis and formulated algorithms for aggregating and disaggregating foreign trade indices (FT-indices) in calculating and studying the group dynamics of the most important APF goods.

Findings: We prove the acceptability of using mirror statistics for APF from the viewpoint of methodological standards by determining the position of the most important Czech APF products on the Russian market, including a comparison with similar imported goods. The study revealed that Czech statistics on beer exports to Russia should be increased by the amount of re-exports.

Implications & Recommendations: We formulate recommendations for the development of Czech APF exports to Russia for leaders' goods, taking into account prices for similar imported goods. For beer (trade leader), we recommend enhancing the use of the intellectual property factor for trade growth. Moreover, we give recommendations on statistics of Czech exports to Russia on the need to adjust beer export volumes taking into account re-exports.

Contribution & Value Added: The research is original, as there were no studies prior to this one that would apply mirror statistics as an additional database and tool for identifying export problems not observed by national statistics.

Article type: research article

Keywords: foreign trade; agricultural products and foodstuffs; mirror international statistics; foreign trade indices

JEL codes: C43, Q17, O34

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INTRODUCTION

The Russian market is the largest market for agricultural products and foodstuffs (APF) goods among all European countries, including the Czech Republic. Therefore, the practical analysis of the condition, sales conditions, and prices of goods exported to the Russian market is in demand and relevant for each country trading with Russia.

Growing barriers to APF trading in the Russian market, especially the currently existing lists of mutual sanctions – including trade restrictions between the EU and Russia on APF – have significantly affected the volume and structure of mutual trade. Against this background, trade and trade policies require regular and comprehensive monitoring, including analyses with traditional tools and statistics, along with the development of additional methods for identifying and studying emerging problems.

Traditionally, a country's export analysis is based on national statistics (Szczepaniak, 2019). However, the analysis of the same flow based on mirror statistics of the host country in the form of its import is of indubitable practical interest.

In general, mirror statistics is closer to the real conditions of a sales market, since it fixes the cost and quantity of goods for sale on the domestic market of the importing country.

The purpose of this article is to study the possibilities of mirror statistics of Russian imports to analyse and identify problems of Czech APF exports to the Russian market. To achieve this goal, we analysed three subtopics. The first subtopic considers mirror statistics as an additional source of information and proves the possibility of using statistics on Russian APF imports in terms of methodological standards. The second subtopic proposes methods of aggregation and disaggregation of FT-indices to further analyse the dynamics of the most important groups of goods and explore the possibilities of recovery and expansion of APF exports. The third subtopic examines the mirror statistics of deliveries of the leader of the Czech trade – beer – which reveals the underestimation of Czech export statistics on beer supplies to Russia, along with the problem of re-export and parallel import. All studies within the framework of this work were conducted for the first time.

The article consists of the following sections. First, we review the subject literature. Next, we describe the applied methods and techniques of research. Third section presents results of the study, along with discussion. The article ends with concluding remarks.

LITERATURE REVIEW

Studies about problems of mirror statistics are scarce, which is explained by the difficulties of the gathering of initial data and the problematic subsequent interpretation of results of mirror comparison of information. The main volume of publications focuses on the topic of increasing the reliability of statistics (Markowicz & Baran, 2019). What predominates the field are macroeconomic comparisons of data of the total value of trade results with the recording of the largest deviations, including between countries; e.g. see publications of the Central Bank of Russia (BOPR-CMD, 2019), but also Javorsek (2016), Valiev (2016), Seltsovsky (2009). Moreover, we also note publications that conduct a wide mirror comparison of the value results of trade at the level of trade partners of the country, including mirror comparison by product groups and sometimes by selected goods (CCSKR, 2014; Troshina & Kislitsyna, 2008; Korolev, Zhukovskaya, Trofimova & Chertko, 2007; EIFRF, 2003).

From our viewpoint, the common drawback of mirror statistics research is its wide focus, when asymmetry studies are conducted on the almost complete composition of product groups with the comparison of values of trade. In this case, due to the large amount of information, the interpretation of results is difficult and often remain at the level of fixing the fact of asymmetry and determining its size, followed by an assessment of the estimated losses of budget revenues. Based on mirror comparisons, a rather large number of different estimation techniques have also been proposed on this subject; e.g. see the discussion of data comparison techniques and a list of sources in Mantusov and Tibekin (2015; 2016), Bartokova (2019), Borak and Vacek (2018), Ferto (2018). Furthermore, as a general drawback, we note that data on natural supplies of goods and prices remain unused in almost all publications devoted to the topic of comparing mirror statistics.

We conclude that the practical use of mirror statistics has its own characteristics and is not always possible due to large discrepancies or asymmetries in the volumes of comparable flows of national statistics and statistics of the host country, when the reliability of the data is doubtful (asymmetry is higher than the permissible values) and requires additional checks. However, large discrepancies in mirror data are not recorded everywhere; in a number of publications this fact is noted both for goods and for countries. Nevertheless, we did not find any publications that would consider the further use of "normal" mirror statistics as an additional source of information – along with national statistics – for studying goods trade between countries.

Let us note that mirror statistics as a full-fledged information base is closer to the real conditions of the sales market, because accounts for the cost and quantity of goods of different countries for sale on the domestic market of the importing country, taking into account logistics and insurance cost.

The focus of the study was narrowed down to the group of APF (HS 01-24)[1], for which we examined exports from the Czech Republic to the Russian market and investigated the possibilities of its analysis based on data from mirror statistics of Russian imports. To solve this problem, the article will firstly assesses the acceptability of using mirror statistics for APF in terms of existing methodological standards. Here, in the context of the classical analysis of foreign trade flows (by sections, product groups, list of main goods, and the behaviour of trade leaders), we will conduct the comparison of mirror value data at the level of all product APF groups (HS 01-24), then according to the list of main import goods, and finally by leading products. In conclusion, we will consider the asymmetry of not only cost but also natural deliveries for the leader of trade in the Russian market – Czech beer – along with its possible causes, emerging trade problems, suggestions for solutions.

[1] The Harmonized Commodity Description and Coding System generally referred to as "Harmonized System" or simply "HS" is a multipurpose international product nomenclature developed by the World Customs Organization. The system is used by more than 200 countries and economies as the basis for their Customs tariffs and for the collection of international trade statistics. Over 98% of the merchandise in international trade is classified in terms of the HS. Source: http://www.wcoomd.org/en/topics/nomenclature/overview/what-is-the-harmonized-system.aspx.

MATERIAL AND METHODS

Mirror Statistics

As we know, international trade between two countries is simultaneously monitored and registered by the customs services of these countries. The result is a two-sided display of trade data, which is commonly referred to as mirror statistics. Theoretically, in the mirror statistics, the export of goods from country A to country B should equal the import from country B from country A, whereas the import from country B to country A should equal the export from country A to country B. However, in practice the mentioned trade volumes usually differ and, at times, they differ dramatically. In general, experts associate the presence of differences or *asymmetry* in the data of mirror statistics with two groups of reasons: the customs methodology for fixing flows and various errors in determining the customs value of goods, including those associated with understating customs value to reduce budget deductions and organise capital flight (cf. IMTS, 2010).

What is considered a normal asymmetry of mirror flows? First of all, the asymmetry of the data is associated with the difference in prices of recorded flows. As we know, according to customs statistics methodology (IEMD, 2018), the value of exporting goods of country A to the market of country B is represented by statistics of country A in Free On Board (FOB) prices, while imports of goods from country A to country B are represented by statistics of country B at Cost, Insurance, and Freight (CIF) prices, which additionally include costs of insurance and transportation of goods. According to the International Monetary Fund (IMF), the world average CIF/FOB value is 1.06 (DOTS, 2018, p. xii; Bogdanova & Chuplanov, 2010, p. 47), although earlier studies use the coefficient of 1.10 (EIFRF, 2003; DOTS, 2011). Currently, the Central Bank of Russia at the mirror comparing statistics for countries outside of the Commonwealth of Independents States (CIS) applies coefficient 1.0588 (BOPR-C, 2018, p. 1). Moreover, we note that permissible differences in estimates depend on the specifics of goods and are determined by the amount of expenses not only for transportation and insurance but also losses during transportation and calendar differences in sending and receiving goods.

Thus, we may conclude that, in general, the permissible discrepancy in estimates for trade with non-CIS countries is usually taken equal to 6-10%. In the future, when assessing the acceptability of the asymmetry of value flows, we will focus on the indicated values.

What is registered more precisely: export or import? To this question, the United Nations statistics experts answer that, for a given country, imports are usually recorded with more accuracy than exports, because imports are the main revenue base of the state budget and exports are not (IEMD, 2018). The general view of experts on the accuracy of data collected by customs offices is that import data are more reliable than export data because customs services are more serious about recording imported goods for purposes of budget revenue from duties collection, taxes, and other regulatory controls (Hamanaka, 2011, p.1; EIFRF, 2003).

The conclusion about the smaller asymmetry of import flows of mirror statistics was practically confirmed when comparing Czech export statistics on APF and mirror statistics on the import of Czech goods to Belarus (Yurik, 2017). Indeed, the mirror data of Czech imports from Belarus and Belarusian exports to the Czech Republic had rather large differences, while data on the opposite flow to Belarus differed within the limits of methodologically permissible norms.

Research Design with Mirror Statistics

Within the framework of the designated topic, the study focused on the APF group (HS 01-24). In the beginning, to assess the practical use of mirror statistics in the analysis of competitive positions of Czech APF goods in the Russian market, we compared the statistics of Czech exports to the Russian Federation and statistics of Russian imports from the Czech Republic. Next, on the basis of the Federal Customs Service of the Russian Federation database (FCSR), we compiled a list of imports of Czech APF goods to Russia from 29 items (99% of the trade volume), within which we distinguished 12 main goods (more than 90% of trade) and three leading goods (60% of trade volume). We then calculated foreign trade (FT) indices of price, quantity, and value for the selection of groups of goods using the proposed methods. Based on FT-indices and mirror statistics, we estimated the position of the leaders' products surrounded by similar imported goods from other countries and the prospects for expanding trade on the Russian market. In conclusion, we compared the asymmetry of mirror statistics of natural supplies for the three leading products of Czech APF imports to Russia (more than 60% of trade) and commented on possible causes of deviations.

Methods of FT-Indices Calculation

In Russian statistics, FT-indices are calculated based on the Laspeyres formula:

$$I^p = \frac{\sum p^1 q^0}{\sum p^0 q^0} \quad (1)$$

where:

p^0, p^1 - is the price per unit of goods in the reference and reporting years;
q^0, q^1 - is the quantity of goods in the reference and reporting years;
I^p - Laspeyres average price index.

For calculating FT-indices, we used methods of aggregation and disaggregation of indices that are a modification of general methods (Pushkin & Yurik, 2018), adapted to solve the problems under consideration.

To describe the algorithm for calculating FT-indices, we will use the following notation:

n, k – the quantity of goods in the sample and in the selected group;
p^0_i, p^1_i – the price of goods i in the reference and reporting years;
q^0_i, q^1_i – the quantity of goods i in the reference and reporting years;
s^0_i, s^1_i – the value of goods i in the reference and reporting years;
S^0_n, S^1_n – the value of all n goods in the reference and reporting years;
S^{01}_n – the value of all n goods in the reference year at the prices of the reporting year (numerator of the Laspeyres formula (1));
I^s_n, I^p_n, I^q_n – value index, average price index and quantity index of the reporting year to the reference year for a group of n goods.

Aggregation: total FT-indices for a list of n products.

Initially known: s^1_i, s^0_i, q^1_i, q^0_i, i = 1,2…, n.

Moreover, we calculate the total value of n goods:

$$S^1_n = \sum_{i=1}^n s^1_i, \quad S^0_n = \sum_{i=1}^n s^0_i \quad (2)$$

Next, we note that the denominator of formula (1) is equal to S^0_n:

$$\sum_{i=1}^n p^0_i q^0_i = \sum_{i=1}^n s^0_i = S^0_n \quad (3)$$

and the numerator can be calculated by the formula:

$$S_n^{01} = \sum_{i=1}^{n} p_i^1 q_i^0 \quad (4)$$

Then the value index, average price index and quantity index for a list of n products are calculated with formulas:

$$I_n^s = \frac{S_n^1}{S_n^0} \quad (5)$$

$$I_n^p = \frac{S_n^{01}}{S_n^0} \quad (6)$$

$$I_n^q = \frac{I_n^S}{I_n^p} \quad (7)$$

Disaggregation: total indices for a group of k products and a group of other (n - k) products.

For a group of k products (k < n), initially known: s^1_j s^0_j, q^1_j q^0_j, j = 1,2…, k. To determine FT-indices using formulas (2) - (4), we calculate the required total parameter values for n = k, and then the final value index, the average price index, and the quantity index for the group using formulas (5) - (7) for n = k.

For the group of other (n - k) goods, the total values of formulas (2) - (4) – necessary for calculating the three indices – are defined as the difference between the corresponding amounts for n and k goods. Then, the value index, the average price index, and the quantity index for the remaining (n - k) goods are calculated according to formulas (8) - (10):

$$I_k^S = \frac{S_k^1}{S_k^0} = \frac{(S_n^1 - S_k^1)}{(S_n^0 - S_k^0)} \quad (8)$$

$$I_k^p = \frac{S_k^{01}}{S_k^0} = \frac{(S_n^{01} - S_k^{01})}{(S_n^0 - S_k^0)} \quad (9)$$

$$I_k^q = \frac{I_k^S}{I_k^p} \quad (10)$$

Using the formulas (1) - (10), we calculated the indices in Table 2.

Initial Data

The interval of presentation of all indicators is 2015-2018. The study simultaneously used the United Nations database (UN COMTRADE, 2019; general asymmetry) and the database of the Federal Customs Service of the Russian Federation (FCSR, 2019; main goods). Note that the data from the two indicated databases are identical, while possible minor deviations are associated with technical adjustments at the level of national statistical services, which are not always promptly reflected in the UN COMTRADE database.

RESULTS AND DISCUSSION

The Asymmetry of Mirror Statistics of the Czech Republic and Russia for APF

Mirror comparison of the data of export and import of Czech goods to the Russian market is presented in Table 1.

The comparison of the overall results shows that from 2015 to 2018 shows the total Czech exports to Russia (FOB prices minus Czech statistics) were higher than the volumes of Russian imports from the Czech Republic (CIF prices minus FCS of the Russian Federation) by 11% on average. This unnatural asymmetry of data indicates problems with errors

in reporting and determining the customs value of goods that may mask shadow operations, taxes minimisation, and capital flight, which requires additional analysis by both statisticians and customs officers should it reach critical volumes.

Table 1. Mirror comparison of APF trade data

HS	CIF: Russian import from the Czech Rep.			FOB: Czech export to Russia			CIF/FOB		
	2015	2017	2018	2015	2017	2018	2015	2017	2018
	thous USD			thous USD					
Total	2 679 134	3 216 554	3 775 324	3 199 490	3 539 595	4 116 618	84%	91%	92%
01-24	100 324	125 876	156 776	95 556	115 661	143 593	105%	109%	109%

Source: own elaboration of data from UN COMTRADE (2019).

In contrast to the overall results, a mirror comparison of APF trade data (Table 1) shows a generally normal situation with an average valuation excess of CIF prices over FOB by 6-7%, which is comparable to the ratio of 1.0588 of the Central Bank of Russia for calculating the balance of payments (BOPR-C, 2018). Noteworthy, focus on a specific APF product group allowed us to find a positive result for the asymmetry of mirror data.

Thus, we may conclude that the use of import statistics of the Federal Customs Service of the Russian Federation for the analysis of mirror data on the Czech APF trade in the Russian market is generally possible in view of methodologically permissible differences in data.

Czech Exports in the Mirror of Russian Statistics: Main APF Goods and Trade Development Prospects

According to the statistics (Figure 1), Russian APF import from the Czech Republic in 2018 reached the maximum pre-crisis level – before the introduction of Russian countersanctions for the EU countries in August 2014 – and exceeded it.

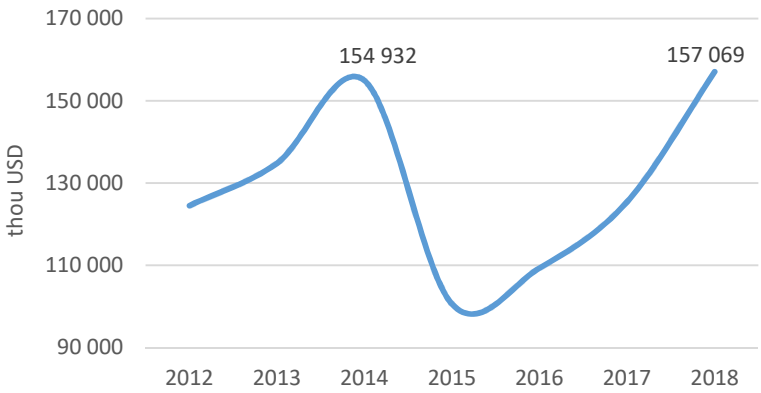

Figure 1. Russian APF import from the Czech Republic
Source: own elaboration of the FCSR data (2019).

We will analyse the dynamics of the commodity structure of Czech APF supplies to the Russian market in 2015-2018 after the introduction of Russian countersanctions.

Main APF Goods and the Top Three Products

To analyse trends and patterns of Czech APF exports to the Russian market, we selected the interval 2015-2018; that is, the period after the introduction of Russian sanctions on agricultural products against EU countries. Based on the data of the Federal Customs Service of the Russian Federation, we compiled a list of imports of Czech APF goods to Russia, which includes 29 products (sample depth 98.6% for 2018). Using the aggregation method described above, total indices were calculated for 29 main goods, including the group of 12 goods with the largest share of value, but also for other goods (Table 2).

As Table 2 reveals, the centre of trade interests of Czech APF exports to Russia concentrates on the group of the main 12 goods (94% of the total in 2018). Deliveries of these goods had an upward growing dynamic (all indices are more than one) and for 2015-2018 they increased in value on average by 1.7 times (by 62 million USD), based on rising prices and physical volumes by 16% and 48%.

It should be noted that almost 3/4 of the growth in exports was achieved due to the three leading products: beer, animal feed, birds' eggs. By 2018, their share amounted to 2/3 of the export volume (Figure 2).

Let us consider these products in more detail in increasing order of importance. FCSR mirror statistics of imports allows us to analyse the position of Czech goods on the Russian market in comparison with similar goods imported from other countries. We should note that Czech export statistics do not have such data for comparative analysis.

The third place – position 0407, birds' eggs – after 2015 increased sales volumes by 23% with a slight decrease in prices (by 3%) and an increase in natural supplies (by 27%). However, already in 2018, while maintaining the growth in value (by 13%), a noticeable increase in prices (by 19%) was recorded with a decrease in natural supplies (by 4%). However, Russian statistics on imports of these products from other non-CIS countries (Table 3) shows that among the four non-CIS countries with a market share of more than 75%, Czech products have the lowest price, despite its growth from 3.44 to 4.10 USD/kg.

This means that the prospects for trading in the birds' eggs market for the Czech Republic are stable: the market share is high – second or third place among non-CIS countries – while prices are lower than most of competitors' prices. In the future, one should pay attention to the increase in natural supplies while prices continue to rise; possibly to the leader level of the Netherlands 4.28 USD/kg and then to the average non-CIS price of 5.59 USD /kg.

The second place – position 2309, animal feed – increased trade volume for 2015-2018 more than twofold, while the price and natural supplies increased by 10% and 1.9 times, respectively. Although the price slightly decreased for this position (by 7%) in 2018, the increase in natural supplies by almost 20% ensured an increase in trade volume by 12%. In this case, the assortment is probably changing towards cheaper and more demanded types of feed. However, this conclusion is not certain.

Russian statistics on imports of animal feed suppliers from non-CIS countries show an increase in average prices from 1.83 to 1.99 USD/kg. As Table 4 reveals, feed prices in 2018 rose in all countries on the list, except for the Czech Republic. This is a hint to Czech marketers from the Russian market: it is possible and necessary to increase the price up to the level average for the market (1.99 USD/kg) and even higher.

Table 2. Russian APF import from the Czech Republic: the set of main goods with the largest share of value

HS	Product groups, products	2015		2018		2018-2015, thou USD	Indices 2018/2015			Indices 2018/2017		
		Value, thou USD	Share	Value, thou USD	Share		*price*	*volume*	*value*	*price*	*volume*	*value*
01-24	Agricultural products and foodstuffs	100 532	100%	157 069	100%	56 537	–	–	1.562	–	–	1.252
29	main goods	96 794	96.3%	154 930	98.6%	58 136	1.151	1.390	1.601	1.093	1.153	1.260
- 12	*main goods with the largest share of value*	85 760	85.3%	147 868	94.1%	62 108	1.162	1.483	1.724	1.092	1.170	1.277
2203	Beer	14 570	14.5%	36 629	23.3%	22 059	0.976	2.575	2.514	1.046	1.470	1.538
2309	Animal feed	17 056	17.0%	34 769	22.1%	17 714	1.099	1.855	2.039	0.932	1.197	1.116
0407	Birds' eggs	21 308	21.2%	26 204	16.7%	4 896	0.969	1.269	1.230	1.194	0.949	1.133
1207	Other oil seeds and oleaginous fruits	11 618	11.6%	18 193	11.6%	6 574	1.700	0.921	1.566	1.684	0.927	1.562
2208	Spirits, liqueurs and other spirituous, beverages	3 596	3.6%	5 708	3.6%	2 112	1.099	1.444	1.587	0.990	1.113	1.102
1905	Pastry, cakes, biscuits and other bakers'wares	2 016	2.0%	5 330	3.4%	3 313	1.218	2.170	2.643	0.741	2.644	1.959
2106	Reparations not elsewhere specified or included	3 723	3.7%	5 088	3.2%	1 365	1.433	0.954	1.367	0.687	1.805	1.241
1704	Sugar confectionery (including white chocolate)	3 684	3.7%	3 847	2.4%	163	1.258	0.830	1.044	1.151	0.937	1.078
1210	Hop cones	2 778	2.8%	3 832	2.4%	1 054	1.360	1.014	1.379	1.112	0.765	0.851
1302	Vegetable saps and extracts	1 564	1.6%	3 689	2.3%	2 125	1.528	1.544	2.359	0.966	1.777	1.717
1107	Malt; whether or not roasted	3 525	3.5%	2 925	1.9%	-600	0.962	0.862	0.830	1.039	0.862	0.896
2202	Waters mineral and aerated	323	0.3%	1 656	1.1%	1 333	1.180	4.348	5.129	1.166	2.439	2.844
- other	*17 main goods*	11 034	0.3%	7 063	1.1%	-3 972	1.064	0.601	0.640	1.112	0.883	0.982

Source: own elaboration of the FCSR data (2019), using formulas (1)-(10).

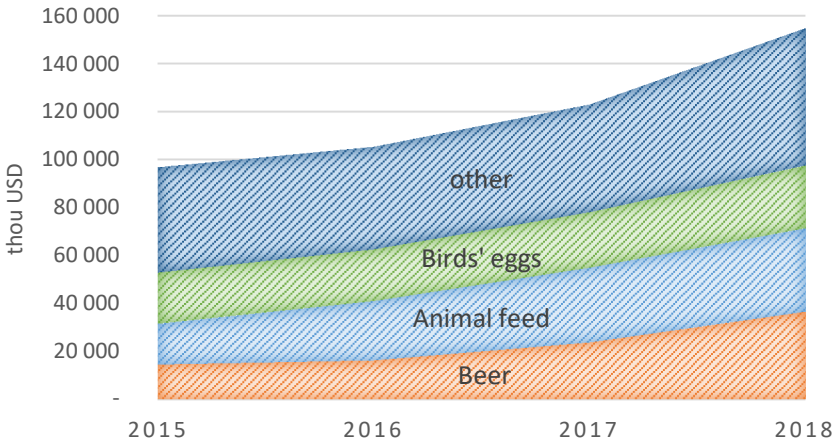

Figure 2. Czech APF in the Russian market: The top three products
Source: own elaboration of the FCSR data (2019).

Table 3. The Russian birds' eggs market: main supplies from non-CIS countries

Groups of countries, countries	thous, USD	Price, USD/kg	Share (vol.)	thous, USD	Price, USD/kg	Share (vol.)
	2017			2018		
	0407 Birds' eggs					
non-CIS	178 561.3	5.28	100.0%	214 658.4	5.59	100.0%
NL	49 055.9	3.94	36.8%	60 308.6	4.28	36.7%
DE	33 516.4	5.43	18.3%	39 028.3	5.89	17.2%
CZ	23 127.1	3.44	19.9%	26 203.6	4.10	16.6%
FR	26 828.3	12.17	6.5%	23 031.8	13.17	4.6%
Other	46 033.6	7.38	18.5%	66 086.1	6.90	24.9%

NL – Netherlands; DE – Germany; CZ – Czech Republic; FR – France.
Source: own elaboration of the FCSR data (2019).

In general, the prospects for growth in the supply of Czech animal feed on the Russian market are not disturbing. Czech producers use modern technology for the manufacture of animal feed, up to the premium segment. These products are in demand and have no Russian counterparts that can satisfy domestic demand.

The first place takes the leader of the APF trade – Czech beer – whose supplies value for 2015-2018 generally rose 2.5 times, with an increase in natural volumes of 2.6 times and a slight decrease in prices (by 2%). We note that in 2018 an average price increase of 5% was recorded with a good increase in natural supplies (1.5 times). The indicated quality of dynamics (all indices are more than one) indicates a steady increase in the competitiveness of Czech beer in the Russian market.

Russian statistics on beer imports from non-CIS countries recorded the Czech Republic's second place in this market with a share of natural supplies in 2018 of 16%. The first and third places were occupied by Germany and Belgium (44% and 9% respectively). As Table 5 shows, the average price of beer from non-CIS countries in 2018 decreased by 4

cents to 1.05 USD/L, including German and Belgian reduction of beer prices by 6 cents, respectively, to 0.97 USD/L and 9 cents to 1.3 USD/L.

Table 4. The Russian market of animal feed: main deliveries from non-CIS countries

Groups of countries, countries	thous, USD	Price, USD/kg	Share (vol.)	thous, USD	Price, USD/kg	Share (vol.)
	2017			2018		
	2203 Beer made from malt					
non-CIS	167 629.6	1.09	100.0%	267 572.7	1.05	100.0%
DE	64 550.6	1.03	40.9%	108 639.3	0.97	44.1%
CZ	23 814.3	0.88	17.6%	36 629.1	0.92	15.6%
BE	20 763.4	1.39	9.7%	30 479.1	1.30	9.2%
LT	5 513.1	0.69	5.2%	10 787.1	0.70	6.0%
GB	10 127.5	1.36	4.8%	15 202.0	1.41	4.2%
Other	42 860.7	1.28	21.7%	65 836.1	1.25	20.8%

FR – France; DE – Germany; IT – Italy; NL – Niderlands; DK – Denmark; CN – China; CZ – Czech Republic; NO – Norway.
Source: own elaboration of the FCSR data (2019).

Table 5. Russian beer market: main deliveries from non-CIS countries

Groups of countries, countries	thous, USD	Price, USD/kg	Share (vol.)	thous, USD	Price, USD/kg	Share (vol.)
	2017			2018		
	2309 Animal feed					
non-CIS	686 911.1	1.83	100.0%	727 080.4	1.99	100.0%
FR	100 495.2	1.99	13.5%	103 758.2	2.28	12.5%
DE	76 989.7	1.71	12.0%	66 319.5	2.02	9.0%
IT	53 292.2	1.68	8.4%	56 169.0	1.89	8.2%
NL	56 491.0	1.94	7.7%	52 222.3	1.98	7.2%
DK	41 987.7	1.43	7.8%	42 185.7	1.58	7.3%
CN	26 658.4	1.11	6.4%	35 396.0	1.47	6.6%
CZ	31 160.1	1.88	4.4%	34 769.1	1.75	5.4%
NO	8 432.3	1.43	1.6%	34 640.7	1.46	6.5%
Other	291 404.5	2.04	38.1%	301 619.9	2.22	37.3%

DE – Germany; CZ – Czech Republic; BE – Belgium; LT – Lithuania; GB – Great Britain.
Source: own elaboration of the FCSR data (2019).

At the same time, the price of Czech beer grew by 4 cents to 0.92 USD/L. As a result, the price gap between Czech and German beer was reduced to 5 cents (in 2017, it equalled 15 cents), which is quite risky and does not correspond to the current dynamics and price structure in the beer market.

According to our estimates, the demand for original Czech beer in the Russian market will continue a growth tendency in both the number of deliveries and prices, since the closest competitors from non-CIS countries still have a price gap for Czech beer. Moreover, it is possible to recommend the supply expansion of premium Czech beer. Judging by the prices for German and Belgian beer, the Russian market is ready to pay more for high-quality original beer brewed and bottled in the Czech Republic.

Furthermore, for group 2203 (beer) the calculations show that the coefficient of deviation of value indicators of mirror data to be higher than permissible values: 1.17 and 1.13

in 2017 and 2018, respectively, instead of the average norm of 1.05. Since beer tops the list of main products (see Table 2), we continued to analyse mirror statistics to discover the possible reasons for this asymmetry.

The Analysis of the Asymmetry of Mirror Data by Quantity on the Example of Beer

The Czech Republic is proud of its national drink, and Czech beer is famous around the world. Moreover, since January 2008, "Czech beer" is a protected designation of the European Union (PGI; protected geographical indication). This mark is considered to be intellectual property and is protected by the EU law in order to preserve the good name and quality of beer produced in the Czech Republic. Moreover, the entry of the designation "Czech beer" in the EU registry provides an opportunity to protect the traditions of Czech brewing and production technology, not to mention prevent the emergence of fakes that breweries could sell as Czech beer and, thereby, abuse the unique qualities of the original product (CAFIA, 2019).

According to the EU protected designation, "Czech beer cannot be considered a product made in the Czech Republic in an unconventional way or produced in the traditional way, but abroad" (Czech beer, 2008). As explained by the Czech Ministry of Agriculture regarding the PGI designation, "the purpose of certification was to clearly identify the specifics of the product under the name "Czech beer". Excluded were drinks made according to the traditional recipe, but not in the Czech Republic, as well as drinks made in the Czech Republic without following the classic recipe" (Our brand, 2009).

Let us analyse the data of mirror statistics for beer. Obviously, when comparing mirror flows, the norm is considered to be an almost complete coincidence of the physical volumes of supplies; a slight difference may be due to possible losses during transportation.

A comparison of Czech exports to Russia (Czech statistics) and Russian imports from the Czech Republic (Russian statistics) on beer in physical terms (in litres) revealed by the following results (Table 6).

Table 6. Mirror comparison of Czech beer data (in litres)

Commodity flows	*2015*	*2017*	*2018*
Russian import from the Czech Republic	15 437 391	27 061 624	39 750 351
Czech export to Russia	15 226 590	24 216 116	37 434 856
Import / Export	101%	112%	106%
Import - Export	210 801	2 845 508	2 315 495

Source: own elaboration of the UN COMTRADE data (2019).

As follows from Table 6, the import of Czech beer to Russia from the Czech Republic was higher than the Czech export of these volumes to the Russian market: in 2015, 2017, and 2018 by 1%, 12%, and 6%, respectively. This unnatural asymmetry of the data indicates that along with the original Czech beer from the Czech Republic, "Czech beer" was also imported to the Russian market from other countries, and the amount of this beer is growing year to year. Over the past two years, the volume of supplies of "Czech beer" not from the Czech Republic generally exceeded the mark of 2 million litres per year and fixed at this level.

Deliveries of goods from one country to another through other countries – including for sale – are not prohibited and are called re-exports. In the final country, according to the methodology of customs statistics and the rule of the country of origin, these goods are

attributed to imports from the first country; in our case, Russian customs refer the volumes of beer re-export to imports from the Czech Republic to the Russian Federation. We do not question the figures of Russian statistics on beer, since these figures are repeatedly checked by the customs and tax authorities of the Russian Federation in the process of calculating customs duties, excise tax, and VAT. Czech statistics do not see these volumes. From this we can conclude that the volume of Czech beer exports to Russia is underestimated in Czech statistics by at least 2 million litres due to the neglect of re-export.

Marketing Strategies for Expanding International Sales at Special Market Prices and Mirror Asymmetry

It is known that re-export often occurs due to the fault of the manufacturer itself, as a result of the implementation of a regional marketing strategy with a special reduction in prices to expand sales and consolidate in the new market; in our case, one of the EU countries. A future re-exporter buys this product and exports it abroad (in our case, to Russia). At the same time, the manufacturer-supplier of goods at a special price may not even know about the existence of a re-exporter. The manufacturer-supplier will report on the successful implementation of the strategy and expand sales in the regional market (EU country), while the re-exporter will also expand his business and be proud of his personal sales success; in our case, in the Russian market. As a result, it is precisely on the Russian market that two sellers of the same product compete, while a re-exporter has more opportunities to lower prices on this market than the original manufacturer. It is practically impossible to counteract such unfair competition, since the re-exporter legally acquired the goods and legally supplies them for export. There is only one exception: if a beer has an Intellectual Property (IP) marking – registered trademark, including the one protected in the EU by the PGI designation or similar – it is equivalent to a trademark in the legislative area. Thus, in the absence of permission from the copyright holder, re-export turns into parallel imports, the counteractions of which are quite well known, including in judicial practice. In this case, the copyright holder may hold the seller liable for the sale of goods without his consent to the export ban and significant fines (Losev, 2019).

Therefore, the marketing services of Czech beer producers in the Czech Republic must take into account the indicated features of the Czech beer trade with IP-marking when preparing plans (marketing strategies) for expanding regional sales with a special price for the product.

For beer without an IP marking, low prices can provoke the organisation of re-export of goods, including with unfair competition in the foreign market of the same product. In this case, it is almost impossible to identify a re-exporter and oppose re-export, which is what Czech producers must take into account up to and including refusal of such trading schemes. For beer with an IP marking, the actions of the re-exporter are unlawful – they violate intellectual property rights – and can be classified as the organisation parallel import by unauthorised copyright holders. Here, re-export can be suppressed by customs and prohibited by the court. On the Russian market for beer in particular, the IP marking (PGI Czech beer) should be included in the register of intellectual property of the FCS of the Russian Federation. So far as we know, this is not the case, and PGI Czech beer intellectual property rights are not protected on the Russian market.

At the same time, large international companies provide legal protection for parallel imports through registered brands and trademarks. For example, in Russia, lawsuits by

Heineken (the owner of the Krušovice brand) were satisfied against parallel importers of Krušovice beer to the Russian market with compensation for losses and the prohibition of importing beer without permission from the Heineken copyright holder (Parallel import, 2013). However, small Czech breweries that produce PGI-labelled beer should also be able to protect their Intellectual Property (IP) when exporting to the Russian market. So far, PGI marking as an IP-object for markets outside of the EU remains a decoration element.

The Czech state should not remain aloof from the problems of national business and provide assistance in registering and maintaining the PGI-marking Czech beer on the Russian market. The Czech state should work to activate the intellectual property factor when exporting Czech PGI beer to the market of the EAEU countries (Russia, Belarus, Armenia, Kazakhstan, and Kyrgyzstan), so that the Czech national world-quality product can earn more revenue for both the state and producers-copyright holders of the PGI-marking, through which the traditions and technologies of unique Czech brewing are legally protected and supported.

Thus, we achieved the goal of the study. We showed the possibilities of using mirror statistics to identify export problems of APF to the Russian market. Within the framework of the study, we proved the methodological acceptability of using mirror statistics for research tasks and conducted an analysis of the supply of the most important Czech APF products to Russian market. We developed recommendations for expanding their sales taking into account prices for similar products imported to the Russian market from other countries were developed. Moreover, the study identified a new problem of beer (trade leader) re-export at the macro level, investigated its root causes, and prepared recommendations for Czech statistics: the need to adjust statistics and increase beer export volumes to Russia by taking re-export into account. Moreover, we formulated recommendations to expand trade in the Russian market for business and trade policies based on the reinforcement of the role of the intellectual property factor.

The conducted research is original. Prior to this research, there were no studies that would use mirror statistics as an additional database and tool for identifying export problems unobserved by national statistics.

CONCLUSIONS

The analysis of a country's exports is traditionally based on national statistics. However, the analysis of the same stream on the basis of the host country's mirror statistics in the form of its imports is no less important.

In mirror statistics, the export of goods from one country to another should theoretically be equal to the import of goods to the latter country from the former one, and vice versa. However, the mentioned trade volumes usually differ in practice. The asymmetry of the data is due to the difference in prices of the recorded flows. As is known, according to the customs statistics methodology, the value of exporting goods of country A is represented in FOB prices, while that of imported goods – at CIF prices, which additionally includes the costs of insurance and transportation of goods. Moreover, the asymmetry of mirror data can also be associated with various errors in determining the customs value, masking shadow operations and capital flight.

Currently, the general view of expert statisticians on the accuracy of data collected by customs offices is that import data are more reliable than export data, because customs services are more serious about recording imported goods for the purpose of tariff

revenue collection, taxes, etc. This fact was confirmed by us on the example of the import of Czech APF goods to the Russian market. The mirror comparison of APF trade data showed a generally normal situation with an average valuation excess of CIF prices over FOB by an average of 6%, which is comparable to the ratio of 1.0588 of the Central Bank of Russia for calculating the balance of payments for non-CIS countries. Based on the results, we concluded that – taking into account the methodologically permissible differences in the mirror data – statistics on Russian imports can be used to analyse the export of Czech APF goods to the Russian market.

To analyse the supply of Czech APF to the Russian market, we proposed algorithms for aggregating and disaggregating FT-indices based on the Laspeyres formula. The aggregation algorithm allows us to calculate the total FT-index, including by the group of goods. The disaggregation algorithm allows for the isolation of additional groups of goods and the calculation of group indices by recounting the remaining aggregated indices without involving goods outside of the selected group.

For the 2015-2018 interval, using the database of the Federal Customs Service of the Russian Federation, we compiled a list of 29 main products (sample depth 99%) and their FT-indices, including the indices of the 12 main products (94%) with the highest weight and the top three (62 % of trade).

The analysis showed that the Czech Republic in APF trade in 2018 could achieve and overcome the historical maximum of trade in 2014; i.e. after the introduction of Russian countersanctions on agricultural products in August 2014. The basis of growth was formed by the upward (increasing) dynamics of supply growth: FT-indices of the group of 12 main goods were more than one, i.e. the increase in the value of supplies of the group was ensured by a simultaneous increase in prices and natural supplies. Herewith, the top three in four years provided more than 70% of the increase in the value of APF supplies to the Russian market.

For the three leaders, we conducted a market analysis of similar goods supplied from non-CIS countries and formulated recommendations on trade development. Thus, for position 0407 (birds' eggs), we noted that it holds one of the lowest prices among competitors in the market and recommended the further increase of trade volumes on the basis of rising prices that are below the average market price. The dynamics of supply growth at position 2309 (animal feed) is not a concern. However, the analysis showed that prices for all suppliers are rising, while prices for Czech products in 2018 fell below the average market level. Therefore, we recommended to increase trade volumes on the basis of rising prices and expanding the supply of premium feeds in demand on the Russian market, the production technologies of which have been mastered in the Czech Republic. For position 2203 (beer), the quality of supply growth (all indices are greater than one) indicates a growing demand for products. The price of Czech beer is lower than the market average and the prices of the closest competitors from Germany and Belgium, so they can be increased, since the Russian consumer is willing to pay more for the original Czech beer.

In conclusion, mirror data comparison of beer in litres showed that beer exports from the Czech Republic were significantly lower than Czech imports registered by Russian customs. First of all, this difference in mirror data reveals that Czech beer exports to Russia in the Czech statistics are underestimated by at least 2 million litres, due to the neglect of re-exports (in volumes in litres, re-export flow is comparable to beer trade in countries such as

Finland, Netherlands, Austria, or Poland). These deliveries pose a real threat of unfair competition on the Russian market for the same product at different prices from a direct supplier and the re-exporter who legally bought the product on the market of one of the EU countries with a special reduced price. Czech companies can only protect themselves from such re-export schemes if the beer has an IP-marking registered on the Russian market.

For business, we recommend to form special prices for external markets taking an unfair competition into account, while developing marketing strategies. In the case of uncontrolled sales strategies, there is a high risk of overall losses due to the re-export of cheaper beer. If there is a registered intellectual property trademark (PGI-mark), one should apply the possibility of legislative restriction and prohibition of deliveries to the Russian market due to the lack of permission of the manufacturer-holder of the intellectual property trademark.

For trade policy, we deem necessary state-level action aiming to enhance the intellectual property factor in the production and export of Czech beer – assistance in registering trademarks and PGI-marking Czech beer on the Russian market – so that Czech beer producers who use traditional technologies can get fair profit for the quality of their goods and have the opportunity to defend themselves against unfair competition in export.

In our opinion, an analysis of the post-sanctioned development of APF trade in the countries of the Visegrad Group – in which Poland occupies the first place in terms of trade volume – could be an interesting area for future research.

REFERENCES

Bartóková, L. (2019). The position of agriculture and food sector in V4 countries. *Agris on-Line Papers in Economics and Informatics, 11*(3), 13-22. https://doi.org/10.7160/aol.2019.110302

BOPR-C (2018). Balance of payments of the Russian Federation: Commentary to the data comparison tables of the external merchandise trade mirror data, 1-3. Retrieved from http://www.cbr.ru/Content/Document/File/71650/mirror_e.pdf on February 28, 2020.

BOPR-CMD (2019). Comparisons of mirror data on external merchandise trade of the Russian Federation with the rest of the world data. Retrieved from http://www.cbr.ru/eng/statistics/macro_itm/svs/ on February 28, 2020.

Bogdanova, E., & Chuplanov, A. (2010). *Customs statistics of foreign trade*. St. Petersburg: St. Petersburg State University of Information Technologies, Mechanics and Optics. Retrieved from http://window.edu.ru/resource/742/72742/files/itmo491.pdf on February 28, 2020.

Borák, J., & Vacek, T. (2018). Czech foreign wine trade – Comparative Advantages Distribution in relation to the European Union. *Agris on-Line Papers in Economics and Informatics, 10(3)*, 31-43. https://doi.org/10.7160/aol.2018.100303

CCSKR (2014). *Comparative customs statistics of the Kyrgyz Republic: 2008-2012.* Bishkek: UNPD. Retrieved from http://www.kg.undp.org/content/kyrgyzstan/en/home/library/democratic_governance/comparative-customs-statistics-of-the-kyrgyz-republic--2008-2012.html on February 28, 2020.

CAFIA (2019). List of breweries using the PGI designation "Czech beer". Retrieved from https://www.szpi.gov.cz/en/docDetail.aspx?docid=1004209&docType=ART&nid=&chnum=11 on February 28, 2020.

Czech beer (2008). Czech beer produced in other countries will not be considered Czech. Retrieved from https://m.fontanka.ru/2008/08/06/108/ on February 28, 2020.

DOTS (2018). Direction of trade statistics quarterly 12/2018. Retrieved from https://data.imf.org/?sk=9D6028D4-F14A-464C-A2F2-59B2CD424B85 on February 28, 2020.

EIFRF (2003). *Export-import flows of the Russian Federation (Comparison of customs statistics of the Russian Federation and OECD international trade statistics)*. Moscow: the Russian Academy of Science, Institute of World Economy and International Relations.

FCSR (2019). Customs statistics of foreign trade of the Russian Federation Database. Retrieved from http://stat.customs.ru/apex/f?p=201:10: 334428385228299::NO on February 28, 2020.

Ferto, I. (2018). Global agri-food trade competitiveness: Gross versus value added exports. *Agris on-Line Papers in Economics and Informatics, 10*(4), 39-47. https://doi.org/10.7160/aol.2018.100404

Hamanaka, S. (2011). Utilizing the Multiple Mirror Technique to Assess the Quality of Cambodian Trade Statistics. *ADB Asian Development Bank Working Paper Series on Regional Economic Integration, 88*. Retrieved from https://www.adb.org/sites/default/files/publication/30401/reiwp-088.pdf on February 28, 2020.

IEMD (2018). Imports, Exports and Mirror Data with UN COMTRADE. Retrieved from https://wits.worldbank.org/wits/wits/witshelp/content/data_retrieval/T/Intro/B2.Imports_Exports_and_Mirror.htm on February 28 on February 28, 2020.

IMTS (2013). *International Merchandise Trade Statistics: Compilers Manual.* Retrieved from https://unstats.un.org/unsd/trade/eg-imts/IMTS%202010%20(English).pdf on February 28, 2020. https://doi.org/10.18356/baa992f0-en

Javorsek, M. (2016). Asymmetries in International Merchandise Trade Statistics: A case study of selected countries in Asia-Pacific. *UN ESCAP*, *19*. Retrieved from https://ec.europa.eu/eurostat/documents/7828051/8076585/Asymmetries__trade_goods.pdf on February 28, 2020.

Korolev I., Zhukovskaya V., Trofimova I., & Chertko T. (2007). "Mirror" statistics of import of consumer goods. *Questions of Statistics, 2*, 25-34.

Losev, S. (2019). On the issue of exhaustion of exclusive rights and “parallel import”. Retrieved from https://ilex.by/k-voprosu-ob-ischerpanii-isklyuchitelnykh-prav-i-parallelnom-importe/ on February 28, 2020.

Mantusov, V., & Tebekin. A. (2015). Problems of assessing the completeness of the collection of customs payments. *Bulletin of the Russian Customs Academy*, *4*, 7-17.

Mantusov, V., & Tebekin, A. (2016). Improving methodological recommendations for a comparative analysis of data on foreign trade of the Russian Federation. *Bulletin of the Russian Customs Academy, 1*, 7-19.

Markowicz, I., & Baran, P. (2019). ICA and ICS-based rankings of EU countries according to quality of mirror data on intra-Community trade in goods in the years 2014-2017. *Oeconomia Copernicana*, *10*(1), 55-68. https://doi.org/10.24136/oc.2019.003.

Our brand (2009). *Our brand in Europe. Czech Republic – panorama*. Retrieved from: http://czpanorama.ru/content/view/404/35/ on February 28, 2020.

Parallel import (2013). *Influence of parallel import restriction on product markets of the Russian federation*. Retrieved from: http://www.eurasiancommission.org/ru/act/finpol/dobd/intelsobs/Documents/Итоговый%20Отчет%20ФОНДА%20ЦСР.pdf on February 28, 2020.

Pushkin, N., & Yurik, S. (2018). Index Methods for Analysis of Commodity Groups of Foreign Trade. *Proceedings of 18th International Joint Conference: Central and Eastern Europe in the Changing Business Environment, 352-361*. Retrieved from https://ceeconference.vse.cz/wp-content/uploads/2018/05/proceedings2018.pdf on February 28, 2020.

Seltsovsky, V.L. (2009). The problems of comparability of statistics in Russia's foreign trade. *Russian Foreign Economic Bulletin*, *2*, 42-49.

Szczepaniak, I. (2019). Changes in comparative advantages of the Polish food sector in world trade. *Equilibrium. Quarterly Journal of Economics and Economic Policy*, *14*(3), 463-480. https://doi.org/10.24136/eq.2019.022

Troshina, L.N., & Kislitsyna, M.A. (2008). Mirror comparisons of imports in foreign trade statistics. *Money and Credit, 2*, 32-34.

UN Comtrade Database (2019). Retrieved from https://comtrade.un.org on February 28, 2020.

Valiev, V. (2016). Problems in data comparability in mutual trade. *Fundamental Research*, *12(1),* 140-148. Retrieved from https://www.fundamental-research.ru/ru/article/view?id=41061 on February 28, 2020.

Yurik, S. (2017). Foreign trade of the Czech Republic and Eurasian Economic Union in agricultural and food market: additional tools for analysis. *Proceedings of Agrarian perspectives XXVI: competitiveness of European agriculture and food sector. Proceedings of the 26th international scientific* conference, 439-447. Retrieved from https://ap.pef.czu.cz/dl/58880?lang=en on February 28, 2020.

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Sovereign Credit Rating Determinants of the EU Countries: The Role of the Euro Area Crisis and Its Legacy

Ewa Stawasz-Grabowska

ABSTRACT

Objective: The objective of the article is to identify the determinants of the EU countries' sovereign credit ratings with a particular focus on the impact of the euro area crisis.

Research Design & Methods: The study is conducted for the 28 EU countries for the years 2004-2018. The research period is later divided into pre-crisis, crisis, and post-crisis subperiods. The frequency of data is yearly, and panel error correction model is used as the main research method.

Findings: The study shows that the role of individual credit rating determinants differed in the distinguished subperiods. In particular, the condition of the banking sector seems to have gained in importance after the outbreak of the euro area crisis and remained high in the post-crisis years. At the same time, the status of being a euro area member, which negatively affected countries' ratings during the crisis, switched again to positive in the post-crisis period. Its effect is however much weaker than before 2008.

Implications & Recommendations: EU/euro area countries should continue reforms aimed at weakening negative feedback loops between banks and sovereigns. Based solely on the rating criterion, it seems that non-euro area EU members are not necessarily better off staying on the side-lines of the European integration process.

Contribution & Value Added: The study extends the literature on the determinants of sovereign credit ratings by showing how the role of individual factors might change depending on varying economic conditions, and by taking into account the specific context of the euro area crisis.

Article type: research article

Keywords: sovereign credit ratings; euro area crisis; banking sector stability

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INTRODUCTION

Sovereign credit ratings are used as measures of countries' ability and willingness to pay their debt obligations in full and on time. These assessments, which are provided by credit rating agencies (CRAs), have gained in importance over the past few decades due to financial integration and globalization of capital markets. Countries care about the best possible ratings as they largely determine the terms and extent of these countries' access to international financial markets. Moreover, the sovereign credit rating constitutes the benchmark for ratings given to various domestic entities such as banks and companies. This sovereign ceiling policy, as it is described in literature, has been found to be still applicable, especially towards emerging countries and distressed advanced economies, despite CRAs' declarations of its abolishment (cf. Luitel, Vanpée, & De Moor, 2016). Finally, sovereign credit ratings are closely monitored by institutional investors, and in particular those that are legally bound to take into account the quality of assets when constructing investment portfolios.

In their assessments, CRAs use a wide set of quantitative and qualitative variables relating to different categories of sovereign credit risk (macroeconomic, institutional, political, etc.). And although these factors are revealed, the rating process still lacks transparency. In particular, there is no concrete knowledge of weights assigned to individual variables, nor their possible variability due to, for example, countries assessed (e.g. developed vs. developing economies) or prevailing economic conditions (e.g. crisis vs. non-crisis situation). Moreover, the final decisions on credit ratings might differ from what is implied by quantitative and qualitative analyses as they are subject to judgmental adjustments of credit rating committees (De Moor, Luitel, Sercu, & Vanpée, 2018). Hence, numerous studies aim to identify and model the determinants of sovereign credit ratings.

This paper aims to identify the determinants of sovereign credit ratings of European Union (EU) countries, with a particular focus on the impact of the euro area crisis. The panel error correction model is used as the main research method. This study contributes to the existing literature in at least three ways, with a common denominator that is strongly embedded in the European context. First, next to economic and political aspects, which are traditionally considered in studies of this nature, the set of explanatory variables includes a factor reflecting the condition of a banking sector. This approach seems justified given the size and importance of the EU banking sector and the fallout of the euro area crisis, which was characterised by a negative feedback loop between banks and sovereigns. Surprisingly, the role of risk transfer from banks to sovereigns in shaping the latter's rating scores has been little explored, with only a handful of analyses solely devoted to EU economies. Taking the European perspective, this study gives particular attention to the level of non-performing loans (NPLs) as a measure of banking sector risk. The problem of NPLs was particularly acute in the euro area, so much so that its addressing was flagged as "one of the key priorities for ECB Banking Supervision since its inception," having been recognised as "critical to restoring confidence in the euro area banking system and the wider economy" (ECB, 2019).

Second, this study takes into account the specific course of the crisis in the European Economic and Monetary Union (EMU), which differed in comparison to the one observed in the United States and other parts of the world. More specifically, three subperiods are ana-

lysed: pre-crisis (2004-2007), crisis (2008-2012), and post-crisis (2013-2018). The demarcation between the last two is the most distinctive as it relates to the European Central Bank's (ECB) acceptance of the role of lender of last resort in the second half of 2012 and the consequent reduction in stress in the EMU. By focusing on this periodization, this study will determine if and how the role of individual rating drivers changed under diverse economic conditions along with the changing architecture of the EU/euro area financial safety net.

Third, this study addresses the status of (non-)euro area members as an important determinant of the rating assessments of the EU countries. The findings offered by this study will add fresh insight to the existing literature on the costs and benefits of joining a common currency area such as the EMU. Research into this effort was initiated by Reusens and Croux (2017), who provide evidence that the effect of Eurozone membership switched from positive to negative after the outbreak of European debt crisis in 2009. This study aims to investigate whether there was another change after 2012 when the tensions in the EMU largely receded and the EU/euro area financial safety net underwent many changes related to its pre-crisis shape.

This paper is structured as follows. The introduction precedes a review of the literature on the determinants of sovereign credit ratings. The next section describes the data and explains the methodology used. Then, the empirical results are discussed and some political implications are offered. The main findings of the study are summarised in the concluding section.

LITERATURE REVIEW

There are a large number of studies that have aimed to identify the determinants of a country's credit rating. Different factors have been found to play a role depending on countries and time periods considered as well as estimation methods used. A chronological overview of existing literature allows us to distinguish the following lines of research.

The initial studies concentrated mainly on the role of quantitative macroeconomic variables in explaining sovereign credit ratings. In the seminal paper of Cantor and Packer (1996), six variables have been found statistically significant, i.e.: per capita income, GDP growth, inflation, external debt, level of economic development, and default history. Somewhat surprisingly, the authors did not identify any systematic relationship between ratings and fiscal stance. Subsequent studies confirmed to a large extent the findings of Cantor and Packer (1996) and/or pointed to a slightly larger explanatory power of external variables (cf. Monfort & Mulder, 2000; Afonso, 2003; Bissoondoyal-Bheenick, 2005).

Over time, next to macroeconomic indicators, more and more attention was given to institutional and political factors as potential determinants of sovereign credit ratings. For example, Connolly (2007) shows that higher governmental corruption has a negative impact on sovereign rating scores. This finding particularly pertains to low-income countries with poor regulatory framework and those that have not been a former British colony (as the rule of English law is believed to provide an institutional framework, lessening corruption). The statistically significant effect of corruption has also been found by, among others, Mellios and Paget-Blanc (2006), Amstad and Packer (2015), and Teixeira, Silva, Ferreira, and Vieira (2018). Other authors provide evidence that the quality of institutions, which is often approximated by the six governance indicators reported by the World Bank, is an important driver of sovereign ratings (cf. Erdem & Varli, 2014 or

Ozturk, 2014). The findings of those studies should be of particular interest to developing economies, as they suggest that the rating gap with regard to developed countries can be narrowed through the enhancement of institutions. Further, the institutional strength of monetary authorities has also been found to play a role. For example, Montes and de Oliveira (2016) identify the introduction of inflation targeting as a very relevant factor enhancing sovereign creditworthiness assessment of CRAs. This is due to the fact that the adoption of this policy framework is associated with greater levels of accountability, transparency, and independence of a country's central bank, which should translate into a more effective monetary policy. Similarly, central bank independence turns out to be significant in the study of Soudis (2016).

A large number of research studies find different sets of sovereign rating determinants for different groups of countries. The level of the country's economic development is the most commonly used criterion of division. For example, Afonso (2003) finds that GDP per capita is the sole important economic variable when explaining credit ratings for developed economies. In turn, for developing economies, external debt turns out to be statistically significant. Similarly, Bissoondoyal-Bheenick (2005) concludes that GNP per capita and inflation play an important role for high-rated countries with a long financial stability history, while ratings of low-rated economies are additionally influenced by the current account balance and the level of foreign exchange reserves. In a study solely devoted to the euro area countries, Boumparis, Milas, and Panagiotidis (2017) show that GDP per capita is a major driver of high-rated countries. It follows that countries with high levels of GDP per capita take advantage of a kind of "protection" against potential downgrades. At the same time, low-rated countries are under the stronger influence of the unemployment rate, regulatory quality and competitiveness.

Membership in a given economic integration group is another commonly used criterion of division. For example, Chodnicka-Jaworska (2015) applies the following political divisions to a sample of 45 European economies: EU and non-UE countries, euro area and non-euro area members, CEE countries. Among other factors she finds that changes in GDP growth are of key importance for the credit rating assessment for countries remaining outside the EU. In another study, Reusens and Croux (2017) investigate the time varying weights attached by CRAs to different factors in their decision-making process over the years 2002-2015. One of their main findings is that after the outbreak of the European debt crisis, the effect of being a euro area member switched from positive to negative.

Some authors go one step further and devote their analyses to the issue of bias in the CRAs' rating of sovereign debt. A growing number of such studies, and particularly those carried out after the outbreak of the 2007/2008 global financial crisis, indicate the existence of such a phenomenon. For example, Gültekin-Karakaş, Hisarcıklılar, and Öztürk (2011) find that CRAs give higher ratings to developed economies regardless of their macroeconomic fundamentals. Tennant, Tracey, and King (2020) provide evidence of a statistical bias against poor countries, which entails that it is more difficult for them to get an upgrade for any given favourable changes in institutional and macroeconomic fundamentals. The results obtained by Reinhart (2002) and Reusens and Croux (2017) suggest that discrimination against developing economies might deepen after crises. The conclusions stemming from other studies imply that the US as well as countries which are close to the US in economic, geographical, and political terms receive higher ratings (cf. Yalta & Yalta,

2018; De Moor *et al*., 2018). In this context, Luitel *et al*. (2016) observe that American rating agencies favour countries that are in high voting coincidence with the US in the UN General Assembly. Conflicting results are provided by Ozturk (2014), who suggests that lower ratings of developing economies do not result from any discrimination on the side of CRAs, but rather from poor quality of their institutions. Similarly, Amstad and Packer (2015) identify no signs of bias against any groups of countries.

Analysis of the existing literature shows that financial sector stability has been rarely accounted for in research on the determinants of sovereign credit ratings. Surprisingly, this also pertains to a large number of analyses conducted after the outbreak of the 2007-2008 crisis. Among this scarce literature, Aktug, Nayar, and Vasconcellos (2013) – using a large set of advanced and developing economies – show that concentration in the banking sector and increased liquid reserves of the banking system are likely to exert a negative impact on ratings, while larger financial systems are associated with lower sovereign risk. Somewhat conflicting results were obtained by Sehgal, Mathur, Arora, and Gupta (2018) who conclude that because larger banking systems are more vulnerable to systemic risk, they are more likely to weigh on the country's rating.

Further, in a study devoted to the EU countries from 1999 through 2014, Brůha and Kočenda (2018) investigate the impact of various banking sector characteristics on four different indicators of sovereign risk, including credit ratings. They show that NPLs are the single most influential sector-specific variable, the increase of which is likely to adversely affect sovereign risk assessment. Boumparis, Milas, and Panagiotidis (2019), using a panel of 72 countries from 1998 through 2016, identify a feedback loop between sovereign credit ratings and banking risk factors. Finally, Chari, Garcés, Martínez, and Valenzuela (2019) investigate the relationship between financial fragility, global factors, and sovereign credit risk in a group of emerging market economies. They introduce a new metric of financial fragility, which computes the direct costs of bailing out the whole banking sector, and show that there is a negative correlation between the metric and sovereign credit ratings.

Based on the literature review, as well as accounting for the course of the crisis in the EMU and the changes introduced to the EU/euro area financial safety net since the crisis, the following hypotheses have been formulated.

H1: Next to the macroeconomic and institutional variables, the factors reflecting financial stability risk have additional explanatory power for sovereign ratings in the EU countries.

H2: Since the outbreak of the crisis, there has been an increase in the role of banking sector stability in explaining the sovereign ratings of the EU countries.

H3: When the financial safety net was enhanced, the status of euro area members regained positive effect on the sovereign ratings in the post-crisis years.

MATERIAL AND METHODS

The study is conducted for the 28 EU countries, out of which 19 use the euro and 9 remain outside the common currency area, for the years 2004-2018[1]. The lower boundary relates to the year of the largest EU enlargement, when 10 countries, mainly from Central and

[1] Since the research period ends in 2018, the United Kingdom is counted as an EU member.

Eastern Europe, became the EU members. The choice of the upper boundary was conditional on the availability of data at the time of the study. The frequency of data is yearly. The study employs the rating classification of Standard & Poor's (S&P) to construct the dependent variable. A detailed description of the variables used in the study as well as research methodology is presented below.

S&P's credit rating system and the dependent variable

The credit rating industry is dominated by three big agencies, i.e. S&P, Moody's, and Fitch Group. To generate the dependent variable, the credit rating decisions of S&P will be used. The choice of this rating agency was dictated by the following considerations. First, S&P has been found to be most active in making credit rating changes, which allows for obtaining a larger data set. Second, S&P's ratings are known to precede those of the other two rating agencies. Third, they are less anticipated by market participants and therefore evoke a stronger market reaction (for all three arguments, cf. Gande & Parsley, 2005; Christopher, Kim, & Wu, 2012; Ballester & González-Urteaga, 2017).

S&P distinguishes four main credit rating scales: A, B, C, and D. "AAA" is the highest rating and indicates an obligor's "extremely strong capacity to meet its financial commitments". "SD" and "D" are the lowest credit ratings. The first is assigned when an obligor is believed to have selectively defaulted on part of its financial obligations. An obligor rated "D" is believed to fail to meet (substantially) all of its obligations in a timely manner. To differentiate among issuers within the rating categories, S&P uses plus (+) and (-) signs. Those modifications are applied to ratings from "AA" to "CCC" categories[2]. Like in a number of previous studies, the ratings are transformed to a scale from 1 to 21 ("SD"/"D" to "AAA") as detailed in Table 1.

Furthermore, S&P uses rating outlooks in its assessment of potential changes to long-term credit rating over the intermediate term (from six months to two years). In particular, an outlook can be positive, negative, or stable. To account for outlook changes, 1/3 is added to (subtracted from) the numerical value assigned to a given rating in case of a positive (negative) outlook. That way, to give an example, a "BB" rating with a positive outlook will be transformed to 10 and 1/3, while a "BB" rating with a negative outlook will be transformed to 9 and 2/3.

Finally, unlike in many previous studies which take into account end-of-year observations, the rating variable for a given country in a given year is created as the average of numerically expressed ratings and outlooks assigned by S&P for that country in that year. Such a construction of the dependent variable allows for the inclusion of all changes introduced by S&P throughout the year[3]. S&P's credit ratings and outlooks have been collected from Thomson Reuters Eikon database.

[2] Retrieved from https://www.standardandpoors.com/en_EU/web/guest/article/-/view/sourceId/504352 on November 11, 2019.

[3] For example, on 16 June 2017, S&P changed its credit rating for Slovenia from A with positive outlook (set at that level in December 2016) to A+ with a stable outlook. The next revision took place only in 2018. Thus, the value of 16 and 1/3 is applied for the days between the beginning of 2017 and June, 15 2017, and the value of 17 is applied for the days from June 16, 2017 till the end of 2017. Hence, the rating variable for Slovenia in 2017 is 16.70, which is calculated as the average from daily data.

Table 1. The linear transformation of S&P's long-term issuer credit ratings

Category	Rating description	Rating	Transformation
Investment grade	Prime	AAA	21
	High grade	AA+	20
		AA	19
		AA-	18
	Upper medium grade	A+	17
		A	16
		A-	15
	Lower medium grade	BBB+	14
		BBB	13
		BBB-	12
Speculative grade	Non-investment grade speculative	BB+	11
		BB	10
		BB-	9
	Highly speculative	B+	8
		B	7
		B-	6
	Substantial risks	CCC+	5
		CCC	4
		CCC-	3
	Extremely speculative	CC	2
	In default/ in default with little prospect for recovery	D/SD	1

Source: own elaboration based on https://countryeconomy.com/ratings; retrieved on November 9, 2019.

Explanatory variables

The set of explanatory variables consists of traditionally considered macroeconomic and institutional factors, as well as factors reflecting financial stability risk which are specific to the EU context and have been given little attention in prior research. Its construction was also dependent on data availability. The list of explanatory variables with their definitions, sources and expected sign of the effect on the credit rating are presented in Table 2.

In general, an improvement in macroeconomic fundamentals is expected to exert a positive impact on the dependent variable. More specifically, an increase in GDP growth, GDP per capita, investment, as well as an improvement in general government (GG) balance should be conducive to higher ratings, while an increase in GG debt, private debt, inflation, and unemployment is expected to work in the opposite direction. The impact of two external variables, i.e., the CA variable and the Openness variable, on the credit rating seems ambiguous. In the case of the former, on the one hand, current account (CA) deficits might indicate a country's competitiveness problems. On the other hand, as the CA also reflects the difference between national savings and investment, a CA deficit might be indicative of a higher rate of investment and point to a highly productive and fast-growing economy[4]. Regarding the Openness variable, it

[4] Retrieved from https://www.imf.org/external/pubs/ft/fandd/basics/current.htm#author on November 11, 2019.

can be argued that countries that do not honour their payment obligations can be "punished" via disruptions in trade. Hence, higher openness should be conducive to lower sovereign risk. On the other hand, more open economies are more vulnerable to external shocks, which, in times of heightened stress, may increase their default risk (cf. Ramlall, 2016).

Referring to the institutional and qualitative factors, better governance and a higher level of economic sentiment are likely to exert a positive impact on the rating. When it comes to the Default history variable, a negative sign of the corresponding coefficient is expected since sovereigns that have defaulted on their debt in the recent past are considered riskier. Similar reasoning pertains to the Assistance variable. During the crisis, several EU countries were beneficiaries of financial assistance granted at the level of euro area/EU and – in most cases – the International Monetary Fund (IMF). As countries applying for such assistance most often experience serious market turbulences and loss of access to market sources of financing, a negative sign of the parameter estimate is expected. Finally, NPLs are used for assessing financial stability risk. They weigh on banks' profitability and limit their capacity to grant new loans, thus undermining future growth prospects. Hence, the predicted effect of the NPL variable on the rating is negative.

Table 3 presents some basic descriptive statistics. In the years 2004-2018 the median rating for all EU countries amounted to 17.00, which corresponds to A+. The lowest rating of 2.91 was observed in Greece in 2012. The maximum value of 21.00 was reached by a dozen countries, though only Denmark, Germany, Luxembourg, and Sweden retained the triple-A rating over the whole period considered. Moreover, the mean rating of the euro area countries is higher than the one of non-euro area EU members. Nonetheless, that difference has clearly narrowed since the outbreak of the crisis (cf. Figure 1).

Table 3 also shows that the EU countries were marked by substantial heterogeneity in wealth per capita and other macroeconomic variables. The median GDP per capita (PPP-based) was 32 743.24 USD. The minimum value of 12 150.07 USD was obtained for the poorest country, Bulgaria, in 2004, while the maximum value of 98 537.42 USD belonged to the richest country, Luxembourg, in 2007.

Among qualitative and institutional indicators, the Governance variable ranged from -0.01 to 1.96. Both boundaries were recorded in 2004 – the lowest in Romania and the highest in Finland. In general, higher values of that variable were observed in the euro area, which was particularly evident in the years preceding the crisis. The Default history variable adopts the value of one in the case of Greece and Cyprus from 2012 and 2013 onwards, respectively. The Assistance variable takes on the value of one in the case of five euro area countries (Greece, Ireland, Portugal, Spain, and Cyprus) as well as three (at that time) non-euro area EU members (Hungary, Latvia, and Romania), all of which benefited from different forms of official financial aid during the crisis.

Finally, the distribution of the NPL variable exhibits positive skewness. The problem of NPLs was particularly evident in the peripheral euro area countries, specifically Cyprus, Greece, Italy, and Ireland. The maximum value of 47.75% was observed in Cyprus in 2015. The countries with the lowest ratios of NPLs were Luxembourg, Finland, and Sweden.

Table 2. Explanatory variables: definitions, sources, and the expected sign of their impact on credit ratings

Variable	Definition	Source	Sign
GDP growth	Real GDP growth rate	Eurostat	+
GDP per capita	Gross domestic product per capita, constant prices (PPP, international dollars)	WEO Database October 2019	+
GG balance	General government surplus/deficit (% of GDP)	Eurostat	+
GG debt	General government debt (% of GDP)	Eurostat	-
Private debt	Private sector debt, consolidated (% of GDP)	Eurostat	-
Inflation	HICP inflation rate	Eurostat	-
Investment	Gross fixed capital formation (% of GDP)	Eurostat	+
Unemployment	Unemployment rate	Eurostat	-
CA	Current account balance (% of GDP)	Eurostat, WEO Database October 2019	+/-
Openness	Sum of exports and imports of goods and services (% of GDP)	World Bank	+/-
Default history	Binary variable adopting the value of 1 if a country has defaulted on its debt in the past; 0 otherwise[a]	Moody's (2017)	-
Governance	The mean of 6 indices of the World Bank reflecting different dimensions of governance: voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, control of corruption. The mean might adopt values from the range -2.5 (weak governance) to 2.5 (strong governance).	World Bank and author's calculations	+
ESI	Economic Sentiment Indicator	Eurostat	+
Assistance	Binary variable adopting the value of 1 in the years when a given country received financial assistance from the ESM, the EFSF, the EFSM[b], the EU balance of payments assistance facility and/ or the IMF; 0 otherwise	EU Commission-State Aid Database	-
NPL	Bank non-performing loans to gross loans (%)	World Bank, FRED	-

[a] If the country defaulted on its debt after 2004, 1 is assigned to the year of the default and to subsequent years.
[b] ESM, EFSF, EFSM stand for European Stability Mechanism, European Financial Stability Facility, and European Financial Stabilisation Mechanism respectively.
Source: own study.

Econometric model

The relationship between the sovereign ratings and their determinants have been modelled with the use of different econometric techniques. Due to the adopted character of the dependent variable, two main approaches can be identified. The early studies employed linear regression techniques that assume the cardinality of the sovereign ratings (cf. Cantor & Packer, 1996; Afonso, 2003; Connolly, 2007). Over time, this approach came under criticism, as more and more authors questioned the assumption of an equal distance between any two neighbouring categories of rating. The example often used is the difference between BB+ and BBB-, when the grade changes from speculative to investment one, and the difference between AA+ and AAA. To address this controversy, a large

Table 3. Descriptive statistics

Variable	N	Mean	Median	Max.	Min.	Std. Dev.	Skewness	Kurtosis
Rating	420	16.65	17.00	21.00	2.91	3.93	-0.62	2.75
GDP growth	420	2.23	2.40	25.20	-14.80	3.72	-0.31	8.90
GDP per capita	420	34 566.95	32 743.24	98 537.42	12 150.07	14 887.72	2.05	9.05
GG balance	420	-2.57	-2.40	5.10	-32.10	3.61	-1.80	13.55
GG debt	420	60.24	54.05	181.20	3.80	34.89	0.87	3.88
Private debt	420	141.69	124.50	352.80	33.60	68.77	0.95	3.44
Inflation	420	2.18	2.00	15.30	-1.70	2.11	1.84	9.62
Investment	420	21.91	21.60	37.30	11.10	4.11	0.70	4.68
Unemployment	420	8.89	7.80	27.70	2.30	4.33	1.68	6.31
CA	420	-0.86	-0.60	11.80	-23.90	5.91	-0.60	3.81
Openness	420	121.13	103.22	416.39	45.61	67.85	1.94	7.49
Default history	420	0.03	0.00	1.00	0.00	0.17	5.42	30.34
Governance	420	1.06	1.03	1.96	-0.01	0.49	-0.10	2.08
ESI	416	100.32	101.63	118.41	72.18	9.20	-0.66	3.01
Assistance	420	0.08	0.00	1.00	0.00	0.27	3.13	10.81
NPL	416	6.27	3.82	47.75	0.10	7.42	2.73	9.36

Source: own calculations conducted in EViews.

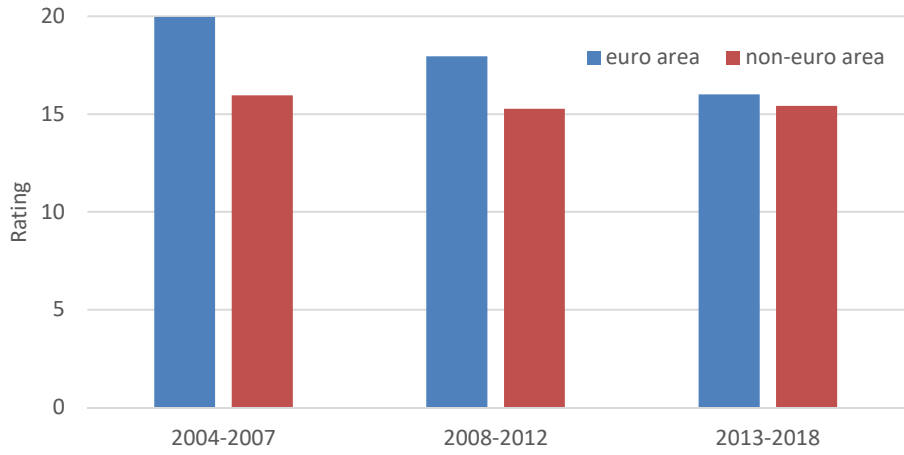

Figure 1. Sovereign credit ratings in the EU in 2004-2018: Euro area versus non-euro area
The means for both groups of countries provide for their changing compositions.
Source: own calculations based on Thomson Reuters Eikon data.

number of studies have applied an ordered probit model, which assumes that sovereign ratings represent an ordinal ranking of creditworthiness (cf. Bissoondoyal-Bheenick, 2005; Ozturk, 2014; Teixeira *et al*., 2018). Some authors have also used both estimation techniques for cross-checking the results (cf. Afonso, Gomes, & Rother, 2010; Erdem & Varli, 2014). The panel VAR (Boumparis *et al*., 2019) and Bayesian methods (Brůha & Kočenda, 2018) are among the less frequently used estimation techniques.

In this study, the construction of the dependent variable, as presented in the previous section, does not allow it to be treated in a discrete, ordinal nature. Taking this into account, panel cointegration techniques were chosen, as these allow for the identification of a long-run relationship between the ratings and the explanatory factors. These techniques are appropriate in the case of the presence of time series generated by stochastic processes integrated of order 1. At the same time, to address the controversy regarding the construction of the dependent variable, a robustness check is conducted with the use of end-of-year ratings and ordered probit as an estimation technique. The results of this check are presented in the Appendix.

As a starting point, the following panel-data model illustrating a long-run relationship between the rating and the explanatory variables is considered:

$$y_{it} = \alpha_i + \boldsymbol{\beta}^T \boldsymbol{x}_{it} + u_{it}, \qquad i = 1, \dots, N \quad t = 1, \dots, T \tag{1}$$

where:

$\boldsymbol{x}_{it}$ - *K×1* vector of regressors;
$\boldsymbol{\beta}$ - *K×1* vector of parameters to be estimated;
α_i - constant individual nuisance parameters.

It is assumed that u_{it} are independent and identically distributed. However, in the case of a panel modelling framework, cross-sectional dependence may occur, which means that error terms u_{it} are correlated across sections. To verify whether the problem of cross-sectional dependence occurs, the test proposed by Pesaran (2004) is applied. In this test, the null hypothesis assumes that there is no correlation across sections. The appropriate statistic is defined as follows:

$$CD = \sqrt{\frac{2T}{N(N-1)}} \left(\sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \hat{\rho}_{ij} \right) \tag{2}$$

where:

$\hat{\rho}_{ij}$ - product-moment correlation coefficient of error terms.

If the null hypothesis of no cross-sectional dependence is valid, then CD follows the standard normal distribution. Table 4 presents the results of testing for cross-sectional dependence.

Table 4. Testing for cross-sectional dependence in panel model

Statistic	p-value
7.98	0.000

Source: own calculations conducted in Stata.

The results indicate that the problem of cross-sectional dependence exists and the second-generation panel techniques should be used. The Pesaran test for the presence of a unit root is conducted (cf. Pesaran, 2007). The results of the Pesaran unit root test are presented in Table 5. The results indicate that most of the variables are integrated of order 1. This implies that the panel cointegration methods can be used to identify long-run relationships among the variables. Private debt is the only variable that is integrated of order 2 and therefore will not be used in the final specification.

Table 5. Testing of order of integration for variables using Pesaran panel unit root test in the case of cross-sectional dependence

Variable	Level		First difference		Decision
	Statistic	p-value	Statistic	p-value	
Rating[a]	0.584	0.720	-1.770	0.038	I(1)
GDP per capita[b]	0.266	0.605	-2.537	0.005	I(1)
GG balance	0.555	0.710	-4.678	0.000	I(1)
GG debt	0.587	0.721	-5.892	0.000	I(1)
Private debt[c]	0.729	0.767	0.741	0.771	I(2)
Inflation	-2.634	0.004	-	-	I(0)
Investment	1.392	0.918	-3.706	0.000	I(1)
Unemployment	0.515	0.697	-2.140	0.016	I(1)
CA	-3.017	0.001	-	-	I(0)
Openness	0.513	0.696	-4.105	0.000	I(1)
Governance	0.588	0.722	-3.466	0.000	I(1)
ESI	-1.001	0.158	-2.533	0.006	I(1)
NPL	-3.642	0.000	-	-	I(0)

[a] As the Rating variable may adopt different values, it is treated as continuous.
[b] Due to the fact that GDP per capita is integrated of order 1, GDP growth is stationary.
[c] The results of testing the stationarity for second order differences are available upon request.
Source: own calculations conducted in Stata.

Due to the existence of cross-sectional dependence and the fact that most of the variables are integrated of order 1, the Westerlund (2007) test for panel cointegration is conducted. The test is based on the following data-generating process:

$$y_{it} = \phi_{1i} + \phi_{2i} t + z_{it}, \tag{3}$$

$$\boldsymbol{x}_{it} = \boldsymbol{x}_{it-1} + \boldsymbol{v}_{it}, \qquad i = 1, \dots, N \quad t = 1, \dots, T \tag{4}$$

The scalar y_{it} consists of a deterministic part and stochastic part z_{it}, which is modelled as:

$$\lambda_i(L)\Delta z_{it} = \lambda_i(z_{it-1} - \boldsymbol{\beta}_i^T \boldsymbol{x}_{it-1}) + \boldsymbol{\gamma}_i(L)^T \boldsymbol{v}_{it} + e_{it} \tag{5}$$

where:

$$\lambda_i(L) = 1 - \sum_{j=1}^{p_i} \lambda_{ij} L^j;$$
$$\boldsymbol{\gamma}_i(L) = \sum_{j=0}^{p_i} \gamma_{ij} L^j.$$

After substituting equation (3) into (5), the following panel error correction model is obtained:

$$\lambda_i(L)\Delta y_{it} = \delta_{1i} + \delta_{2i} t + \lambda_i(y_{it-1} - \boldsymbol{\beta}_i^T \boldsymbol{x}_{it-1}) + \boldsymbol{\gamma}_i(L)^T \boldsymbol{v}_{it} + e_{it} \tag{6}$$

where:

$$\delta_{1i} = \lambda_i(1)\phi_{2i} - \lambda_i \phi_{1i} + \lambda_i \phi_{2i};$$
$$\delta_{2i} = -\lambda_i \phi_{2i}.$$

The inclusion of a constant and/or deterministic trend depends on statistical significance. After testing the significance of deterministic components, the constant turned out to be significant and the trend was statistically insignificant. Based on equation (6), group mean statistics (G_τ, G_α) and panel statistics (P_τ, P_α) have been calculated. The results of testing panel cointegration are presented in Table 6.

The results of the Westerlund test indicate that cointegration exists in the presence of cross-sectional dependence. Therefore, the parameters of the panel error correction model are estimated. The results are presented in the next section.

Table 6. Results of testing panel cointegration with the use of the Westerlund test

Statistic	Value of statistic	p-value
G_τ	-3.450	0.000
G_α	-25.239	0.000
P_τ	-7.440	0.000
P_α	-2.886	0.000

Source: own calculations conducted in Stata.

RESULTS AND DISCUSSION

Table 7 presents the results of the estimation of the cointegrating relation for the whole research period and all EU countries[5]. As a general-to-specific modelling strategy was adopted (Charemza & Deadman, 1997), the table presents only parameter estimates that turned out to be statistically significant at 0.1 or lower level of significance.

Table 7. Estimates of the cointegrating relation

Variable	Estimate
$Rating_{t-1}$	-0.313*** (0.035)
$GDP\ per\ capita_{t-1}$	0.001* (0.001)
$Unemployment_{t-1}$	-0.030* (0.017)
$Assistance_{t-1}$	-0.572*** (0.200)
$Default\ history_{t-1}$	-2.297*** (0.374)
$GG\ debt_{t-1}$	-0.019*** (0.004)
NPL_{t-1}	-0.025** (0.011)
$Governance_{t-1}$	2.400*** (0.495)

Standard errors in parentheses.
*, **, *** indicate statistical significance at the 0.1, 0.05, and 0.01 level, respectively.
Source: own calculations conducted in Stata.

After normalization, the long-run relation between credit ratings and other categories is as follows:

$$\widehat{Rating} = 0.003GDP\ per\ capita - 0.096Unemployment - 1.827Assistance + 7.668Governance - 0.061GG\ debt - 7.339Default\ history - 0.080NPL \quad (7)$$

As it can be seen, a large number of considered variables turned out to be statistically significant. The signs of the parameter estimate for these variables are in line with expectations. The results are consistent with findings of prior empirical works in the sense that they show that ratings are under influence of the macroeconomic fundamentals (particularly domestic) as well as political and institutional factors (as indicated by the significance of the Governance variable). The study finds a negative and statistically significant effect

[5] Short-run estimates of parameters are available upon request.

for past defaults, which is also in line with previous research, and points to a similar impact of countries' dependence on financial aid from official creditors. This may deepen countries' reluctance to use such assistance, including its precautionary forms targeted at countries with sound economic conditions and aimed at reinforcing their macro-financial position in times of heightened stress. Finally, the study's findings indicate that the condition of the banking system, which is proxied by the NPL variable, played an important role in the creditworthiness assessment of the EU countries in the period under analysis.

It is worth noting that the results presented in Table 7 are largely robust to a change of estimation technique, as suggested by the conclusions obtained with the use of an ordered probit model (cf. Appendix). All in all, as implied by the importance of the Assistance and the NPL variables, there is strong evidence supporting H1 hypothesis: "Next to the macroeconomic and institutional variables, the factors reflecting financial stability risk have additional explanatory power for sovereign ratings in the EU countries."

In the next step, in order to verify how the experience of the crisis changed the importance of individual variables in determining the country's rating and assess the durability of such changes (i.e. check whether there was a shift from crisis-related to post-crisis approach to sovereign creditworthiness assessment), the sample is divided into three subperiods:

1. pre-crisis period (2004-2007),
2. crisis period (2008-2012),
3. post-crisis period (2013-2018).

The demarcation between the first and the second subperiod is marked by the collapse of Lehman Brothers, which took place in 2008. The beginning of the third subperiod falls in 2013, when a permanent drop in tensions in the sovereign bond market in the EMU was already observed as a consequence of the announcement of the Outright Monetary Transactions (OMT) program by the ECB in the summer of 2012.

To check whether the division into three subperiods is reasonable, the Chow breakpoint test was conducted. Table 8 presents the results of testing.

Table 8. Results of testing stability of parameters

Testing	Structural break between 1-st and 2-nd subperiod	Structural break between 2-nd and 3-rd subperiod
Value of statistics	2.433	2.533
p-value	0.028	0.023

Source: own calculations conducted in Stata.

The results from Table 8 indicate that the estimation of the parameters of the model for sub-samples is reasonable. Subperiods are relatively short and the number of years for each subperiod is low (from 4 to 6). Therefore, it is not justified to use panel cointegration techniques and the parameters of a simple panel regression model will be estimated. Table 9 contains the results of the estimation of the parameters of the panel regression model[6]. For

[6] Only the variables that turned out to be statistically significant in the main model and the variables available for all subperiods were used.

each subperiod, the model assuming the presence of random effects turned out to be an optimal choice[7].

Table 9. Results of the estimations of panel models with random effects for three subperiods

Variable	2004-2007	2008-2012	2013-2018
GG debt	-0.007 (0.006)	-0.028*** (0.004)	-0.017** (0.008)
Unemployment	-0.121*** (0.015)	-0.219*** (0.067)	-0.128*** (0.038)
GDP per capita	0.003*** (0.001)	0.001* (0.001)	0.001 (0.002)
Governance	3.828*** (0.562)	5.049*** (0.982)	4.562*** (0.836)
NPL	-0.009 (0.008)	-0.103*** (0.021)	-0.097*** (0.031)
EA[a]	1.374** (0.681)	-0.048* (0.028)	0.244* (0.131)
Model	**Random effects**	**Random effects**	**Random effects**
p-value of the Hausman test	**0.278**	**0.217**	**0.354**

Robust standard errors in parentheses.

[a] Binary variable adopting the value of 1 if a given country is a euro area member state; 0 otherwise.

Source: own calculations conducted in Stata.

The results clearly indicate a change in the relevance of individual variables between the first and second subperiods, which – under different research assumptions – was previously found by Reusens and Croux (2017). One can also notice differences between the second and third subperiods, although these are less pronounced. Detailed assessment of the results allows us to formulate three main conclusions.

First, starting with the macroeconomic factors, a strong increase in the significance of the GG debt variable in the second subperiod deserves particular attention. During the crisis, the vast majority of EU countries recorded a sharp deterioration in the condition of the public finance sector. Over the fears of debt sustainability, some of them even lost access to market-based sources of financing and were forced to seek EU- and IMF-organized bailouts. This finding may also support the "wake-up call" contagion, i.e. an increased sensitivity to macroeconomic fundamentals in the pricing of sovereign risk observed after the start of the European debt crisis (cf. Beirne & Fratzscher, 2013; Giordano, Pericoli, & Tommasino, 2013). During the third subperiod, the role of macroeconomic factors somewhat decreased.

Second, an increase in the importance of the Governance variable during the crisis is noteworthy. The variable also remains more relevant in the third subperiod when compared to pre-crisis years. In a study on country default risk conducted for a group of euro area countries, which uses government bond yield spreads as the dependent variable, Boysen-Hogrefe (2017) shows that after the announcement of the OMT program the quality of governance has gained in importance with regard to other possible determinants of spreads, including the debt-to-GDP ratio. The author argues that since that announcement "financial markets have become more concerned about the willingness and capability to cooperate with the institutions that conduct the adjustment programs". The willingness and capability are, in turn, linked to different dimensions of governance. It can be assumed that CRAs also became more sensitive to the quality of governance, which they assessed as crucial for undertaking anti-crisis measures at the euro area/EU level. The fact that the

[7] Results of testing presence of effects are available on request.

reforms aimed at safeguarding macro-financial stability in the future are not yet completed (like the banking union project) may be one of the explanations for why the importance of the Governance variable also remains high in the third subperiod.

Third, the condition of the banking sector seems to have gained importance in determining a country's rating after 2007. The crisis has demonstrated that the costs of bank bailouts with the use of public funds are huge and can undermine the sustainability of public finances, particularly in bank-based financial systems like the ones in the EU countries. And despite the fact that the bail-in regime recently introduced by the EU aims at reducing the costs of bank bailouts for taxpayers, there are concerns that it can only prove itself in a one-off failure. In case of a systemic banking crisis, bail-in of private investors can add to a financial panic instead (cf. Avgouleas & Goodhart, 2015). It appears, therefore, that the experience of a negative feedback loop between banks and sovereigns, unfinished reforms aimed at weakening the links between these two sectors, as well as persistent risks to banking sector stability such as the problem of NPLs (but also home bias in banks' sovereign portfolio) may explain still high relevance of the considered variable in the third subperiod. All in all, the findings strongly support H2 hypothesis about an increase in the role of banking sector stability in explaining the sovereign ratings of the EU countries after the outbreak of the crisis.

Finally, the role of the euro area member status in explaining ratings in the specified subperiods was checked. For this purpose, a binary variable EA was created. The variable adopts the value of 1 if a given country is a euro area member state and 0 otherwise. Analysis of the results (Table 9) allows us to indicate clear differences between individual subperiods. It seems that in the pre-crisis years the euro area countries derived additional benefits in terms of perceived credibility from the mere fact of holding the status of EMU members. It might have been due to the fact that the euro area was then perceived as an "elite club" of developed European economies. The monetary policy was transferred to the level of the ECB, which was supposed to build upon the Bundesbank's impeccable record of maintaining price stability, and the rest of the euro area countries experienced economic benefits (like lower interest rates) through the deepening of integration with Germany. That way, and amid the Great Moderation period, the risks associated with investing in the euro area, including the analysed countries, could have been under-priced (cf. Bernoth & Erdogan, 2012; Oliveira, Curto, & Nunes, 2012).

During the crisis, a switch from a positive to a negative effect of euro area member status is identified, which supports the previous findings of Reusens and Croux (2017). This is very likely to reflect the fact that the crisis revealed many "flaws" in the institutional architecture of the EMU, especially related to its financial safety net. These encompassed, among others, a failure to entrust the ECB with the role of a lender of last resort (LOLR), the lack of a banking union, including above all the supranational mechanism of bank resolution, and the absence of risk-sharing mechanisms such as the later-established European Stability Mechanism (ESM) (cf. Navaretti, Calzolari, & Pozzolo, 2016). Under such conditions, contagion phenomena were observed within the euro area, which exacerbated the crisis and put the single currency project into question. In the post-crisis period, there is a return to a positive effect of euro area membership, which supports H3 hypothesis. At the same time, this effect is definitely weaker than before the crisis. This result may indicate a gradual return of confidence in the euro area

after it addressed some of its "architectural deficiencies". In particular, the ECB become the LOLR with the announcement of the OMT programme, and the banking union had its promising start with the creation of the Single Supervisory Mechanism and the Single Resolution Mechanism in 2014 and 2016, respectively.

This study's findings suggest several policy implications. Regarding the euro area, these implications especially pertain to high stocks of NPLs which, despite a reduction observed in recent years, remain a challenge in some countries. The high levels of NPLs can considerably weigh on banks' performance and undermine future economic growth (Balgova, Nies, & Plekhanov, 2016)[8]. Nonetheless, in the EMU, insufficient improvement in tackling the problem of NPLs might additionally revive self-fulfilling fears over the "doom loop" between banks and sovereigns. Compounding factors, particularly evident in the so-called peripheral EMU countries, are high public debt ratios and home bias in banks' sovereign debt holdings (cf. Altavilla, Pagano, & Simonelli, 2017). Therefore, it is very important to continue with reforms initiated during the crisis, aimed at strengthening financial stability in the EMU. In a deeply integrated area where financial systems are highly interconnected, a coordinated approach to the problem of NPLs and other potential triggers of the loop is required. Proposals to delink banks from sovereigns include: completing the banking union by establishing the European Deposit Insurance Scheme, restricting the principle of zero-risk weight for sovereign exposures, and creating a "safe asset" for the euro area. All of these measures are likely to encounter political hurdles, hence the greater role for governance understood as readiness and willingness to cooperate.

For non-euro area countries, this study's findings might contribute to the long-running debate on the costs and benefits of their potential participation in the single currency project. The findings suggest that-apart from the crisis period-having non-euro-area status worked to the disadvantage of the country's creditworthiness assessment. This might come as surprising especially in the post-crisis years, given the fact that at that time, on average, these countries dealt relatively better in terms of macroeconomic fundamentals. Nevertheless, with many reservations regarding the incompleteness of reforms undertaken since the crisis, the euro area made progress in strengthening its financial safety net. The non-euro area countries have been included only in some initiatives and only to a limited extent (e.g., opting into the banking union before the euro adoption). However, they cannot take advantage of the rest of the net's elements. The recent proposal of the Eurogroup to establish Pandemic Crisis Support based on the ESM's Enhanced Conditions Credit Line can serve as an example (Eurogroup, 2020). Unlike what was experienced during the height of the euro area crisis, the conditionality attached would be limited. Due to the highest credit assessments assigned to the ESM, the members of the EMU would gain access to liquidity at very low-interest rates. It seems, therefore, that especially the lower-rated, non-euro area countries are worse off not having access to such instruments, which takes on special importance in the face of projected contraction in economic activity and challenges for public finances across the globe.

[8] Quoted in (Boumparis *et al.*, 2019, p. 313).

CONCLUSIONS

In this paper, the determinants of the EU countries' sovereign credit ratings have been studied. The analysis was conducted for the period from 2004 to 2018, which was later divided into pre-crisis, crisis, and post-crisis subperiods. The main research method used was the panel error correction model.

The empirical findings show that the role of individual credit rating determinants differed in the distinguished subperiods. In particular, the condition of the banking sector seems to have gained in importance after the outbreak of the euro area crisis and remained high in the post-crisis years. This most likely derives from the experience of a negative feedback loop between banks and sovereigns, which largely characterized the crisis, especially in the euro area, and its legacy in the form of macroeconomic imbalances (mainly fiscal) and persistent risks in the banking sector (such as the problems of NPLs and home bias). That is why it is so important to continue the reforms initiated during the crisis at the EU/euro area level and aimed at reducing the interdependence between the two sectors.

The study also shows that the status of being a euro area member exerts an impact on the country's creditworthiness assessment. Its effect switched from positive to negative during the crisis. In the post-crisis period, when euro redenomination risk had become a thing of the past and the EMU had emerged from the crisis institutionally stronger, euro area countries again began to reap additional benefits in terms of their credibility assessment from the mere fact of using the common currency. The opposite conclusions have been drawn for non-euro area EU members. It seems therefore that these countries are not necessarily better off staying on the side-lines of the European integration process, at least when it comes to their perceived default risk.

It would be worth conducting a similar study in the future when longer time series are available. The use of higher-frequency (i.e., quarterly) data should also be considered, which would improve the precision of the estimates. Ongoing monitoring of the situation in the euro area is particularly important for countries outside the single currency, which are still analysing the costs and benefits of (potential) future membership.

REFERENCES

Afonso, A. (2003). Understanding the determinants of sovereign debt ratings: Evidence for the two leading agencies. *Journal of Economics and Finance*, *27*(1), 56-74. https://doi.org/https://doi.org/10.1007/bf02751590

Afonso, A., Gomes, P., & Rother, P. (2010). Short- and long-run determinants of sovereign debt credit ratings. *International Journal of Finance & Economics*, *16*(1), 1-15. https://doi.org/10.1002/ijfe.416

Aktug, R., Nayar, N., & Vasconcellos, G. (2013). Is sovereign risk related to the banking sector?. *Global Finance Journal*, *24*(3), 222-249. https://doi.org/10.1016/j.gfj.2013.10.001

Altavilla, C., Pagano, M., & Simonelli, S. (2017). Bank Exposures and Sovereign Stress Transmission. *Review of Finance*, *21*(6), 2103-2139. https://doi.org/10.1093/rof/rfx038

Amstad, M., & Packer, F. (2015). Sovereign ratings of advanced and emerging economies after the crisis. *BIS Quarterly Review*. Retrieved from https://www.bis.org/publ/qtrpdf/r_qt1512h.htm on October 21, 2019.

Avgouleas, E., & Goodhart, C. (2015). Critical Reflections on Bank Bail-ins. *Journal of Financial Regulation*, *1*(1), 3-29. https://doi.org/10.1093/jfr/fju009

Ballester, L., & González-Urteaga, A. (2017). How credit ratings affect sovereign credit risk: Cross-border evidence in Latin American emerging markets. *Emerging Markets Review*, *30*, 200-214. https://doi.org/10.1016/j.ememar.2016.09.004

Beirne, J., & Fratzscher, M. (2013). The pricing of sovereign risk and contagion during the European sovereign debt crisis. *Journal of International Money and Finance*, *34*, 60-82. https://doi.org/10.1016/j.jimonfin.2012.11.004

Bernoth, K., & Erdogan, B. (2012). Sovereign bond yield spreads: A time-varying coefficient approach. *Journal of International Money and Finance*, *31*(3), 639-656. https://doi.org/10.1016/j.jimonfin.2011.10.006

Bissoondoyal-Bheenick, E. (2005). An analysis of the determinants of sovereign ratings. *Global Finance Journal*, *15*(3), 251-280. https://doi.org/10.1016/j.gfj.2004.03.004

Boumparis, P., Milas, C., & Panagiotidis, T. (2017). Economic policy uncertainty and sovereign credit rating decisions: Panel quantile evidence for the Eurozone. *Journal of International Money and Finance*, *79*, 39-71. https://doi.org/10.1016/j.jimonfin.2017.08.007

Boumparis, P., Milas, C., & Panagiotidis, T. (2019). Non-performing loans and sovereign credit ratings. *International Review of Financial Analysis*, *64*, 301-314. https://doi.org/10.1016/j.irfa.2019.06.002

Boysen-Hogrefe, J. (2017). Risk assessment on euro area government bond markets – The role of governance. *Journal of International Money and Finance*, *73*, 104-117. https://doi.org/10.1016/j.jimonfin.2017.01.005

Brůha, J., & Kočenda, E. (2018). Financial stability in Europe: Banking and sovereign risk. *Journal of Financial Stability*, *36*, 305-321. https://doi.org/10.1016/j.jfs.2018.03.001

Cantor, R., & Packer, F. (1996). Determinants and Impact of Sovereign Credit Ratings. *Economic Policy Review*, *2*(2). https://doi.org/10.2139/ssrn.1028774

Charemza, W., & Deadman, D. (1997). *Nowa ekonometria*. Warszawa: Polskie Wydawnictwo Ekonomiczne.

Chari, A., Garcés, F., Martínez, J., & Valenzuela, P. (2019). *Sovereign Credit Risk, Financial Fragility, and Global Factors*. Retrieved from http://www.up.edu.pe/UP_Landing/conference-financial-stability-sustainability/documents/Valenzuela-Paper.pdf on March 20, 2020.

Chodnicka-Jaworska, P. (2015). Credit Rating Determinants for European Countries. *Global Journal of Management and Business Research*, *15*(9).

Christopher, R., Kim, S., & Wu, E. (2012). Do sovereign credit ratings influence regional stock and bond market interdependencies in emerging countries?. *Journal of International Financial Markets, Institutions and Money*, *22*(4), 1070-1089. https://doi.org/10.1016/j.intfin.2012.01.003

Connolly, M. (2007). Measuring the Effect of Corruption on Sovereign Bond Ratings. *Journal of Economic Policy Reform*, *10*(4), 309-323. https://doi.org/10.1080/17487870701552053

De Moor, L., Luitel, P., Sercu, P., & Vanpée, R. (2018). Subjectivity in sovereign credit ratings. *Journal of Banking & Finance*, *88*, 366-392. https://doi.org/10.1016/j.jbankfin.2017.12.014

ECB (2019). *Communication on supervisory coverage expectations for NPEs*. Retrieved from https://www.bankingsupervision.europa.eu/press/letterstobanks/shared/pdf/2019/ssm.supervisory_coverage_expectations_for_NPEs_201908.en.pdf on December 19, 2019.

Erdem, O., & Varli, Y. (2014). Understanding the sovereign credit ratings of emerging markets. *Emerging Markets Review*, *20*, 42-57. https://doi.org/10.1016/j.ememar.2014.05.004

Eurogroup (2020). *Report on the comprehensive economic policy response to the COVID-19 pandemic.* Retrieved from https://www.consilium.europa.eu/en/press/press-releases/2020/04/09/report-on-the-comprehensive-economic-policy-response-to-the-covid-19-pandemic/ on April 12, 2020.

Gande, A., & Parsley, D. (2005). News spillovers in the sovereign debt market. *Journal of Financial Economics, 75*(3), 691-734. https://doi.org/10.1016/j.jfineco.2003.11.003

Giordano, R., Pericoli, M., & Tommasino, P. (2013). Pure or Wake-up-Call Contagion? Another Look at the EMU Sovereign Debt Crisis. *International Finance*, *16*(2), 131-160. https://doi.org/10.1111/j.1468-2362.2013.12033.x

Gültekin-Karakaş, D., Hisarcıklılar, M., & Öztürk, H. (2011). Sovereign Risk Ratings: Biased Toward Developed Countries?. *Emerging Markets Finance and Trade*, *47*(sup2), 69-87. https://doi.org/10.2753/ree1540-496x4703s204

Luitel, P., Vanpée, R., & De Moor, L. (2016). Pernicious effects: How the credit rating agencies disadvantage emerging markets. *Research in International Business and Finance*, *38*, 286-298. https://doi.org/10.1016/j.ribaf.2016.04.009

Mellios, C., & Paget-Blanc, E. (2006). Which factors determine sovereign credit ratings?. *The European Journal of Finance*, *12*(4), 361-377. https://doi.org/10.1080/13518470500377406

Monfort, B., & Mulder, C. (2000). *Using Credit Ratings for Capital. Requirements on Lending to Emerging. Market Economies: Possible Impact of a New Basel Accord* (IMF Working Paper, 00/69). Retrieved from https://www.imf.org/en/Publications/WP/Issues/2016/12/30/Using-Credit-Ratings-for-Capital-Requirementson-Lending-to-Emerging-Market-Economies-Possible-3526 on November 21, 2019.

Montes, G., & de Oliveira, D. (2016). *Beyond the macroeconomic determinants of sovereign credit ratings in developing economies: a panel data analysis considering different dimensions*. Retrieved from https://www.anpec.org.br/encontro/2015/submissao/files_I/i4-4bb778240c44a3de16bb2e82fd73a4a4.pdf on November 21, 2019.

Navaretti, G., Calzolari, G., & Pozzolo, A. (2016). *Diabolic Loop or Incomplete Union? Sovereign and Banking Risk*. Retrieved from https://european-economy.eu/2016-1/diabolic-loop-or-incomplete-union-sovereign-and-banking-risk/ on December 15, 2019.

Oliveira, L., Curto, J., & Nunes, J. (2012). The determinants of sovereign credit spread changes in the Euro-zone. *Journal of International Financial Markets, Institutions and Money*, *22*(2), 278-304. https://doi.org/10.1016/j.intfin.2011.09.007

Ozturk, H. (2014). The Origin of Bias in Sovereign Credit Ratings: Reconciling Agency Views with Institutional Quality. *The Journal of Developing Areas*, *48*(4), 161-188. https://doi.org/10.1353/jda.2014.0066

Pesaran, M. (2004). *General Diagnostic Tests for Cross Section Dependence in Panels* (IZA Discussion Paper No. 1240). Retrieved from http://ftp.iza.org/dp1240.pdf on April 4, 2020.

Pesaran, M. (2007). A simple panel unit root test in the presence of cross-section dependence. *Journal of Applied Econometrics*, *22*(2), 265-312. https://doi.org/10.1002/jae.951

Ramlall, I. (2016). Does Central Bank Quality Determine Sovereign Ratings and Credit Default Swap Spreads: Evidence from the World?. *Journal of Central Banking Theory and Practice*, *5*(3), 5-29. https://doi.org/10.1515/jcbtp-2016-0017

Reinhart, C. (2002). Sovereign Credit Ratings Before and After Financial Crises. In R. Levich, G. Majnoni, & C. Reinhart, *Ratings, Rating Agencies and the Global Financial System*. New York: Springer.

Reusens, P., & Croux, C. (2017). Sovereign credit rating determinants: A comparison before and after the European debt crisis. *Journal of Banking & Finance*, *77*, 108-121. https://doi.org/10.1016/j.jbankfin.2017.01.006

Sehgal, S., Mathur, S., Arora, M., & Gupta, L. (2018). Sovereign ratings: Determinants and policy implications for India. *IIMB Management Review*, *30*(2), 140-159. https://doi.org/10.1016/j.iimb.2018.01.006

Soudis, D. (2016). Determinants of Sovereign Bonds Ratings: A Robustness Analysis. *Bulletin of Economic Research*, *69*(2), 164-177. https://doi.org/10.1111/boer.12093

Teixeira, J., Silva, F., Ferreira, M., & Vieira, J. (2018). Sovereign credit rating determinants under financial crises. *Global Finance Journal*, *36*, 1-13. https://doi.org/10.1016/j.gfj.2018.01.003

Tennant, D., Tracey, M., & King, D. (2020). Sovereign credit rating: Evidence of bias against poor countries. *The North American Journal of Economics and Finance*, *51, 100877*. https://doi.org/10.1016/j.najef.2018.11.006https://doi.org/

Westerlund, J. (2007). Testing for Error Correction in Panel Data. *Oxford Bulletin of Economics and Statistics*, *69*(6), 709-748. https://doi.org/10.1111/j.1468-0084.2007.00477.x

Yalta, A., & Yalta, A. (2018). Are credit rating agencies regionally biased?. *Economic Systems*, *42*(4), 682-694. https://doi.org/10.1016/j.ecosys.2018.08.001

Appendix:

As a robustness check, variables associated with credit ratings were treated as an ordered one[9] and the parameters of an ordered probit model were estimated.

$$RAT_{it}^{*} = \boldsymbol{\beta}^{T}\boldsymbol{x}_{it} + \varepsilon_{it}, \quad \text{(A.1)}$$

$$RAT_{i} = 2 * \{RAT_{it}^{*} > \mu_3\} + \{\mu_3 \geq RAT_{it}^{*} > \mu_2\} - \{RAT_{it}^{*} \leq \mu_1\}, \quad \text{(A.2)}$$

$$\varepsilon_{it} \sim N(0,1), \quad \text{(A.3)}$$

In the model (A.1)-(A.3) the variable associated with credit rating is treated as discrete, ordered variable. It takes the following 4 values:

-1 – in the case of highly speculative, substantial risk, extremely speculative or default grade (B+ or lower),
0 – in the case of non-investment speculative grade (between BB- and BB+),
1 – in the case of lower medium investment grade (between BBB- and BBB+),
2 – in the case of upper medium, high or prime investment grade (A- or higher)

Results of the estimation of the parameters of the model (A.1)-(A.3) are presented in Table A. 1.

Table A.1. Results of the estimation of the parameters of the ordered probit model

Variable	Estimate
GDP per capita	0.012*** (0.003)
Unemployment	-0.005 (0.830)
Assistance	-1.389*** (0.175)
Default history	-0.698* (0.398)
GG debt	-0.019*** (0.002)
NPL	-0.144*** (0.025)
Governance	1.990*** (0.236)
μ_1	-2.319
μ_2	0.033
μ_3	2.342

*, **, *** indicate statistical significance at the 0.1, 0.05, and 0.01 level, respectively.
Source: own calculations conducted in Stata.

The results indicate that most of the variables, which were found to have explanatory power for sovereign ratings in the cointegrating relation, turned out to have a significant impact in an ordered discrete choice model. The only exception is the Unemployment variable, whose statistical significance was found only in the main model. All in all, the obtained results largely confirm the validity of the main model, presented in Table 7.

[9] The rating of a particular year is the rating attributed at 31st December of that year.

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Housing Prices in a Market Under Years of Constant Transformation: A County-Based Analysis of Istanbul

Meltem Ucal, Uğur Kaplan

ABSTRACT

Objective: The objective of the article is to present a comprehensive approach to analysing Istanbul's housing prices, using a hedonic price model with a large dataset and a single variable for locational attributes.

Research Design & Methods: The analysis of consequent housing prices in İstanbul's counties with hedonic price modelling and the extrapolation of results by comparing the prices to the human development level of counties. We use multiple regression and Ordinary Least Squares (OLS) methods to estimate two semi-log hedonic price models for two time periods.

Findings: The relationship between socioeconomic development levels and housing prices varies for counties under different urban transformation processes.

Implications & Recommendations: The results are useful for the housing price analysis in Istanbul. The housing prices appear to follow the socioeconomic development level of the county in which a house is located, thus showing variations between different counties. The relationship between housing prices and urban transformation processes should be approached with caution by policymakers, as the outcomes may disturb both the sociological and economic balance in the long run.

Contribution & Value Added: The study contributes to the existing research on housing price analysis by interpreting locational attributes as a whole and housing research at large by combining hedonic price modelling and case study methods.

Article type: research article

Keywords: housing prices; semi-log hedonic price model; Istanbul

JEL codes: Q1, Q18, C25

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INTRODUCTION

The housing prices change dramatically within an urban area when there is an ongoing urban transformation process such as urbanisation, urban regeneration, gentrification or suburbanisation (Guerrieri, Hartley, & Hurst, 2013). These kinds of urban transformation simultaneously shape the entire area socioeconomically and demographically (Atkinson & Bridge, 2005; Steinmetz-Wood *et al.*, 2017). Istanbul – one of the most densely populated cities in the world – has recently witnessed a substantial acceleration in urban transformation. The suburbanisation, urban development, and modernisation of its buildings has been intense for over a decade, catalysed by many policy changes (The World Bank, 2015).

This article analyses consequent housing prices and their relationship with human development levels in Istanbul's counties. The analysis method is a combination of quantitative and qualitative methods. The study estimates prices by hedonic price modelling and extrapolates findings by juxtaposing the prices to the human development level of counties in the quantitative part. Then, we interpret extreme cases of price and human development discrepancies on the basis of case studies of three types of counties and existing research from various sociological fields.

The article is organised as follows: the first section scrutinises the discussed background of housing sector related to the article target, second section is methodology, followed by a discussion of results, and the last section is conclusion.

LITERATURE REVIEW

One of the components of a house that influences its price the most is location (Bradbury *et al.*, 1977; Ottensmann, Payton, & Man, 2008). This is mainly due to some aspects of the daily life being shaped by either the exact location or the neighbourhood to which the house belongs (Li & Brown, 1980). Consequently, it is not uncommon for people to determine a certain set of target neighbourhoods when searching for a house to purchase. For example, prospective buyers tend to highly rate the neighbourhoods that offer a short commuting time to work (Lipscomb, 2006; Xiao, 2017). Likewise, houses are often priced higher when there are high quality schools and various amenities in the proximity (Dokmeci *et al.*, 1996). It is evident that car ownership alters the preferability of locational attributes of houses, thus the significance of price (Ciraci & Kundak, 2000; Frenkel, Bendit, & Kaplan, 2013). Additionally, the locational attributes vary largely within the metropolitan area, making their effect on price all the more inconsistent. Evidence from previous research indicate that the relationship between housing prices and locational attributes is worthy of further inquisitive effort (Głuszak, 2018).

The discussion presented so far raises the question if and how large a correlation exists between housing prices and the locational attributes in large cities. In this context, Istanbul is a legitimate city to examine, with a large urbanised metropolitan area and high variability in housing prices. The locational attributes of Istanbul's 39 counties are aggregated into and ranked by two indices, namely the "Life Quality Index" (Şeker, 2015) and the "Human Development Index" (Şeker, Bakış, & Dizeci, 2018). A ranking among counties may as well be performed by using housing prices. This article hypothesises that – when ranked – the housing prices in Istanbul's counties would show a significant correlation with their index rankings.

Istanbul has seen constant a growth of population through migration for the last 50 years (Keskin, 2008). As with other metropolitan cities, the transformation of urban areas is needed as much as their expansion. Istanbul shares the same urban transformation policy as Turkey, criticised for its poor planning (Gülersoy & Güler, 2011; Karaman, 2009), revenue-generation-oriented (Efe *et al.*, 2015; Kisar Koramaz, Koramaz, & Özer, 2018; Özdemir Sarı, Özdemir, & Uzun, 2019), and its inability – or, in some cases, disregard – to preserve cultural values and social capital (Ozden, 2012).

The general urban transformation scheme in Turkey is a combination of urban renewal, suburbanisation, and urban redevelopment. In the case of Istanbul, it has three major lanes: (1) the urban renewal of old houses susceptible to earthquakes in old neighbourhoods; (2) the area-based regeneration of neighbourhoods labelled risky based on the Law on Transformation of Areas under Disaster Risk enacted in 2012, regarded as a veiled effort of slum clearance; and (3) suburbanisation through new housing projects on public lands, executed by private companies (Turkmen, 2014; Yılmaz Bakır, 2019).

Because Istanbul is one of the oldest cities in the world, some of its most central neighbourhoods are historically significant. Therefore, they are less likely to be targeted for a mass renewal. The urban transformation projects undertaken in this kind of counties in recent years are mostly renovations and individual renewal of old houses (Kisar Koramaz, Koramaz, & Özer, 2018). Like in any metropolitan area, social amenities are abundant and human development level is higher in inner city Istanbul. Consequently, there is some merit in investigating whether the housing prices in Istanbul's central counties are high as well. We expected that there would be little to no discrepancies between the ranking of housing prices and indices in the case of counties with old settlements.

The neighbourhoods that once used to be outer districts of Istanbul – inhabited by poorer demographic – have gradually become inner city (Güler, 2013; Ocakçı, 2000). These areas have recently become the primary sites of urban transformation policies, mainly in the form of gentrification. It is also the case that these areas have more access to amenities and services than the more remote counties (Yapıcı & Ileri, 2019). Hence, it is very likely that there is a potential revenue generation in gentrifying these areas by the construction of modern housing projects. In most cases, homeowners in a block that consists of risky buildings are collectively offered a deal by the contractor, which requires the consent of all the involved homeowners. In exchange for their houses, the homeowners are offered either an upfront payment or an apartment in a finished project that is to occupy the land emptied by demolished houses (Yılmaz Bakır, 2019).

Lower income households living in the gentrified areas are pushed to outer city neighbourhoods, as they are replaced by a new group of residents with potentially higher income and higher education (NYU Furman Center, 2015). Consequently, one of the most common outcomes of a gentrified area is an improvement in the quality of infrastructure, be it social or physical (Michalos, 2014). This is related to the demographic change, since new residents are likely to be professionals who opt to live in smaller households with fewer children, if any. In the social context, this shift causes the average size of houses to decrease. In the economic sense, this change of construction increases prices per area and the total area of living. Therefore, gentrification eventually causes an increase in rents, property values, and taxes within and around the gentrified area (Martin & Beck, 2018). This discussion indicates that gentrification is not only related to demographic changes.

However, it is expected to impact many more aspects of life quality in such neighbourhoods or even the whole city (Steinmetz-Wood *et al.*, 2017).

Noteworthy, individuals across the board prefer to live in richer neighbourhoods compared to poorer neighbourhoods, with the expectancy of better access to public goods and services and the convenience of amenities (Michalos, 2014). However, the above process proposes an interesting aspect of gentrification that the economic changes might as well trigger demographic and social changes in gentrified areas (Billingham, 2015; Zambon & Salvati, 2019). A recent example are the urban renewal projects in squats of Ankara, which involve giving homeowners a house from the new projects. However, low-income households, unable to cope with the eventual increase in maintenance costs that come with the improvement of amenities and services, ended up selling their houses for a subjectively large sum of money (Atkinson & Bridge, 2005). Therefore, the impact and intent of gentrification might be observed to have a great variation from displacement and marginalisation of certain social groups to quality of life improvements (The World Bank, 2015; Wacquant, 2008). This has been confirmed in a qualitative study in Istanbul, where residents of an old industrial area reported they appreciate the developments related to the introduction of gated communities (Güler, 2013). In light of the above, the counties with gentrified areas in Istanbul are expected to rank higher in prices than indices.

Suburbanisation is defined as the spatial reorganisation of a city in consequence of growing population. Low-density areas attract amenities as their population grows, and there arise suburbs that have their own organisation. The suburbs gained popularity thanks to lower costs of car ownership and the increasing income levels, although they still rely on commuting (Michalos, 2014). In Istanbul, large areas that allow for the construction of gated communities with shopping malls have become much more common with the urbanisation policies of administrative bodies. Public lands are offered to private construction companies as a partnership deal with governmental agency of public housing, TOKI (Bodur & Dülgeroğlu Yüksel, 2017). In cities under intense urban transformation, the newly-built housing projects eventually see an overall increase in housing prices when social amenities become extensive (Montgomery, 2008; Tang, 2006). Istanbul's counties with extensive suburban settlements are usually in mid to low ranks in human development indices. In the future, many unsettled areas in various counties of Istanbul are expected to receive better public services, such as road construction or schools. However, the review of literature presented here indicates that suburbanised counties of Istanbul rank higher in socioeconomic development indices than price.

After integrating all the above, we construct our hypotheses as follows:

- **H1:** There is a correlation between housing prices and the socioeconomic development levels of counties.
- **H2:** Older counties have higher housing prices and socioeconomic development.
- **H3:** Suburbanised counties rank higher in socioeconomic development than price.
- **H4:** Counties with gentrified areas rank higher in price than socioeconomic development.

MATERIAL AND METHODS

This study investigates the hypotheses through a combination of quantitative and qualitative analysis. Firstly, we apply hedonic price modelling to our dataset of 2 235 245 observations, in which sales price is the dependent variable and the independent variables of age, size, and county are predictors. Secondly, we use the estimation output to rank counties according to their coefficients. The obtained rankings are used to run a correlation analysis with socioeconomic development rankings of Istanbul's counties. The coefficient and index rankings of certain types of counties are assessed in a case study of specific groups of counties.

There are two indices ranking Istanbul's counties according to socioeconomic development levels: Life Quality Index and Human Development Index. We estimate separate models corresponding to each of the indices by splitting the dataset into two. In our first model, we regress housing prices from January 1, 2015 to December 31, 2016 and interpret the findings via the "Life Quality Index of Istanbul" (LQI; Şeker, 2015). The estimation in our second model follows the same path, using the data from January 1, 2017 to July 15, 2018 and the "Human Development Index of Istanbul" (HDI; Şeker, Bakış, & Dizeci, 2018). The rankings of Istanbul's counties are taken as references for the coding of county variable in our study. The lowest ranking counties in the indices are determined as the base levels for the county variable in corresponding models, which are Arnavutköy and Şile.

We use a hedonic price model, in which housing price is predicted by structural and locational attributes of a housing unit, used as independent variables. The hedonic approach is widely recognised as superior compared to macroeconomic and repeat sales methods in housing. The macroeconomic perspective views the estimation of housing prices solely as a problem of supply and demand, which is proven only marginally compatible with heterogeneous products. Hill (2011) extensively discusses the issue of method selection and suggests that the repeat-sales method and hybrid methods are incompetent compared to hedonic models. On top of that, the houses in Turkey receive no unique identifiers, which sets a barrier to conducting an analysis with repeat-sales method. There are also hedonic price methods in literature that treat time as a dummy variable, hence the name "Time-Dummy Method" (de Haan & Diewert, 2013; Hill, 2011). We opted to estimate two separate models for different time periods instead of one model with a time dummy, as our study focuses on the comparison between human development and price, not price changes over time.

The key assumption of the model is that the total effect of locational attributes of a house can be expressed by the county in which it is located. This assumption is based on the premise that the effects of locational attributes are contingent (Heyman & Sommervoll, 2019). On that account, while theoretically valid, it is not meaningful to measure the marginal effect of unit change in predictors, i.e. a house's distance to the city centre (Fletcher, Gallimore, & Mangan, 2000). That being stated, using a limited number of predictors poses a risk of omitted variable bias, which is a result of omission of an independent variable that potentially affects the dependent variable. In fact, the number of variables included in a linear regression proposes a trade-off between issues of multicollinearity and omitted variable bias (Hülagü *et al.*, 2016), both of which are incompatible with assumptions of Ordinary Least Squares (OLS). The authors concede the bias and avoid multicollinearity by using few variables. This decision is

based on four grounds. Firstly, multicollinearity is considered a more important problem in hedonic regression, because it may result in a problem so severe that the predictors produce opposite signs of their actual effect (Xiao, 2017). Secondly, the assumption of the lack of bias can be flexible in certain situations, and it is recommended to opt for a biased estimator, especially if it offers less variance than an unbiased one (Salkind, 2010). Thirdly, omitted variable bias may never get terminated, while remedies like control variable may even increase the bias (Clarke, 2005). Fourthly, since we use the rankings of coefficients to analyse counties rather than the values of coefficients, a potential bias would not be a great concern for this study's results. This bias would affect every coefficient in the same direction (either over- or underestimation) and, thus, would not change the rankings.

The interpretation of marginal effects in a hedonic price model has some practical impairments that stem from the requirement of holding other variables constant when interpreting one's effect (Xiao, 2017). This requirement becomes even more impractical when interpreting marginal effects of categorical variables. For example, holding a variable like sea view constant is not always entirely possible when one interprets the effect of the house's floor. In a practical sense, it is impossible to interpret the marginal price change of switching form a rooftop with a sea view to a basement floor while holding the sea view constant. Similarly, locational attributes are often categorical in a hedonic model and suffer from the same impracticality. The varying levels of socioeconomic development and demographics within the metropolitan area make the effect of locational attributes to fluctuate. For example, the effect of school proximity on price is not constant across the sample. It would be much higher for a house in the suburbs compared to the one in inner city. Therefore, tracking marginal changes would have more explanatory power when locational attributes are treated as a whole. This is not to disqualify the findings in the extensive literature on the hedonic modelling of housing prices. However, it is compelling to incorporate all of the locational attributes in the interpretation at once (Lipscomb, 2006). To achieve this, the study uses county as the factor variable in its modelling. We then rank the prices across counties and run them through a correlation analysis with rankings from LQI and HDI. These indices take into account a wide range of spatial and socioeconomic attributes in counties, such as the education level of residents and the number of hospitals in the county. We used the rankings from indices in the county variable, rather than actual index scores, so as to enable interpretations appropriate to the study's aim.

In order to avoid ambiguities and misclassifications, we limited our dataset to only one particular type of housing unit in this study: apartments. We take the natural logarithm of the dependent variable, as the semi-log level is the typical form proposed in literature (de Haan & Diewert, 2013; Hill, 2011). We do this mostly to address the heteroscedasticity issue inherent to hedonic models (Xiao, 2017). Despite this transformation of dependent variable, the error terms might still display heteroscedasticity, which is not compatible with OLS assumptions. In this case, estimation with robust standard errors is suggested. The interpretation of coefficients with the logarithm approach is done in proportions, which provides a more sensible explanation of variance in the dependent variable than reporting a fraction of unit change caused by a unit change in independent variables.
Our proposed model is as follows:

$$lnP = \propto_0 + \sum_{i=1}^{n} \propto_i z_i + \varepsilon \quad (1)$$

in which P is the transaction price of the property, lnP is the logarithmic form of P, z_i is a housing characteristic, $\propto_0$ is the intercept term, $\propto_i$ is the coefficient of a housing characteristic; and ε is the error term. We use OLS method and STATA 14 software package to estimate models. We identify the logarithm of price as the dependent variable, the age of building and the size of the apartment as continuous explanatory variables, and the county in which the house is located as discrete explanatory variable. The age and size are the most used variables in the housing sector research, consistently proven to have similar effects across studies (Goodman, 1978; Goodman & Thibodeau, 2003; Hill, 2011; Kangallı Uyar, 2015; Kaya, 2012; Keskin, 2008; Li & Brown, 1980; Song & Knaap, 2004).

We then continue to investigate the relationships between the coefficients and the development levels of Istanbul's counties. Our dataset consists of 2 235 245 real estate sales ads from January 1, 2015 to July 15, 2018, which cover only apartment units. The observation count in our study is higher than most studies, which is likely to lead to significant estimators. The data is obtained from a data and analytics firm REIDIN, which operates in real estate and finance sectors that serves investors, banks, and other interested parties in Turkey.

RESULTS AND DISCUSSION

Descriptive Statistics

In Table 1, we present the mean price, age, and size of apartments in counties. We can easily notice in frequencies that the older (hence the more central) the county is, the fewer new properties are listed for sale there, according to the Turkish Statistical Institute's (TURKSTAT) "Building Permits Statistics" data of 2015, 2016, and 2017. Coupled with the mean prices, this observation can be extrapolated, as the prices tend to be higher on average in the older counties of Istanbul.

Mean prices in the old central counties such as Bakırköy, Beşiktaş, Beyoğlu, Kadıköy, and Üsküdar are higher than all other counties, except for Sarıyer and Beykoz. The counties that follow this group – such as Maltepe, Fatih, Zeytinburnu, and Eyüp – are on the periphery of the most central counties. The average age of apartments in those counties is lower in respect to that in the most central counties and they have more than a few gentrified areas. Bahçelievler, Bayrampaşa, Gaziosmanpaşa, Avcılar, Bağcılar, Ümraniye, and Kağıthane have seen a sizeable number of new construction projects. Therefore, their mean age of apartments for sale is relatively low. The mean prices of apartments in the said counties vary between 300 000 TL and 430 000 TL. Arnavutköy, Sultangazi, Beylikdüzü, Esenyurt, Sancaktepe, and Pendik are counties with a high number of apartments for sale and a high number of new projects.

Regression

Model 1 is estimated based on observations from January 1, 2015 to January 1, 2017 and Model 2 by observations from January 1, 2017 to July 15, 2018. We first tested both models for robustness against model specification errors by estimating different regressions that test the same hypotheses with an alternating set of predictors. We kept county dummies as the main variable and alternated age and size as test variables. The test variables produced significant coefficients with consistent signs. Results from Table 2 indicate that our primary models are robust to the specification error. Consequently, we proceeded with our main models.

Table 1. Descriptive Statistics

County	Frequency	Price (TRY)		Age		Size (m^2)		New Projects*
		mean	st dev	mean	st dev	mean	st dev	
Adalar	4 025	668 534	374 694	27.0	8.5	122.2	55.5	9
Arnavutköy	21 631	255 514	102 558	1.9	3.5	119.2	43.6	1 931
Ataşehir	69 448	623 838	444 787	7.9	7.3	116.6	47.4	1 346
Avcılar	77 732	300 461	148 319	8.5	9.7	117.9	43.2	866
Bağcılar	44 833	378 604	187 440	6.1	8.0	115.3	38.9	1 868
Bahçelievler	130 825	415 142	276 017	10.3	11.4	115.8	42.8	1 323
Bakırköy	35 048	1 171 173	1 228 914	18.1	14.4	128.8	64.4	364
Başakşehir	55 568	498 828	336 770	6.3	6.0	132.3	54.9	811
Bayrampaşa	18 492	419 539	211 082	8.0	9.4	116.3	44.3	1 046
Beşiktaş	32 094	1,130 423	727 180	22.9	13.0	117.3	46.3	165
Beykoz	8 868	770 473	526 306	15.7	8.7	144.5	58.4	40
Beylikdüzü	134 983	300 690	165 051	3.4	5.4	125.2	45.9	1 827
Beyoğlu	27 976	606 936	509 011	23.4	18.5	100.7	41.5	423
Büyükçekmece	50 788	446 721	259 591	9.7	8.9	143.5	58.7	956
Çatalca	2 752	314 553	160 594	6.3	7.5	133.2	56.2	201
Çekmeköy	48 863	340 160	176 280	3.9	4.4	111.7	40.7	1 343
Esenler	28 102	254 700	104 210	5.9	7.8	93.5	20.4	1 359
Esenyurt	146 595	218 288	107 802	2.7	3.7	106.7	32.6	4 778
Eyüp	85 092	508 042	374 863	4.1	5.5	118.8	47.2	1 700
Fatih	43 000	425 494	255 893	27.5	11.3	97.9	36.7	557
Gaziosmanpaşa	52 111	357 012	187 088	7.9	8.1	116.0	41.1	786
Güngören	27 781	365 284	204 767	21.0	10.7	110.2	37.4	210
Kadıköy	168 621	1 210 483	753 112	10.1	12.9	143.6	48.9	1 098
Kağıthane	71 666	389 242	173 987	3.9	6.0	102.0	37.7	1 743
Kartal	93 313	422 801	229 060	7.1	8.9	117.5	39.4	984
Küçükçekmece	95 513	402 235	239 454	6.4	7.8	112.5	44.6	2 422
Maltepe	125 347	503 721	251 593	8.1	10.2	121.4	46.1	1 180
Pendik	79 098	339 378	162 274	6.8	7.1	116.0	41.8	1 648
Sancaktepe	56 727	316 316	180 071	2.3	3.4	119.5	38.7	2 935
Sarıyer	42 513	1 253 259	748 699	7.9	9.0	148.0	63.7	477
Şile	12 517	368 533	158 582	9.9	9.5	116.3	46.0	942
Silivri	10 427	291 927	131 257	9.0	9.1	127.4	49.0	670
Şişli	57 775	668 161	507 048	15.2	14.4	108.7	41.3	1 206
Sultanbeyli	5 635	308 437	151 541	2.2	4.3	112.3	37.1	525
Sultangazi	60 156	284 083	116 920	5.2	6.2	116.9	43.1	1 030
Tuzla	67 794	364 549	191 653	3.6	5.5	112.9	41.1	1 116
Ümraniye	69 686	432 552	227 888	6.1	5.9	113.4	39.3	1 801
Üsküdar	35 946	725 594	671 508	14.8	13.0	120.0	51.9	863
Zeytinburnu	35 904	515 340	378 192	14.2	10.1	113.9	44.4	471
Total	2 235 245	510 519	486 533	8.4	10.6	118.9	46.1	25 908

*Building Permits Statistics, annual reports compiled, 2015-2017, Turkish Statistical Institute (TURKSTAT).
Source: own elaboration based on data from REIDIN.

Table 2. Robustness Checks

Variables	Model 1_1		Model 1_2		Model 1_3		Model 2_1		Model 2_2		Model 2_3	
_cons	11.39	***	12.29	***	11.36	***	11.96	***	12.83	***	11.90	***
age	0.00	***	-0.01	***	–	–	-0.01	***	-0.01	***	–	–
size	0.01	***	–	–	0.01	***	0.01	***	–	–	0.01	***
Adalar	1.05	***	1.00	***	0.95	***	0.62	***	0.69	***	0.52	***
Ataşehir	0.91	***	0.87	***	0.90	***	-0.44	***	-0.42	***	-0.39	***
Avcılar	0.19	***	0.17	***	0.16	***	0.41	***	0.41	***	0.42	***
Bağcılar	0.37	***	0.31	***	0.36	***	-0.24	***	-0.24	***	-0.23	***
Bahçelievler	0.50	***	0.41	***	0.45	***	-0.02	0.001	-0.03	***	0.01	0.236
Bakırköy	1.31	***	1.26	***	1.22	***	0.05	***	0.05	***	0.05	***
Başakşehir	0.55	***	0.51	***	0.55	***	0.90	***	1.02	***	0.86	***
Bayrampaşa	0.50	***	0.41	***	0.48	***	0.05	***	0.19	***	0.07	***
Beşiktaş	1.56	***	1.51	***	1.47	***	0.09	***	0.09	***	0.10	***
Beykoz	0.87	***	1.07	***	0.83	***	1.09	***	1.12	***	1.03	***
Beylikdüzü	0.26	***	0.33	***	0.25	***	0.52	***	0.72	***	0.48	***
Beyoğlu	1.08	***	0.93	***	0.97	***	-0.39	***	-0.34	***	-0.35	***
Büyükçekmece	0.35	***	0.49	***	0.33	***	0.52	***	0.42	***	0.46	***
Çatalca	0.13	***	0.21	***	0.11	***	-0.05	***	0.15	***	-0.05	***
Çekmeköy	0.38	***	0.32	***	0.38	***	-0.31	***	-0.18	***	-0.29	***
Esenler	0.20	***	-0.02	0.195	0.18	***	-0.10	***	-0.15	***	-0.07	***
Esenyurt	-0.01	0.288	-0.14	***	-0.01	0.556	-0.21	***	-0.38	***	-0.18	***
Eyüp	0.61	***	0.58	***	0.61	***	-0.51	***	-0.59	***	-0.46	***
Fatih	0.81	***	0.65	***	0.71	***	0.15	***	0.17	***	0.19	***
Gaziosmanpaşa	0.27	***	0.21	***	0.26	***	0.31	***	0.19	***	0.22	***
Güngören	0.52	***	0.44	***	0.44	***	-0.05	***	-0.06	***	-0.04	***
Kadıköy	1.40	***	1.52	***	1.34	***	0.06	***	0.02	0.001	0.00	0.839
Kağıthane	0.54	***	0.41	***	0.54	***	0.91	***	1.12	***	0.92	***
Kartal	0.52	***	0.49	***	0.50	***	0.12	***	0.00	0.881	0.15	***
Küçükçekmece	0.43	***	0.34	***	0.42	***	0.10	***	0.10	***	0.11	***
Maltepe	0.70	***	0.68	***	0.67	***	0.03	***	0.01	0.431	0.05	***
Pendik	0.26	***	0.21	***	0.24	***	0.25	***	0.28	***	0.26	***
Sancaktepe	0.32	***	0.30	***	0.33	***	-0.08	***	-0.09	***	-0.06	***
Sarıyer	1.36	***	1.45	***	1.34	***	-0.26	***	-0.25	***	-0.22	***
Şile	0.36	***	0.34	***	0.34	***	0.90	***	1.15	***	0.91	***
Silivri	-0.11	***	-0.03	0.149	-0.14	***	-0.31	***	-0.24	***	-0.31	***
Şişli	1.09	***	0.98	***	1.02	***	0.55	***	0.50	***	0.53	***
Sultanbeyli	0.37	***	0.31	***	0.37	***	-0.23	***	-0.26	***	-0.18	***
Sultangazi	0.05	***	-0.02	0.274	0.04	***	-0.28	***	-0.27	***	-0.25	***
Tuzla	0.35	***	0.24	***	0.35	***	-0.06	***	-0.09	***	-0.02	***
Ümraniye	0.61	***	0.57	***	0.61	***	0.13	***	0.10	***	0.16	***
Üsküdar	0.92	***	0.91	***	0.87	***	0.51	***	0.54	***	0.49	***
Zeytinburnu	0.68	***	0.59	***	0.64	***	0.29	***	0.28	***	0.26	***

***: $p < 0.001$

Source: own study.

Table 3. Results of Model 1

Dependent Variable: price_log	Coef.	Robust Std. Err.	t	P>t
_cons	11.3872	0.009	1306.85	***
age	-0.0044	0.000	-53.94	***
size	0.0071	0.000	358.13	***
Beşiktaş	1.5614	0.010	161.04	***
Kadıköy	1.4050	0.009	162.87	***
Bakırköy	1.3052	0.010	130.76	***
Şişli	1.0857	0.009	114.64	***
Fatih	0.8137	0.009	86.04	***
Beyoğlu	1.0763	0.012	91.92	***
Üsküdar	0.9217	0.010	96.3	***
Sarıyer	1.3638	0.010	140.98	***
Eyüp	0.6124	0.009	64.75	***
Maltepe	0.7018	0.009	81.55	***
Kartal	0.5239	0.009	59.74	***
Küçükçekmece	0.4345	0.009	48.33	***
Bayrampaşa	0.5029	0.011	45.58	***
Büyükçekmece	0.3499	0.009	38.68	***
Bahçelievler	0.4976	0.009	56.87	***
Ataşehir	0.9093	0.009	101.73	***
Pendik	0.2551	0.009	29.33	***
Zeytinburnu	0.6781	0.010	66.73	***
Beylikdüzü	0.2604	0.009	30.36	***
Beykoz	0.8744	0.014	64.74	***
Tuzla	0.3532	0.010	34.95	***
Kağıthane	0.5445	0.009	59.14	***
Ümraniye	0.6143	0.009	69.51	***
Güngören	0.5155	0.010	51.37	***
Adalar	1.0521	0.017	63.46	***
Başakşehir	0.5524	0.009	59.98	***
Avcılar	0.1932	0.009	22.15	***
Bağcılar	0.3719	0.010	38.53	***
Esenyurt	-0.0112	0.009	-1.31	0.19
Çatalca	0.1285	0.027	4.84	***
Çekmeköy	0.3815	0.009	42.92	***
Silivri	-0.1063	0.014	-7.76	***
Gaziosmanpaşa	0.2709	0.009	30.02	***
Sancaktepe	0.3223	0.009	34.1	***
Esenler	0.1965	0.009	21.02	***
Sultangazi	0.0520	0.009	5.89	***
Şile	0.3643	0.019	18.87	***
Sultanbeyli	0.3675	0.021	17.32	***

Note: R^2=0.7049, p=0.000, base county: Arnavutköy, ***: p=0.000
Source: own elaboration based on data from REIDIN.

Table 4. Results of Model 2

Dependent Variable: price_log	Coef.	Std. Err.	t	P>t
_cons	11.9570	0.003	3654.11	***
age	-0.0055	0.000	-181.09	***
size	0.0075	0.000	909.21	***
Beşiktaş	1.0937	0.004	275.60	***
Kadıköy	0.9113	0.003	278.05	***
Şişli	0.5543	0.004	146.29	***
Bakırköy	0.9018	0.004	232.35	***
Maltepe	0.2456	0.003	75.37	***
Üsküdar	0.5110	0.004	143.21	***
Sarıyer	0.9000	0.004	251.53	***
Ataşehir	0.4107	0.004	115.59	***
Ümraniye	0.1334	0.003	39.72	***
Beyoğlu	0.5249	0.005	106.55	***
Fatih	0.3147	0.004	87.44	***
Avcılar	-0.2434	0.003	-72.03	***
Beylikdüzü	-0.3854	0.003	-116.15	***
Tuzla	-0.0587	0.003	-16.83	***
Çekmeköy	-0.1019	0.003	-30.11	***
Başakşehir	0.0462	0.004	12.82	***
Pendik	-0.0835	0.003	-25.01	***
Kartal	0.0956	0.003	28.76	***
Küçükçekmece	0.0345	0.003	10.14	***
Bayrampaşa	0.0860	0.004	21.75	***
Eyüp	0.1525	0.003	43.91	***
Silivri	-0.3142	0.004	-79.58	***
Beykoz	0.5157	0.006	88.71	***
Esenler	-0.2080	0.004	-58.45	***
Kağıthane	0.1163	0.003	34.38	***
Bahçelievler	0.0466	0.003	13.83	***
Güngören	0.0598	0.004	15.86	***
Gaziosmanpaşa	-0.0510	0.004	-14.56	***
Büyükçekmece	-0.0518	0.004	-14.76	***
Zeytinburnu	0.2852	0.004	73.45	***
Sultanbeyli	-0.2272	0.004	-52.61	***
Esenyurt	-0.5058	0.003	-153.63	***
Arnavutköy	-0.4350	0.004	-122.05	***
Çatalca	-0.3058	0.007	-47.01	***
Bağcılar	-0.0158	0.004	-4.41	***
Sancaktepe	-0.2639	0.003	-76.30	***
Sultangazi	-0.2755	0.003	-82.14	***
Adalar	0.6154	0.006	99.27	***

Note: R^2=0.7348, p=0.000, base county: Şile, ***: p=0.000

Source: own elaborations based on data from REIDIN.

Our estimations yielded heteroscedastic error terms; Model 1 more so, which is a common problem with hedonic models. We estimated the model with robust standard errors as the literature suggests (Hill, 2011). The distribution of errors improved much and we report these estimation results as final in Table 3 and Table 4. Variance inflation factor in both our estimations showed no sign of multicollinearity. Omitted variable bias is present in both our estimations, but it is not fatal for our analysis, since we use the rankings of coefficient, which is not affected by the bias.

In Table 3, we present the estimation results for Model 1, fitted to sales ads data covering 390 530 observations between January 1, 2015 and December 31, 2016. The model is fit as the p-value is 0.000 and the adjusted R^2 is 0.7049, which is fairly high for a hedonic model, particularly when considering the high number of levels in the county variable. The slope coefficients of age and size are estimated to be -0.0044 and 0.0071, respectively. As for the county variable, we found all but one county's coefficient to be significant at 0.001 level. The coefficients are listed in respect to their ranking from the "Life Quality Index" (LQI; Şeker, 2015).

Table 4 displays the findings from our second model, estimated using a dataset consisting of 1 844 715 observations from January 1, 2017 to July 15, 2018. The statistics for the fitness of the model are obtained as p-value=0.000 and the adjusted R^2=0.7348. The slope coefficients of age and size are estimated to be -0.0055 and 0.0075, respectively. As for the county variable, we found all counties' coefficients to be significant at 0.001 level. The coefficients are listed in respect to their ranking from the "Human Development Index 2017" (HDI; Şeker, Bakış, & Dizeci, 2018).

Correlations

Table 5 displays the correlations between counties' price rankings obtained from models and index rankings with the use of Spearman's rank order correlation method. The results indicate strong – and positive correlation between rankings of price and index that belong the same time period, 77% and 57% respectively. The coefficients of first model are more in line with the LQI rankings than that of the second model with the HDI rankings. The results of this analysis support H_1.

Table 5. Correlations

LQI – Model 1	HDI – Model 2
0.77*	0.57*

*: p<0.05

Note: LQI – Life Quality Index; HDI – Human Development Index.

Source: own study.

Discussion

In terms of direction and magnitude, the coefficients of age and size in both estimations are logically correct; and they are also parallel and in reasonable proportion to the previous findings in literature (Berry & Bednarz, 1975; Can, 1992; Li & Brown, 1980; Ozus *et al.*, 2007; Song & Knaap, 2004). Considering the heterogeneous nature of the real estate market, our main focus here is county, as the development level of a county implies an impact on its price according to the hedonic approach. Being a categorical variable, each county's coefficient

represents the percentage of marginal change in logarithm of prices. We ranked the coefficients of different levels of the county variable from the largest to the smallest; and obtained a price ranking for each model. We present ranks of price from the first model and the LQI in Figure 1, while the price from the second model and the HDI in Figure 2. The geographical locations and administrative borders of counties are presented in Figure 3.

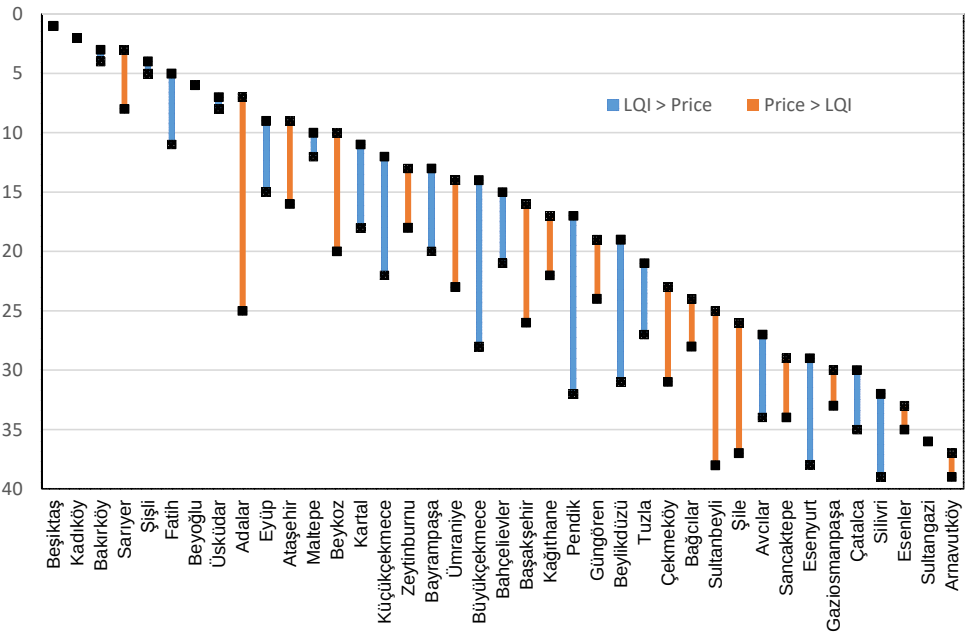

Figure 1. Counties' ranking of coefficients from first model and Life Quality Index
Source: own elaboration.

The county with the highest apartment prices in both models is found to be Beşiktaş. This is coherent with that county's ranking in indices, as Beşiktaş tops both the LQI and the HDI.

Our first focus is older counties in the inner parts of the city. On 12 occasions across both models, mean deviation between the price and index rankings of Beşiktaş, Kadıköy, Bakırköy, Üsküdar, Şişli, and Fatih is found to be only 1.25. The correlation between index and price rankings of these counties emerged to be 0.910 and 0.98 in Model 1 and Model 2, respectively. These findings support H_2.

Among the counties whose index ranking is higher than the price ranking are Beylikdüzü, Büyükçekmece, Pendik, and Küçükçekmece in the first model; and Beylikdüzü, Çekmeköy, Pendik, Silivri, and Tuzla in the second model. Said countries feature qualities of suburbanised areas; with limited public transportation to the city centre, low average age of houses, a high number of new constructions, and proper access to nearby social amenities and services. From the data presented in Table1, new building permits from 2015 to 2018 in the said counties from the first model make up 6 853 combined; the same number for the second model is 6 623. These numbers are both larger than a quarter of all permits in Istanbul given in that period. These results show that counties undergoing the suburbanisation process rank higher in socioeconomic development than price; therefore, H_3 is supported.

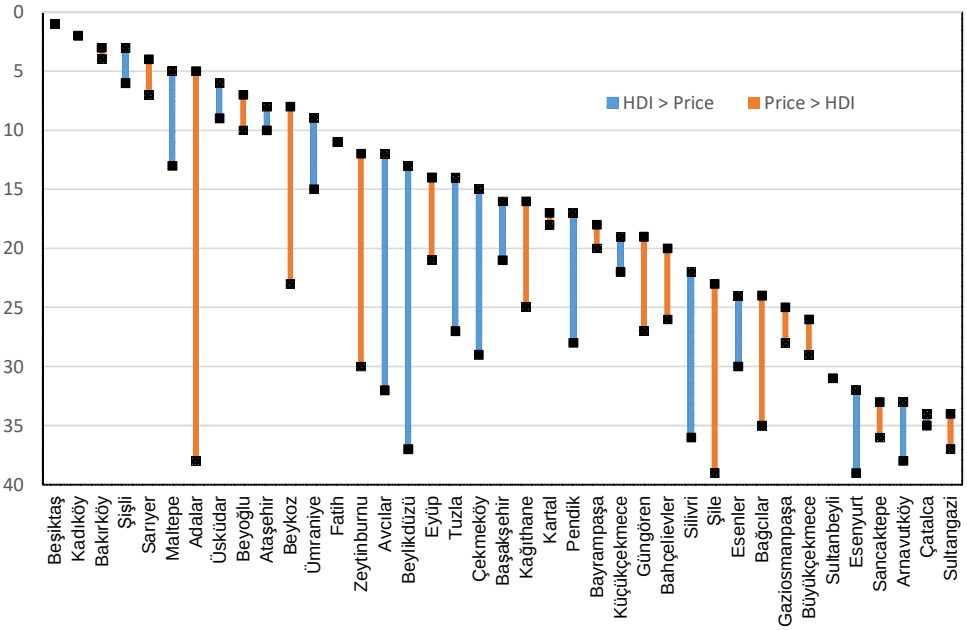

Figure 2. Counties' ranking of coefficients from second model and Human Development Index
Source: own elaboration.

Figure 3. Map of Counties of Istanbul
Source: Istanbul Metropolitan Municipality.

Among the factors that account for housing prices to be lower in suburbanised counties in comparison to their social development levels, two in particular appear to be in effect here. The first is that all of those counties are far from the city centre and closer to the peripheries. This potential reason proves true even when high social development exists, because the evidence from metropolitan areas show that the very distance of a suburb from the centre drives a need to establish a socially developed environment within (Ciraci & Kundak, 2000; Eraydın, 2008; Keyder, 2005; Kolluoglu & Bartu Candan, 2008; Mieszkowski & Smith, 1991; Ottensmann, Payton, & Man, 2008). The second factor is the unparalleled rapid development of construction projects in said counties (Eraydın, 2008). One can expect this situation to translate into higher housing prices (Karaman & Islam, 2012; Kuyucu & Ünsal, 2010; White, 1975). However, the new construction projects have led to a sufficient influx of housing supply to keep prices in check by meeting the demand adequately on average for long periods (Ozsoy *et al.*, 2003).

The counties that have gentrified areas indeed show to have higher rankings in price than respective index rankings, thus supporting H_4. Başakşehir, Sultanbeyli, and Ümraniye in the first model and Bağcılar, Kağıthane, and Zeytinburnu in the second model fall into this group. Except for Başakşehir, whose urban transformation consists mostly of new housing projects, these counties have been homes to squatters. Among them, Zeytinburnu, Bağcılar, Kağıthane, and Ümraniye are in the proximity of the inner city on both sides of Bosphorus, which attracted migrant settlements and squatters for years. Bağcılar, Kağıthane, and Zeytinburnu have a common characteristic that drives the sales price of apartments higher: they are located in the immediate hinterland of the central parts of Istanbul. Their social structures once consisted of squatters and slums built by immigrants (Ozcevik *et al.*, 2007). They were occupied by manufacturing facilities and their workers, as Bağcılar was the county with mostly workers dwellings (Ocakçı, 2000), but then they turned into centres of sprawl in the 2000's (Akdogan, 2009). Later, it became a site for urban regeneration programs since 2011, thanks to the aforementioned legislation that promise urban aesthetic and durability against the threat of an earthquake (Bodur & Dülgeroğlu Yüksel, 2017; Karaman, 2009; Ozcevik *et al.*, 2008; Yapıcı & Ileri, 2019). The reason why Başakşehir is among these counties is regarding its special case of transformation. Started as a satellite city with very limited public transportation and many new constructions every year, Başakşehir used to be a suburbanised county. With recent introductions of the metro line and multiple bus lines covering the nearby suburban areas, Başakşehir transformed into a centre on its own. Consequently, Istanbul's evolution into a multi-centred city can be attributed to TOKI's actions, which display similarities to actions of a for-profit institution (Güney, Keil, & Üçoğlu, 2019).

Despite the policymakers' argument that the urban redevelopment in Istanbul is done for risk mitigation, many parties from academia and NGOs are suspicious of an underlying motive of interest-seeking through gentrification (Ergun, 2004; Islam, 2010; Karaman & Islam, 2012; Lovering & Türkmen, 2011; OECD, 2018; Pinarcioğlu & Isik, 2008; Yapıcı & Ileri, 2019; Yetiskul, Kayasü, & Ozdemir, 2016). This concern is mostly backed by our findings, especially in the case of counties with gentrified areas. These counties used to accommodate the poor and the middle class; they used to have low social development and bad infrastructure (Ozus, Turk, & Dokmeci, 2011). Thanks to easy access to main highways and with the

addition of new units, the housing prices are now much higher than before. As a consequence, their demographic is replaced by high-income households (Öktem, 2011). However, since the land is already almost fully occupied, a rapid transformation occurred in the housing sector, in form of one house replacing the old one's spot, which does not necessarily accelerate the improvement of infrastructure or social amenities in the vicinity. Hence, a higher HDI ranking in said counties is expected to follow the increase in housing prices.

CONCLUSIONS

In our study, we analysed the housing prices in Istanbul at county level by hedonic modelling; then, we extrapolated the results by juxtaposing them onto the LQI (Şeker, 2015) and the HDI (Şeker, Bakış, & Dizeci, 2018). We pursued a standardisation to reduce the complexity of the problem at hand by using data from apartment units only. We ranked the coefficients of the counties and compared them with their corresponding index rankings. As an effect, all four hypotheses are supported by the findings.

According to our results, the socioeconomic development level of the area in which a housing unit is located is highly correlated with its price. The socioeconomic development level of a house's county appears to have a positive relationship with the price. The locational attributes as a whole provided a practical interpretation of price that is applicable to any house available on market. The housing units in older counties are the group with prices most in line with the socioeconomic development levels. Counties undergoing the suburbanisation process rank lower in price than in human development. Counties under the gentrification process display the opposite outcome, as they rank higher in price than in human development.

In light of the findings and existing literature, urban transformation methods and changing levels of human development display different relationships with housing prices. It is especially significant when a metropolitan city such as Istanbul has been undergoing every aspect of urban transformation for over a decade. This relationship might be driving the urban transformation process in Istanbul, since it is likely to generate revenue through cultivating the potential of an existing resource: land. Gentrification and suburbanisation at a very aggressive rate in Istanbul, or in any metropolitan area, would result in pushing lower income inhabitants to the outer parts and raising a new demographic almost in every part of the city. This strategy is likely to diminish the characteristics of the city, which hurts not only the sociodemographic landscape but also the economic one, as the two are shown to be linked by an elated body of research, including this study.

Our study proposed a comprehensive approach to analysing Istanbul's housing prices, combining results from quantitative methods and a case study. Our analysis also involved a retrospective and political analysis of the city's counties and an assessment of social development levels with a focus on the counties' characteristics. The study's most important limitation is the use of few variables. Our model suffered from omitted variable bias; therefore, future research can take the route of adding more structural variables to the model so as to better analyse the housing market in Istanbul. There is room for improvement in this line of research that can be achieved by ranking smaller areas such as neighbourhoods to the locational effects as a whole investigated with higher precision. Extending this study to different types of housing is expected to provide a better insight from the comparison of results.

REFERENCES

Akdogan, G. (2009). *Dealing with rapid development: Creation of the informal urban economy and gecekondu housing in Istanbul*. Iowa State University.

Atkinson, R., & Bridge, G. (2005). *Gentrification in a Global Context: The New Urban Colonialism*. New York: Routledge. https://doi.org/10.4324/9780203392089

Berry, B.J.L., & Bednarz, R.S. (1975). A Hedonic Model of Prices and Assessments for Single-Family Homes: Does the Assessor Follow the Market or the Market Follow the Assessor?. *Land Economics*, *51*(1), 21-40.

Billingham, C.M. (2015). The Broadening Conception of Gentrification: Recent Developments and Avenues for Future Inquiry in the Sociological Study of Urban Change. *Michigan Sociological Review*, *29*(Fall 2015), 75-102.

Bodur, A., & Dülgeroğlu Yüksel, Y. (2017). Assessing change in quality of life following rehousing from slum settlements to social housing. *A/Z ITU Journal of the Faculty of Architecture*, *14*(3), 53-65. https://doi.org/10.5505/itujfa.2018.36002

Bradbury, K., Engle, R., Irvine, O., & Rothenberg, J. (1977). Simultaneous estimation of the supply and demand for housing location in a multizoned metropolitan area. In G.K. Ingram (Ed.), *Residential Location and Urban Housing Markets* (pp. 51-92). National Bureau of Economic Research.

Can, A. (1992). Specification and estimation of hedonic housing price models. *Regional Science and Urban Economics*, *22*(3), 453-474. https://doi.org/10.1016/0166-0462(92)90039-4

Ciraci, H., & Kundak, S. (2000). Changing Urban Pattern of Istanbul: from Monocentric To Polycentric Structure. *40th Congress of the European Regional Science Association*. Barcelona, Spain.

Clarke, K.A. (2005). The phantom menace: Omitted variable bias in econometric research. *Conflict Management and Peace Science*, *22*(4), 341-352. https://doi.org/10.1080/07388940500339183

de Haan, J., & Diewert, E. (2013). Hedonic Regression Methods. In *Handbook on Residential Property Price Indices* (pp. 49-64). Luxembourg: Eurostat.

Dokmeci, V., Berkoz, L., Levent, H., Yurekli, H., & Cagdas, G. (1996). Residential preferences in Istanbul. *Habitat International*, *20*(2), 241-251.

Efe, R., Bizzarri, C., Cürebal, I., & Nyussupova, G. (2015). *Environment and Ecology at the Beginning of 21 st Century*. In R. Efe, C. Bizzarri, I. Cürebal, & G. Nyussupova, (Eds.). Sofia: St. Kliment Ohridski University Press.

Eraydın, A. (2008). The Conditional Nature of Relations Between Competitiveness, Social Cohesion and Spatial Inequalities: The Evidence from Istanbul. In P. Ache, H.T. Andersen, T. Maloutas, M. Raco, & T. Taşan-Kok (Eds.), *Cities between Competitiveness and Cohesion* (pp. 99-115). Springer. https://doi.org/10.1007/978-1-4020-8241-2

Ergun, N. (2004). Gentrification in Istanbul. *Cities*, *21*(5), 391-405. https://doi.org/10.1016/j.cities.2004.07.004

Fletcher, M., Gallimore, P., & Mangan, J. (2000). Heteroscedasticity in hedonic house price models. *Journal of Property Research*, *17*(2), 93-108. https://doi.org/10.1080/095999100367930

Frenkel, A., Bendit, E., & Kaplan, S. (2013). The linkage between the lifestyle of knowledge-workers and their intra-metropolitan residential choice: A clustering approach based on self-organizing maps. *Computers, Environment and Urban Systems*, *39*, 151-161. https://doi.org/10.1016/j.compenvurbsys.2012.09.001

Głuszak, M. (2018). Externalities and house prices: A stated preferences approach. *Entrepreneurial Business and Economics Review*, *6*(4), 181-196. https://doi.org/10.15678/EBER.2018.060410

Goodman, A.C. (1978). Hedonic Prices, Price Indices and Housing Markets. *Journal of Urban Economics*, *5*, 471.

Goodman, A.C., & Thibodeau, T.G. (2003). Housing market segmentation and hedonic prediction accuracy. *Journal of Housing Economics*, *12*(3), 181-201. https://doi.org/10.1016/S1051-1377(03)00031-7

Guerrieri, V., Hartley, D., & Hurst, E. (2013). Endogenous gentrification and housing price dynamics. *Journal of Public Economics*, *100*, 45-60. https://doi.org/10.1016/j.jpubeco.2013.02.001

Güler, E.Z. (2013). Urban renewal in working class areas in Istanbul De-industrialization and urban renewal in Beykoz – Paşabahçe Istanbul. In *RC21 Resourceful Cities* (pp. 8-10). Berlin, Germany.

Gülersoy, N.Z., & Güler, E. (2011). Conceptual challenges on urban transformation. *ITU A|Z*, *8*(1), 10-24.

Güney, K.M., Keil, R., & Üçoğlu, M. (2019). *Massive Suburbanization: (Re)Building the Global Periphery*. Toronto: University of Toronto Press.

Heyman, A.V., & Sommervoll, D.E. (2019). House prices and relative location. *Cities*, *95*(April). https://doi.org/10.1016/j.cities.2019.06.004

Hill, R. (2011). Hedonic price indexes for housing. *OECD Statistics Working Papers,* (1), 3-61. https://doi.org/10.1787/5kghzxpt6g6f-en

Hülagü, T., Kızılkaya, E., Özbekler, A.G., & Tunar, P. (2016). *A Hedonic House Price Index for Turkey*.

Islam, T. (2010). Current Urban Discourse: Urban Transformation and Gentrification in Istanbul. *Architectural Design*, *80*(1), 58-63.

Kangallı Uyar, S.G. (2015). *Hedonik fiyat teorisi çerçevesinde İstanbul konut piyasası fiyat dinamiklerinin parametrik ve parametrik olmayan mekânsal modeller ile karşılaştırmalı analizi* (Doctoral dissertation). Pamukkale University, Turkey.

Karaman, O. (2009). Urban Pulse – (RE)Making Space for Globalization in Istanbul. *Urban Geography*, *29*(6), 518-525. https://doi.org/10.2747/0272-3638.29.6.518

Karaman, O., & Islam, T. (2012). On the Dual Nature of intra-urban borders: The case of a Romani neighborhood in Istanbul. *Cities*, *29*(4), 234-243. https://doi.org/10.1016/j.cities.2011.09.007

Kaya, A. (2012). *Türkiye'de Konut Fiyatlarını Etkileyen Faktörlerin Hedonik Fiyat Modeli ile Belirlenmesi*. Specialist Dissertation submitted to TCMB Statistics Department.

Keskin, B. (2008). Hedonic analysis of price in the istanbul housing market. *International Journal of Strategic Property Management*, *12*(2), 125-138. https://doi.org/10.3846/1648-715X.2008.12.125-138

Keyder, Ç. (2005). Globalization and Social Exclusion in Istanbul. *International Journal of Urban and Regional Research*, *29*(1), 124-134.

Kisar Koramaz, E., Koramaz, T.K., & Özer, Ö. (2018). Urban transformation through property-led regeneration: A case of building renewals in Istanbul. *A/Z ITU Journal of the Faculty of Architecture*, *15*(2), 183-196. https://doi.org/10.5505/itujfa.2018.95815

Kolluoglu, B., & Bartu Candan, A. (2008). Emerging Spaces of Neoliberalism: A Gated Town and a Public Housing Project in Istanbul. *New Perspectives on Turkey*, *39*(1), 5-46. https://doi.org/10.1017/S0896634600005057

Kuyucu, T., & Ünsal, Ö. (2010). "Urban transformation" as state-led property transfer: An analysis of two cases of urban renewal in Istanbul. *Urban Studies*, *47*(7), 1479-1499. https://doi.org/10.1177/0042098009353629

Li, M.M., & Brown, J.H. (1980). Micro-Neighborhood Externalities and Hedonic Housing Prices. *Land Economics*, *56*(2), 125-141.

Lipscomb, C. (2006). An Alternative Spatial Hedonic Estimation Approach. *Journal of Housing Research*, *15*(2), 143-160.

Lovering, J., & Türkmen, H. (2011). Bulldozer neo-liberalism in Istanbul: The state-led construction of property markets, and the displacement of the urban poor. *International Planning Studies*, *16*(1), 73-96. https://doi.org/10.1080/13563475.2011.552477

Martin, I.W., & Beck, K. (2018). Gentrification, property tax limitation, and displacement. *Urban Affairs Review*, *54*(1), 33-73. https://doi.org/10.1177/1078087416666959

Michalos, A.C. (2014). *Encyclopedia of Quality of Life and Well-Being Research*. https://doi.org/10.1007/978-94-007-0753-5

Mieszkowski, P., & Smith, B. (1991). Analyzing urban decentralization. The case of Houston. *Regional Science and Urban Economics*, *21*(2), 183-199. https://doi.org/10.1016/0166-0462(91)90033-J

Montgomery, M.R. (2008). The urban transformation of the developing world. *Science*, *319*(5864), 761-764. https://doi.org/10.1126/science.1153012

NYU Furman Center. (2015). *State of New York City's Housing and Neighborhoods in 2015*. New York. https://doi.org/10.2139/ssrn.2610700

Ocakçı, M. (2000). Commuting Pattern of Industrial Laborers in the Istanbul Metropolitan Area. *Cities*, *17*(1), 55-61.

OECD. (2018). *OECD Economic Surveys: Turkey Overview*.

Öktem, B. (2011). The role of global city discourses in the development and transformation of the Buyukdere-Maslak axis into the international business district of Istanbul. *International Planning Studies*, *16*(1), 27-42. https://doi.org/10.1080/13563475.2011.552498

Ottensmann, J. R., Payton, S., & Man, J. (2008). Urban Location and Housing Prices within a Hedonic Model. *Journal of Regional Analysis and Policy*, *38*(1), 19-35.

Ozcevik, O., Turk, S.S., Beygo, C., Akcakaya, I., & Sen, K. (2007). Community Development for Sustainable Urban Regeneration: Reflections of Zeytinburnu Ottoman Neighbourhood Case. *ENHR International Conference on Sustainable Urban Areas* (pp. 1-19). Rotterdam, Netherlands.

Ozcevik, O., Turk, S., Tas, E., Yaman, H., & Beygo, C. (2008). Flagship regeneration project as a tool for post-disaster recovery planning: the Zeytinburnu case. *Disasters*, *33*(2), 180-202. https://doi.org/10.1111/j.1467-7717.2008.01069.x

Özdemir Sarı, Ö.B., Özdemir, S.S., & Uzun, N. (Eds.). (2019). *Urban and Regional Planning in Turkey*. Cham: Springer International Publishing. https://doi.org/10.1007/978-3-030-05773-2

Ozden, P. (2012). Culture-led regeneration projects in post-industrial areas: the Istanbul experience. In *Transactions on Ecology and The Environment* (pp. 823-834). https://doi.org/10.2495/SC120692

Ozsoy, A., Altas, N.E., Ok, V., & Pulat, G. (2003). Quality assessment model for housing. *Habitat International*, *20*(2), 163-173. https://doi.org/10.1016/0197-3975(95)00045-3

Ozus, E., Dokmeci, V., Kiroglu, G., & Egdemir, G. (2007). Spatial analysis of residential prices in Istanbul. *European Planning Studies*, *15*(5), 707-721. https://doi.org/10.1080/09654310701214085

Ozus, E., Turk, S.S., & Dokmeci, V. (2011). Urban restructuring of Istanbul. *European Planning Studies*, *19*(2), 331-356. https://doi.org/10.1080/09654313.2010.515826

Pinarcioğlu, M., & Isik, O. (2008). Not only helpless but also hopeless: Changing dynamics of urban poverty in Turkey, the case of Sultanbeyli, Istanbul. *European Planning Studies*, *16*(10), 1353-1370. https://doi.org/10.1080/09654310802420060

Salkind, N. (2010). *Encyclopedia of Research Design*. *Dictionary of Statistics & Methodology*. Thousand Oaks: SAGE Publications. https://doi.org/10.4135/9781412961288

Şeker, M. (2015). Quality of Life Index: A Case Study of İstanbul. *Ekonometri ve İstatistik*, (23), 1-15.

Şeker, M., Bakış, Ç., & Dizeci, B. (2018). *İnsani Gelişme Endeksi – İlçeler 2017*. İstanbul: İNGEV Yayınları.

Song, Y., & Knaap, G.J. (2004). Measuring the effects of mixed land uses on housing values. *Regional Science and Urban Economics*, *34*(6), 663-680. https://doi.org/10.1016/j.regsciurbeco.2004.02.003

Steinmetz-Wood, M., Wasfi, R., Parker, G., Bornstein, L., Caron, J., & Kestens, Y. (2017). Is gentrification all bad? Positive association between gentrification and individual's perceived neighborhood collective efficacy in Montreal, Canada. *International Journal of Health Geographics*, *16*(24), 1-8. https://doi.org/10.1186/s12942-017-0096-6

Tang, Z. (2006). *The Urban Housing Market in a Transitional Economy: Shanghai as a Case Study* (Doctoral dissertation). Indiana University, USA.

The World Bank. (2015). *Rise of the Anatolian Tigers: Turkey Urbanization Review*.

Turkmen, H. (2014). *Urban renewal projects and dynamics of contention in Istanbul: The cases of Fener-Balat-Ayvansaray and Suleymaniye*. Cardiff University.

Wacquant, L. (2008). Relocating gentrification: The working class, science and the state in recent urban research. *International Journal of Urban and Regional Research*, *32*(1), 198-205. https://doi.org/10.1111/j.1468-2427.2008.00774.x

White, M.J. (1975). The Effect of Zoning on the Size of Metropolitan Areas. *Journal of Urban Economics*, *2*(4), 279-290.

Xiao, Y. (2017). *Urban Morphology and Housing Market*. Shanghai: Springer. https://doi.org/10.1007/978-981-10-2762-8

Yapıcı, M., & Ileri, E. (2019). Urban Transformation in Istanbul. In E. Özyürek, G. Özpınar, & E. Altındiş (Eds.), *Authoritarianism and Resistance in Turkey*. Springer.

Yetiskul, E., Kayasü, S., & Ozdemir, S. Y. (2016). Local responses to urban redevelopment projects: The case of Beyoğlu, Istanbul. *Habitat International*, *51*, 159-167. https://doi.org/10.1016/j.habitatint.2015.10.019

Yılmaz Bakır, N. (2019). Project-Based Urban Renewal and Transformation of Urban Landscape in Turkey. In *Landscape Reclamation - Rising From What's Left [Working Title]* (pp. 1-22). InTech Open.

Zambon, I., & Salvati, L. (2019). Metropolitan growth, urban cycles and housing in a Mediterranean country, 1910s-2010s. *Cities*, *95*(July), 102412. https://doi.org/10.1016/j.cities.2019.102412

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Does Entrepreneurship Affect Income Inequality within Countries? Direct and Indirect Effects in European Countries

Aleksandra Gaweł

ABSTRACT

Objective: The objective of the article is to verify the direct and indirect impact of entrepreneurship on income inequality within countries. Inequality has long been a problem for people, which appears as a consequence of unequal access to and distribution of wealth. The article implements the perspective of entrepreneurship into the discussion on inequality.

Research Design & Methods: The research method is quantitative. Based on panel data of 26 European countries in years 2008-2018, regression functions are estimated to verify research hypotheses.

Findings: The direct influence of entrepreneurship measured by birth rate, death rate, and survival rate on inequality seems to be quite limited. However, the most important relationship is indirect impact through employment creation, which seems to reduce income inequality, especially regarding the employment of surviving companies.

Implications & Recommendations: The employment share of surviving companies is an important variable that reduces income inequality; the entrepreneurship policy should concentrate on supporting the survival of newly created companies, not just on the start-up process.

Contribution & Value Added: The novelty of the article is to implement the distinction between direct and indirect impact of entrepreneurship. The process of new company creation affects not only incomes of entrepreneurs but most importantly the indirect reduction of income inequality through employment. Moreover, the article sheds new light on the matter of inequality by the incorporation of time lag into analyses.

Article type: research article

Keywords: entrepreneurship; start-up rate; survival rate; employment share; income inequality; within inequality

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INTRODUCTION

Equal income distribution is a dream that inspires humanity, it influences revolutions that treat equal wealth distribution as a sine qua non condition for freedom and dignity. Although today the capitalist system is generally accused of inducing inequality (Ragoubi & El Harbi, 2018), in the historical age – meaning since the availability of written historical sources for a given area – social inequalities are noted in every civilisation. The problem of inequality holds the key position in philosophical debate, with private property being treated as the fundamental cause of inequality (Sunajko 2016). Observed inequalities led to the emergence and development of the concept of social classes. In a review of class theory, Luk'ianchikova and Iamshchikova (2019) begin with the views of Plato, who indicated the existence of two states, one rich and one poor, both living and struggling together. Aristotle assumed the existence of three classes, the very rich, the very poor, and the middle class, among which the middle class is the optimal one, as its members are the most rational. Marx introduced the distribution of social classes based on the structure of production into work or property, while Max Weber later distinguished property (defining economic classes), power (defining political parties), and prestige (status groups) as three separate interacting factors that determine hierarchies in any society. Currently, the division of classes regards the status of occupation (employees, employers, and self-employed) or the share in the means of production (workers and capitalists or traditional and new middle class).

Due to the problem with access to historical data and their comparability, it is difficult to reliably determine the scale and variability of social inequalities throughout centuries. The question of inequality was a central topic of nineteenth-century economics, then in the twentieth century these issues became less important, while the past few years witness these matters regain their previous popularity (Mihalyi & Szelenyi, 2017). Recently, the level of inequality in income distribution has been rising in most countries of the world as a consequence of the economic crisis (Sanchez & Perez-Corral, 2018). Failure to reduce economic inequality could cause not only economic problems but also social erosion, which can in turn lead to less willingness of citizens to obey the law, make sacrifices during crises, or pay taxes (Ippolito & Cicatiello, 2019; Malkina, 2019). European integration causes the narrowing of income equality across countries, but an increase in inequality within countries (Broll, Kemnitz, & Mukherjee, 2019).

Despite the long discussion, scientific literature on inequality and its determinants is far from conclusive, offering fragmented explanation for the mixed evidence on inequality between and within countries (Dumont, Stojanovska, & Cuyvers, 2011).

The main aspects of discussion on income inequality indicate the conflict of capitalists and employees in the creation of added value, in the distribution and concentration of wealth, and in sources and levels of income inequality. However, one more occupational group should be added to the discussion: entrepreneurs. Entrepreneurs are those persons who, to some extent, act as both capitalists and employees. Entrepreneurs invest their financial, social, and capital means in their companies by deciding on the use of all resources, thus fulfilling a capitalist role, but they simultaneously invest their own engagement, skills, experience, and other elements of human capital, thus fulfilling an employee's role.

The novelty of the article is to implement entrepreneurs into the discussion by distinguishing between direct and indirect impacts of entrepreneurship on income inequality.

The direct influence is related to the wealth investment and income gained by entrepreneurs. The indirect impact of entrepreneurship is connected to employing workers by newly created and surviving companies, which reduces the income inequality through the salaries earned by employees.

Implementing entrepreneurs into the discussion on inequality raises several research questions. What are the mechanisms of entrepreneurs' impact on income inequality? Does starting a new business require financial investment and does entrepreneur engagement increase existing income inequality? Does the survival and development of the newly created company lead to deepening inequality through extra profits for entrepreneurs? Does the employment of employees during the development of a newly created company reduce income inequality through the employees' income creation?

The objective of this article is to verify the direct and indirect impact of entrepreneurship on income inequality within countries. Aiming to add an entrepreneurial viewpoint to the discussion, the structure of the article is the following. First, the article presents the existing perspectives on inequality. Then, I present the state of the art in the influence of entrepreneurship on inequality. The hypotheses on the direct and indirect impact of entrepreneurship appear in the next section of the article, together with the research method and results based on panel regression with random and fixed effects for 26 European countries in the years 2008-2017. The last section concludes research results.

LITERATURE REVIEW

Inequality and Its Economic Explanation

Traditionally perceived, human capital, financial capital, and natural resources are production factors, while income inequality and wealth inequality are to result from the conflict between employees and production factors' owners, which is the division of wealth and income. As GDP consists of incomes coming from two sources, labour and capital, there are two kinds of inequality. The first one is "*within*-inequality" for each of these sources of incomes, which means the inequality within labour income and inequality within capital income. The second type of inequality is "*between*-inequality," which relates to the split of GDP between capital and labour (Jones, 2015; Bilan, Mishchuk, Samoliuk, & Yurchyk, 2020). The next distinction is inequality between countries, when the levels of inequality in different countries are compared, and inequality within countries, comparing level of inequality existing in a given economy (Dumont, Stojanovska, & Cuyvers, 2011). The aim of the article is related to the inequality existing within country and the following discussion concentrates on this aspect.

Recently, discussion on income inequality was stimulated by Piketty's monograph (Polish edition 2015), which uses the historical perspective of long time series as the basis for analyses. In history, changes in the distribution of income between capital and labour were observed (Pikkety, 2015, p. 58), and – looking at data from the United Kingdom and France over the past 200 years – the share of income from capital in national income was about 30-50%, while income from work approx. 60-70% (Piketty, 2015, p. 247f). Moreover, a change in the nature of capital is observed: the importance of land and land capital dominating in the eighteenth century, for the benefit of real estate, industrial and financial capital in the twenty-first century (Piketty, 2015, p. 59).

It seems that the greatest contribution of Thomas Piketty is to indicate the $r > g$ formula as the cause of income inequality, meaning that the rate of return on financial capital r is greater than the rate of growth of national income g. The $r>g$ formula is a historical observation that in the eighteenth and nineteenth centuries, the economic growth rate was around 0.5-1% per year, and the growth rate from capital around 4-5% per year. If the rate of return on capital r exceeds the rate of increase in income g, then inherited assets grow faster than the level of production and income, leading to a high concentration of capital. From the mathematical viewpoint, it was enough to save one-fifth of the income from capital and consume the remaining four-fifths so that the capital inherited from the previous generation would grow at the same pace as the economy (Piketty 2015, pp. 41f, 431-439).

Piketty's concept turned out to be very influential; on the one hand, for his supporters, it became a tool for explaining the dynamics of wealth and income inequality. On the other hand, it is strongly criticised (Madsen, Minniti, & Venturini, 2018). Milovanović (2015) even calls Piketty's book a dangerous one, as it gives the impression that economic problems can be discussed without any economic theory, just by using simple logic.

For example, critics of Piketty's approach indicate his omission of capital depreciation. As the stock of capital depreciates over time, it is necessary to replace and increase the stock of capital by a sufficiently large portion of gross capital income, while the depreciation of capital results not only from its physical use but also from economic use (Rallo, 2018). Another issue raised by Piketty's critics is his assumption that the cause of rising income inequality between labour and capital is an elasticity of substitution between them in a production function greater than one. Meanwhile, the estimations made by Semieniuk (2017) for major world economies show that almost all single elasticity estimations are below 0.5.

Further critique of Piketty's concept is that he ignores the impact of human capital on income inequality, focusing only on physical and financial capital (Kuehn, 2018), while human capital is the main economic growth factor in modern economy, and the impact of income distribution on economic development should be examined from the perspective of human capital accumulation instead of physical capital accumulation (Fan, Zhang, & Liu, 2016). The rise of the middle class in the twentieth century proves that human capital is important in order to understand the accumulation of capital and concentration of wealth (Kuehn, 2018). The conflict of the division of wealth and income extends from the division between employees and owners of capital into the division between employees at various levels in the organisational structure of the company.

Entrepreneurs, Capitalists, and Employees

The aforementioned main aspects of the discussion on economic inequality point to the conflict between capitalists and employees in wealth creation and distribution. However, it seems that one more group of occupation should be added to the above dichotomy: entrepreneurs.

Determining the position of entrepreneurs in the distribution of income and wealth is not clear, since the definition of entrepreneurship has many dimensions (Rogalska, 2018). In the narrow sense, entrepreneurship is associated with the unique process of creation and the development of a new enterprise (Santarelli & Vivarelli, 2007; Moroz & Hindle, 2012), resulting from a long series of complex decision-making (Grilo & Thurik, 2008). The creation of a new company requires the identification and acquisition of material and non-material resources, while the initial set of resources not only affects the entrepreneurial

process but also influences future access to other key resources (Hormiga, Batista-Canino, & Sanchez-Medina 2011). A newly created company follows the start-up life cycle stages from the initial stage of bootstrapping, through the seed and creation stage, to the growth stage (Sekliuckiene, Vaitkiene, & Vainauskiene, 2018), which means that the influence of entrepreneurship on income inequality can differ depending on life cycle stage.

To understand the differences in the position of employees and entrepreneurs, scholarship adopts the model of occupational choice, which assumes that an individual can either become a wage employee with a predictable and risk-free salary or an entrepreneur who makes entrepreneurial profit burdened with the risk of failure and of uncertain amount (among others: Kihlstrom & Laffont, 1979; Bradley, 2016; Pardo & Ruiz-Tagle, 2017; Krajčírová, Ferenzi Vaňová, & Munk, 2019). The neoclassical approach of maximising utility is also applied, whereby the choice of occupation form is made rationally depending on the anticipated net profits. Rationality focuses on subjective determination, meaning the realisation of goals consistent with internal hierarchy of preferences (Krstić, 2014). The decision to become an entrepreneur happens when the individual finds that the benefits of becoming an entrepreneur outweigh the benefits of being a wage worker.

As both groups – entrepreneurs and wage workers – are heterogeneous (Brown, Farrell, & Harris, 2011), the set of benefits and costs for each individual differ, which results in individual and unique decisions. There is a wide array of literature on determinants to become an entrepreneur (Rupasingha & Goetz, 2013; Simoes, Crespo, & Moreira, 2016; Crum & Chen, 2015; Szarucki, Brzozowski, & Stankevičienė, 2016; Coppola, Ianuario, Chinnici, Di Vita, Pappalardo, & D'Amico, 2018; Zygmunt, 2018; Dvorský, Petráková, Zapletalíková, & Rózsa, 2019). Summing up these discussions, three groups of factors can be distinguished: socio-demographic factors, such as age structure, the share of men and women in labour force, the level of education; factors connected with the economic environment determining levels of costs and profits involved in running one's own company; and, finally, factors related to one's attitude towards entrepreneurship, showing one's readiness to become self-employed (Fritsch, Kritikos, & Sorgner, 2015).

The important difference between being an entrepreneur and an employee is that starting one's own business requires investing not only in the human capital of the entrepreneur, but also his/ her financial capital and social network while working as an employee means engaging only human capital. Because of that, under the theory of occupational choice, access to financial capital is another group of determinants moderating the occupational decision (Seghers, Manigart, & Uanacker, 2012; Reynolds, 2011). Individuals with broader access to more financial capital are more likely to become entrepreneurs; however, access to capital is influenced not only by the possessed wealth but also by an individual's ability to make savings, the levels of credit rating, or access to financial assets over a time horizon.

The entrepreneur's role is twofold. On the one hand, s/he is the person who decides about the supply and use of company's resources but, on the other hand, s/he is treated as one of the resources. When establishing and running own company, an entrepreneur often invests own financial capital, which may bring him/her closer to the capitalist. However, especially with the currently growing market of private equity funds, the entrepreneur also works based on the investments of external investors, which may make him a manager of external capital to a greater extent than a capitalist. Already Schumpeter (1960) indicated

the separation of entrepreneurial and capitalist functions by introducing the idea of the entrepreneur as the means of transforming the existing situation. Capitalism creates a tendency to think in certain ways, while "the entrepreneur" is a person who produces new combinations that lead to new products or new production methods. Schumpeter's entrepreneur is a dynamic newcomer who transforms the state of things (Joffe, 2017).

The entrepreneur is a person engaged in the creation and development of own business, while his/her human capital and engagement in the entrepreneurial process is one of the key success factors. The individual combination of entrepreneurs' human capital makes the entrepreneurial process unique. Entrepreneurs are an important part of human capital stock, while entrepreneurial activities are believed to have become a critical engine of global economic development, and income distribution might impact economic development through influencing the formation of entrepreneurs (Fan, Zhang, & Liu, 2016).

Occupational Choice Model of Entrepreneurship as Theoretical Background for Explaining Inequality

The connections between entrepreneurship and inequality might be analysed from the input perspective, related to the investment of human, social and financial capital needed to be engaged by entrepreneurs and their access to them; or from the output perspective, related to differences in the level of entrepreneurial profits and employee wages. Both perspectives should be in line with distributive justice principles of a certain society (Mishchuk Samoliuk, & Bilan, 2018). Empirical evidence suggests that entrepreneurship leads to wealth concentration, mostly due to the higher saving rates of entrepreneurs. A uniform increase in entrepreneurial income reduces per-capita household income inequality; however, an increase in the number of entrepreneurs does not affect inequality (Kimhi, 2010). Inequality is also claimed to be the outcome of an intergenerational externality, as current entrepreneurs who are physical-capital formation agents bequeath their wealth to descendants who act in fact as rentiers rather than as entrepreneurs (Soldatos, 2017). Descendants use the capital rather to get the capital income than to actively run a company.

The literature shows some examples of using the occupational choice model to analyse income inequality. Fan, Zhang, and Liu (2016) propose a theoretical model in which individuals make an occupation choice between three: unskilled worker, skilled worker, and entrepreneur. An unskilled worker enters the traditional sector and joins the labour force, with the individual's wealth being the sum of income, parental transfer, and interest on savings. A skilled worker needs to acquire a formal education with a fixed cost and then he enters the modern sector. The wealth of a skilled worker is the sum of wage income and the interest income from savings or reduced by the interest payment for borrowing for education. An entrepreneur also needs to acquire formal education with a fixed cost, then enter the modern sector to organise production by hiring skilled workers with a competitive wage and equipment of some units of physical capital. This means that an entrepreneur must have an initial investment of physical capital and human capital. The results show that the presence of entrepreneurs impacts income distribution by affecting the composition of human capital; they generate the demand for skilled workers and encourage workers to invest in their education, thereby improving the level of income per capita (Fan, Zhang, & Liu, 2016).

Another model expands occupation choices to workers and entrepreneurs who operating in the domestic market or entrepreneurs who operate on the global market, depending on managerial talent. Individuals are driven by expected income maximisation,

whereby individuals with low managerial talent become workers; individuals with intermediate managerial talent become entrepreneurs who act in the domestic market and receive middle-class income; while highly talented individuals become entrepreneurs who operate in the global market and receive higher incomes (Dinopoulos & Unel, 2017). Therefore, entrepreneurship influences income inequality.

The research results presented above assume that entrepreneurship and entrepreneurial activity are factors that affect income inequality. However, there also are studies on the inverse relationship, meaning the impact of income inequality on entrepreneurship (Ragoubi & El Harbi, 2018; Mishchuk, Samoliuk, & Bilan, 2019). Jung, Seo, and Jung (2018) prove the hypothesis that income inequality negatively affects regional economic performance by decreasing entrepreneurial activities. The authors assume that income inequality negatively affects both entrepreneurship and economic growth as the result of insufficient demand for new products/services. Results show as well that the income situation of entrepreneurs is not equal, self-employed entrepreneurs generally have lower incomes than paid workers while incorporated self-employed have higher income than other groups (Halvarsson, Korpi, & Wennberg, 2018).

The connections between entrepreneurship and inequality might also depend on involvement in productive or unproductive activities, which are linked with the institutional environment and the reward structure of the economy. Productive entrepreneurs expand the size of the economy through their wealth-generating activities, with their wealth and income redirected towards productive investments in the form of reinvested profits or loans. Unproductive entrepreneurs seek rent and accumulating non-productive assets (Wiseman & Young, 2014; Rovira, 2015). There might be a difference between the influence of productive and unproductive entrepreneurs on inequality, but this impact is not considered in this article.

Summing up the discussion, entrepreneurs can be the group whose activity will affect income inequality in both direct and indirect ways. Direct impact is connected with the business activity of entrepreneurs who seek to generate their profits by investing in human, social, and financial capital. Starting a new business requires initial investment, effort, and time to get to the break-even point, which means that the initial investment in the starting stage of a company's existence might contribute to widening inequality by decreasing the entrepreneur's income, both from their own work and the income from assets allocated for establishing a company. If the newly created company survives on the market and begins to generate income for the entrepreneur, then the impact on income inequality depends on the difference in the level of entrepreneurial income and employee remuneration, but also in the way of reinvesting income in the development of the enterprise and its fixed assets. On the other hand, if a company closes down, it may cause a loss of income for both the entrepreneurs themselves and their employees, but it may also cause the depreciation of the value of the company's fixed assets, aggravating income inequalities. Therefore, we may formulate the following hypotheses:

H1: Start-up rate directly influences the increase of income inequality.

H2: Survival rate directly influences the reduction of income inequality.

H3: Death rate directly influences the increase of income inequality.

However, entering into entrepreneurship often entails hiring employees and becoming an employer, which differentiates entrepreneurs-employers from the self-employed

(Bennett & Rablen, 2015). The need to hire employees can trigger indirect impacts of entrepreneurship on income inequality. An entrepreneur creates jobs and generates wages for employees, thus he can contribute to the equalisation of incomes for different social groups. These theoretical assumptions allow us to posit the following research hypotheses:

H4: The employment share of start-up companies indirectly influences the reduction of income inequality.

H5: The employment share of survival rate indirectly influences the reduction of income inequality.

MATERIAL AND METHODS

To verify the hypotheses, I conducted the following research. The general relationship between entrepreneurship and inequality is assumed to follow the equations (1) and (2):

$$IE_{it} = \beta_0 + \beta_1 EN_{it} + \nu_{it} \quad (1)$$

$$IE_{t+1} = \beta_0 + \beta_1 EN_{it} + \nu_{it} \quad (2)$$

where:

IE_{it} - dependent variable describing income inequality in t period and in i country;

IE_{t+1} - dependent variable describing income inequality in $t+1$ period and in i country;

EN_{it} - independent variables describing entrepreneurship in t period and in i country;

β_0, β_1 - vectors;

ν_{it} - total random error consisting of a purely random part ε_{jt} and individual effect u_i referring to the specific i unit of the panel ($\nu_{it} = \varepsilon_{jt} + u_i$).

All relationships assumed in the research hypotheses might occur both immediately in the same period of time (equation 1) and with a lag of one period of time (equation 2).

I designated two measures as dependent variables describing income inequality as the most commonly used measures of inequality: the Gini index (GINI) and the Inequality of Income Distribution (IID). According to Eurostat, the Gini coefficient (GINI) is understood as the relationship of cumulative shares of the population – arranged according to the level of equivalised disposable income – to the cumulative share of the equivalised total disposable income received by them. The Gini index is believed to be the most informative indicator of social inequality (Sanchez & Perez-Corral, 2018); the greater the indicator, the more unequally the incomes are distributed in a society. The Gini index is also calculated for different countries, which allows researchers to conduct cross-country analysis (Luk'ianchikova & Iamshchikova, 2019). According to Eurostat, the inequality of income distribution (IID) is measured as the ratio of total income received by the 20% of the population with the highest income to that received by the 20 % of the population with the lowest income.

The direct impact of entrepreneurship on inequality is connected with the creation of new companies, their survival on the market and their death (hypotheses H1, H2; and H3). Three measures were accepted: birth rate (BR) shows the share of newly created companies in the total number of active companies, death rate (DR) is a ratio of enterprise deaths in total number of active companies, while survival rate 2 (SR2) indicates the

share of enterprises in the reference period t newly born in t-2, having survived to t divided by the number of enterprise births in t-2, meaning companies that survived the first two years of existence.

The indirect impact is measured by the influence of employment engaged by newly created or surviving companies (hypotheses H4 and H5). The first indicator here is the employment share of enterprise births (ESBR), which shows the share of persons employed among newly born enterprises, divided by the number of persons employed among all active enterprises. The second indicator is the employment share of two-year-old enterprises (ESSR2), which shows the share of persons employed in newly born enterprises in t-2, having survived to t (survived the first two years of existence), divided by the number of persons employed in the population of active enterprises in t.

The initial equations (1) and (2) differ in time lag. The process of new company creation is time-consuming, which allows the assumption that some time lags may occur in the relationship between the creation of new companies and income inequality. The assumption of one period of time lag is accepted *a priori*.

To estimate the parameters of regression functions and, hence, to verify the research hypotheses, I gathered data from 26 European countries published by Eurostat. The selection criterion was the availability of data, which led me to use yearly data in the period of 2008-2017 from the following countries: Austria, Belgium, Bulgaria, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, the United Kingdom. This allows for the creation of two panels of data: based on equation 1, a panel of ten years 2008-2017 and 26 countries; and, based on equation 2, a panel of ten years 2009-2018 and 26 countries.

The first step in the analysis was to calculate the cross-correlation among data (table 1). The correlation coefficients are mostly positive ones, at around 0.4-0.5 value. The only negative correlated measures are inequality measures and survival rate over two years.

Table 1. Correlation coefficients among indicators of inequality and entrepreneurship

Correlation in period t					
Indicator	BR	DR	SR2	ESBR	ESSR2
GINI	0.422	0.497	-0.325	0.471	0.495
IID	0.432	0.501	-0.321	0.494	0.530
Correlation in period t+1					
Indicator	BR	DR	SR2	ESBR	ESSR2
GINI	0.413	0.515	-0.319	0.471	0.489
IID	0.420	0.510	-0.312	0.496	0.528

Source: own study.

To linearise the relationships between data, all data were converted to natural logarithms, and then I used Gretl software to estimate panel regression in three steps: using the method ordinary least squares (OLS), panel regression with random effects (RE), and panel regression with fixed effects (FE). The values of the Breusch-Pagan test and the Hausman test led me to a conclusion about the correctness of these three methods and indicate the most proper one. Next, the statistical significance of independent variable parameters based on

p-value validated the research hypotheses. Results of all three methods of estimation are presented to indicate whether the results vary depending on the method, although the verification of hypotheses is conducted based on the most relevant regression method.

RESULTS AND DISCUSSION

The first estimations verify the equation (1) with relationship in a given time period. Results of regression function estimations are presented in Table 2. Based on the Breusch-Pagan test, we may state that – in the cases of all functions -panel regression was a better method than OLS. Based on the Hausman test, panel regression with fixed effects (FE) was indicated as the better method in three regressions (lnGINI depending on lnESBR and lnESSR2; lnIIG depending on lnBR and lnDR; lnIIG depending on lnESBR and lnESSR2). The panel regression with random effects (RE) was a better estimation method in the case of the next three functions (lnGINI depending on lnBR and lnDR; lnGINI depending on lnSR; lnIIG depending on lnSR). The next step was to analyse the p-value of parameters in the selected functions. Whenever it was at the acceptable level (0.05), the regression function was accepted. If the p-value was higher than (0.05), the statistically insignificant parameter was rejected, and the function was estimated again, or the function was rejected at once. After introducing this procedure, three regression functions were finally accepted for the verification of research hypotheses.

The first estimation treats the lnGINI index as a dependent variable and explains its changes with lnBR as an independent variable. Analysing the value of regression parameter, the influence of lnBR on lnGINI is a positive one, the increase (decrease) of birth rate influences the increase (decrease) of income inequality measured by the GINI index. The second accepted function assumes the lnGINI to be a dependent variable and lnESSR2 to be an independent variable. Looking at the value of parameter, the relationship is a negative one, the increase (decrease) of employment share in survival companies influences the decrease (increase) of income inequality measured by the GINI index. The last accepted function treats lnIIG as a dependent variable, which is explained by lnESSR2 as an independent variable. The relationship is also a negative one; whenever the employment share in survival companies goes up (down), it influences the decrease (increase) of income inequality measured by the index of the Inequality of Income Distribution (IID). The analysis of adjustment measures and significance levels allow for the acceptance of the following regression functions:

$$lnGINI_{it} = 3.303 + 0.034\ lnBR_{it} \quad (3)$$

$$lnGINI_{it} = 3.408 - 0.032\ lnESSR2_{it} \quad (4)$$

$$lnIID_{it} = 1.591 - 0.056\ lnESSR2_{it} \quad (5)$$

The second approach of the research is that the reaction of income inequality with changes in entrepreneurship requires one period of time, so that the regression function (2) assumes the one-year lag. The results of regression function estimations are presented in Table 3. Based on the Breusch-Pagan test, we may state that in the cases of all functions, panel regression was a better method than OLS. Based on the Hausman test, panel regression with fixed effects (FE) was indicated as a better method in four regressions (lnGINI depending on lnBR and lnDR; lnGINI depending on lnESBR and lnESSR2; lnIIG depending on lnBR and lnDR; lnIIG depending on lnESBR and lnESSR2). Panel regression with random effects

(RE) was a better estimation method in the case of the next two functions (lnGINI depending on lnSR; lnIIG depending on lnSR). After analysing the p-value, the regression functions were accepted (p-value<0.05), estimated again, or rejected (p-value>0.05). After introducing this procedure, two regression functions were finally accepted for analysis.

Table 2. Regression functions estimated in t period

Variable	OLS	FE	RE
Dependent variable (Y): lnGINI			
const lnBR lnDR Fit measures	2.942*** 0.103*** 0.099*** R^2 = 0.572; Adjusted R^2 = 0.569 F(2, 252) = 168.404	3.313*** 0.028 0.001 LSDV R^2 = 0.936 LSDV F(27, 227) = 121.976	**3.303***** **0.034*** . **Breusch-Pagan Test** **p < 0.0001** **Hausman Test p = 0.0891**
const lnSR2 Fit measures	4.664*** −0.304*** R^2 = 0.319; Adjusted R^2 = 0.316 F(1, 250) = 116.932	3.534*** -0.037 LSDV R^2 = 0.937 LSDV F(26, 225) = 128.147	3.568*** -0.044 Breusch-Pagan Test p < 0.0001 Hausman Test p = 0.0806
const lnESBR lnESSR2 Fit measures	3.220*** 0.090*** 0.079*** R^2 = 0.593; Adjusted R^2 = 0.589 F(2, 245) = 178.195	**3.408***** . **-0.032*** **LSDV R^2 = 0.943** **LSDV F(26, 222) =** **140.653**	3.395*** 0.007 -0.021 Breusch-Pagan Test p < 0.0001 Hausman Test p = 0.0027
Dependent variable (Y): lnIID			
const lnBR lnDR Fit measures	0.835*** 0.140*** 0.178*** R^2 = 0.616; Adjusted R^2 = 0.613 F(2, 252) = 201.793	1.492*** 0.031 -0.010 LSDV R^2 = 0.935 LSDV F(27, 227) = 120.608	1.442*** 0.043 0.001 Breusch-Pagan Test p < 0.0001 Hausman Test p = 0.0081
const lnSR2 Fit measures	3.757*** −0.527*** R^2 = 0.359; Adjusted R^2 = 0.357 F(1, 250) = 140.085	1.862*** -0.076 LSDV R^2 = 0.936 LSDV F(26, 225) = 126.348	1.919*** -0.089 Breusch-Pagan Test p < 0.0001 Hausman Test p = 0.0795
const lnESBR lnESSR2 Fit measures	1.260*** 0.154*** 0.136*** R^2 = 0.531; Adjusted R^2 = 0.527 F(2, 245) = 138.491	**1.593***** . **-0.056*** **LSDV R^2 = 0.943** **LSDV F(26, 222) =** **141.062**	1.573*** -0.002 -0.031 Breusch-Pagan Test p < 0.0001 Hausman Test p = 0.0003

* In bold: models accepted for hypotheses verification.
Significant codes: *** p<0.001; ** p<0.01; * p< 0.05.
Source: own elaboration.

Table 3. Regression functions estimated in t+1 time

Variable	OLS	FE	RE
Dependent variable (Y): lnGINI in period t+1			
const lnBR lnDR Fit measures	2.962*** 0.070*** 0.125*** R^2 = 0.576; Adjusted R^2 = 0.572 F(2, 249) = 168.922	3.320*** 0.005 0.024 LSDV R^2 = 0.933 LSDV F(27, 224) = 115.614	3.317*** . 0.030* Breusch-Pagan Test p < 0.0001 Hausman Test p = 0.0067
const lnSR2 Fit measures	4.653*** −0.301*** R^2 = 0.293; Adjusted R^2 = 0.291 F(1, 248) = 102.963	3.426*** -0.011 LSDV R^2 = 0.932 LSDV F(26, 223) = 117.813	3.464*** -0.019 Breusch-Pagan Test p < 0.0001 Hausman Test p = 0.0608
const lnESBR lnESSR2 Fit measures	3.219*** 0.107*** 0.067** R^2 = 0.547; Adjusted R^2 = 0.543 F(2, 245) = 146.529	**3.414***** . **-0.036*** **LSDV R^2 = 0.932** **LSDV F(26, 220) =** **116.680**	3.404*** . -0.023 Breusch-Pagan Test p < 0.0001 Hausman Test = 0.0005
Dependent variable (Y): lnIID in period t+1			
const lnBR lnDR Fit measures	0.831*** 0.120*** 0.204*** R^2 = 0.615; Adjusted R^2 = 0.612 F(2, 249) = 198.651	1.539*** -0.010 0.014 LSDV R^2 = 0.934 LSDV F(27, 224) = 116.759	1.484*** 0.002 0.026 Breusch-Pagan Test p < 0.0001 Hausman Test p = 0.0078
const lnSR2 Fit measures	3.686*** −0.509*** R^2 = 0.362; Adjusted R^2 = 0.360 F(1, 248) = 140.771	1.720*** -0.041 LSDV R^2 = 0.934 LSDV F(26, 223) = 120.477	1.781*** −0.056 Breusch-Pagan Test p < 0.0001 Hausman Test p = 0.0677
const lnESBR lnESSR2 Fit measures	1.254*** 0.182*** 0.119*** R^2 = 0.572; Adjusted R^2 = 0.569 F(2, 243) = 162.604	**1.613***** . **-0.073**** **LSDV R^2 = 0.936** **LSDV F(26, 220) =** **124.239**	1.590*** . -0.047 Breusch-Pagan Test p < 0.0001 Hausman Test p < 0.0001

* In bold: models accepted for hypotheses verification.
Significant codes: *** p<0.001; ** p<0.01; * p< 0.05.
Source: own elaboration.

Both measures of income inequality as dependent variables are explained by lnESSR2 as the independent variable in a negative manner. The increase (decrease) of employment in survival companies (ESSR2) influences the decrease (increase) of both GINI index (GINI) and the Inequality of Income Distribution (IID) as measures of income inequality. These relationships can be presented in the following two regression functions:

$$lnGINI_{it+1} = 3.414 - 0.036\ lnESSR2_{it} \quad (6)$$

$$lnIID_{it+1} = 1.6013 - 0.073\ lnESSR2_{it} \quad (7)$$

To summarise, among entrepreneurship measures of direct impact, death rate (DR) seems to not influence the income inequality measures as such a relationship is statistically insignificant. It means that research hypothesis 3 is rejected. Moreover, the survival rate over two years (SR2) has no statistically significant impact on income inequality. Out of four estimated set of regressions, SR2 does not explain the changes in income inequality in a significant manner. Thus, hypothesis 2 is rejected.

Birth rate as an entrepreneurship measure of direct impact has a limited influence on income inequality and both of them only where the current period of time is concerned. According to the estimation of regression function, out of four analysed relationships, birth rate (BR) significantly impacts just one regression function. BR looks to influence as positively on the GINI index as the income inequality measure (function 3), meaning that the higher the birth rate, the higher the income inequality level. I assume that this relationship is associated with a decrease in entrepreneurs' incomes at the initial stage of creating a new company. Establishing a new company requires, on the one hand, the investment of human, financial and social capital, and on the other hand, as a rule, only after some time of running a new business does its market position establish enough that the founding entrepreneur can count on income from his involvement. It means that hypothesis 1 finds limited support here and requires further investigation.

The strongest impact of entrepreneurship seems to be in regard to the employment shares of surviving companies (ESSR2). Out of four estimated set of equations, ESSR2 was a statistically significant variable in all cases, explaining the income inequality measured both by the GINI (functions 4 and 6) and the IID indexes (functions 5 and 7). The impact of ESSR2 on the GINI and IID measures is negative; the increase (decrease) of ESSR2 influences the decrease (increase) of income inequality. These results allow for the acceptance of hypothesis 5, assuming that the employment share of surviving companies reduces income inequality. Mostly during the first months of the market existence of start-up companies, the entrepreneurs who establish companies work by themselves with some help of family and friends and try not to employ any workers, which explains why the employment share of birth rate (ESBR) does not influence GINI or IID. It means that hypothesis 4 is rejected, as it assumes the impact of employment share of newly created companies. However, after surviving the first two critical years of existence on the market, companies are mature and established enough to employ workers and pay them salaries, which leads to the reduction of income inequality. Moreover, we may assume that the shape of the ESSR2 index is influenced not only by the companies that survive on the market but also by those who have a relatively high intention for development, manifested in the employment of employees. These companies rely not only on the personal work of founding entrepreneurs but also generate employment for external persons. Thus, they indirectly reduce income inequality by influencing the income of employees. This influence is valid not only in the current period of time but also when one year of time lag is considered. All these results give support for accepting hypothesis 5.

CONCLUSIONS

Inequality has a long history and has been discussed since ancient times. However, the novelty of the article is to implement the perspective of entrepreneurship into this discussion and the direct and indirect impact of entrepreneurs on income inequality. The direct influence was assumed to be related to wealth investment and income gained by entrepreneurs. The indirect impact of entrepreneurship is connected with employing workers by newly created and surviving companies, which reduces income inequality through salaries earned by employees.

Based on data from 26 European countries in years 2008-2018, I examined the research hypotheses with the use of panel regression modelling. The results show that the direct influence of entrepreneurship on income inequality seems limited. Death rate and survival rate do not influence income inequality in a statistically significant manner, while birth rate impacts inequality only to a certain extent. Birth rate by the initial financial and human investments of entrepreneurs partly increases the level of inequality by reducing the incomes of entrepreneurs in the initial stage of company creation. However, the most important relationship is the indirect one, which seems to reduce income inequality, especially regarding the employment of surviving companies. The employment share of surviving companies is an important variable that reduces income inequality. The newly created companies that survived on the market through the most critical time begin to employ workers in the development stage. Thus, income inequality lowers thanks to entrepreneurial incomes and the salary growth of employees.

The research findings also give recommendations for entrepreneurship policy. To support social cohesion, the policy should concentrate on supporting the survival of newly created companies, not just on the start-up process, as it leads to reducing income inequality.

The limitation of this research is it exclusive focus on countries from Europe, which necessitates further research in other parts of the world with different levels of equality. Another limitation is that data from all European countries were taken together into one panel, so distinguishing countries with different characteristics and analysing relationships separately in groups of similar features can also be a possible path for further investigation.

REFERENCES

Bennett, J., & Rablen, M.D. (2015). Self-employment, wage employment, and informality in a developing economy. *Oxford Economic Papers*, *67*(2), 227-244. https://doi.org/10.1093/oep/gpu047

Bilan, Y., Mishchuk, H., Samoliuk, N., & Yurchyk, H. (2020). Impact of Income Distribution on Social and Economic Well-Being of the State. *Sustainability*, *12*(1), 429. https://doi.org/10.3390/su12010429

Bradley, J. (2016). Self-employment in an equilibrium model of the labor market. *IZA Journal of Labor Economics*, *5*(6), https://doi.org/10.1186/s40172-016-0046-8

Broll, U., Kemnitz, A., & Mukherjee, V. (2019). Globalization, inequality and economic policy. *Economics and Business Review*, *19*(1), 3-11. https://doi.org/10.18559/ebr.2019.1.1

Brown, S., Farrell, L., & Harris, M.N. (2011). Modelling The Incidence of Self-Employment: Individual and Employment Type Heterogeneity. *Contemporary Economic Policy*, *29*(4), 605-619. https://doi.org/10.1111/J.1465-7287.2010.00232.X

Coppola, A., Ianuario, S., Chinnici, G., Di Vita, G., Pappalardo, G., & D'Amico, D. (2018). Endogenous and Exogenous Determinants of Agricultural Productivity: What Is the Most Relevant for the Competitiveness of the Italian Agricultural Systems?. *AGRIS on-line Papers in Economics and Informatics*, *10*(2), 33-47. https://doi.org/10.7160/aol.2018.100204.

Crum, M., & Chen, Y. (2015). Self-Employment and Subjective Well-Being: A Multi-Country Analysis. *International Journal of Entrepreneurship*, *19*, 15-28.

Dinopoulos, E., & Unel, B. (2017). Managerial capital, occupational choice and inequality in a global economy. *Canadian Journal of Economics / Revue canadienne d'économique*, *50*(2), 365-397.

Dumont, M., Stojanovska, N., & Cuyvers, L. (2011). World inequality, globalisation, technology and labour market institutions. *International Journal of Manpower*, *32*(3), 257-272. https://doi.org/10.1108/01437721111136750

Dvorský, J., Petráková, Z., Zapletalíková, E., & Rózsa, Z. (2019). Entrepreneurial propensity index of university students. The case study from the Czech Republic, Slovakia and Poland. *Oeconomia Copernicana*, 10(1), 173-192. https://doi.org/10.24136/oc.2019.009

Fan, Z., Zhang, R., & Liu, X. (2016). Income inequality, entrepreneur formation, and the economic development: evidence from China. *Journal of The Asia Pacific Economy*, *21*(3), 444-464. https://doi.org/10.1080/13547860.2016.1176646

Fritsch, M., Kritikos, A.S., & Sorgner, A. (2015). Why did self-employment increase so strongly in Germany?. *Entrepreneurship & Regional Development*, *27*(5-6), 307-333. https://doi.org/10.1080/08985626.2015.1048310

Grilo, I., & Thurik, R.(2008). Determinants of entrepreneurial engagement levels in Europe and the US. *Industrial and Corporate Change, 17*(6), 1113-1145.

Halvarsson, D., Korpi, M., & Wennberg, K. (2018). Entrepreneurship and income inequality. *Journal of Economic Behavior & Organization*, *145*, 275-293. https://doi.org/10.1016/j.jebo.2017.11.003

Hormiga, E., Batista-Canino, R.M., & Sanchez-Medina, A. (2011). The Impact of Relational Capital on the Success of New Business Start-ups. *Journal of Small Business Management, 49*(4), 617-638.

Ippolito, M., & Cicatiello, L. (2019). Political Instability, Economic Inequality and Social Conflict: The Case in Italy. *Panoeconomicus*, *66*(3, Special Issue), 365-383. https://doi.org/10.2298/PAN1903365I

Joffe, M. (2017). Evidence and the micro-foundations of economic growth. *Economics and Business Review*, *17*(3), 52-79. https://doi.org/10.18559/ebr.2017.3.410.18559/ebr.2017.3.4

Jones, Ch.I. (2015). Pareto and Piketty: The Macroeconomics of Top Income and Wealth Inequality. *Journal of Economic Perspectives, 29*(1), 29-46. https://doi.org/10.1257/jep.29.1.29

Jung, H., Seo, I., & Jung, K. (2018). Mediating Role of Entrepreneurship in Explaining the Association Between Income Inequality and Regional Economic Performance. *Economic Development Quarterly*, *32*(2), 135-145. https://doi.org/10.1177/0891242418758438

Kihlstrom, R.E., & Laffont, J.-J. (1979). A General Equilibrium Entrepreneurial Theory of Firm Formation Based on Risk Aversion. *Journal of Political Economy*, *87*(4), 719-748. https://doi.org/10.1086/260790

Kimhi, A. (2010). Entrepreneurship and income inequality in southern Ethiopia. *Small Business Economics*, *34*, 81-91. https://doi.org/10.1007/s11187-009-9196-4

Krajčírová, R., Ferenzi Vaňová, A., & Munk, M. (2019). What Is Relationship between Profits and Dividends in Agricultural Legal Entities?. *AGRIS on-line Papers in Economics and Informatics*, *11*(1), 55-64. https://doi.org/10.7160/aol.2019.110106

Krstić, M. (2014). Rational Choice Theory and Addiction Behavior. *Market-TRŽIŠTE*, *XXVI*(2), 163-177.

Kuehn, D. (2018). Human Capital in the Twenty First Century. *The European Journal of Comparative Economics*, *15*(1), 3-9. https://doi.org/10.25428/1824-2979/201801-3-9

Luk'ianchikova, T., & Iamshchikova, T. (2019). The Theory and Reality of Social Inequality. *Russian Social Science Review*, *60*(5-6), 496-506. https://doi.org/10.1080/10611428.2019.1676079

Madsen, J.B., Minniti, A., & Venturini, F. (2018). Assessing Piketty's second law of capitalism. *Oxford Economic Papers*, *70*(1), 1-21. https://doi.org/10.1093/oep/gpx040

Malkina, M. (2019). Spatial wage inequality and its sectoral determinants: the case of modern Russia. *Oeconomia Copernicana*, 10(1), 69-87. https://doi.org/10.24136/oc.2019.004

Mihalyi, P., & Szelenyi, I. (2017). Wealth and capital: a critique of Piketty's conceptualisation of return on capital. *Cambridge Journal of Economics*, *41*, 1237-1247. https://doi.org/10.1093/cje/bew054

Milovanović, M. (2015). Thomas Piketty's Capitalism Revisited. *Panoeconomicus*, *62*(5), 663-677. https://doi.org/10.2298/PAN1505663M

Mishchuk, H., Samoliuk, N., & Bilan, Y. (2019). Measuring social justice in the light of effectiveness of public distributive policy. *Administration & Public Management Review*, (32). 63-76. https://doi.org/10.24818/amp/2019.32-05

Mishchuk H., Samoliuk N., Bilan Y., Streimikiene D. (2018). Income inequality and its consequences within the framework of social justice. *Problemy Ekorozwoju*, 13(2), 131-138.

Moroz, P.W., & Hindle, K. (2012). Entrepreneurship as a Process: Towards Harmonizing Multiple Perspectives. *Entrepreneurship: Theory and Practice, 36*(4), 781-818.

Pardo, C., & Ruiz-Tagle, J. (2017). The dynamic role of specific experience in the selection of self-employment versus wage-employment. *Oxford Economic Papers*, *69*(1), 189-212. https://doi.org/10.1093/oep/gpw047

Piketty, T. (2015). *Kapitał w XXI wieku*. Warsaw: Wydawnictwo Krytyki Politycznej.

Rogalska, E. (2018). Multiple-criteria analysis of regional entrepreneurship conditions in Poland. *Equilibrium. Quarterly Journal of Economics and Economic Policy*, *13*(4), 707-723. https://doi.org/10.24136/eq.2018.034

Ragoubi, H., & El Harbi, S. (2018). Entrepreneurship and income inequality: a spatial panel data analysis. *International Review of Applied Economics*, *32*(3), 374-422. https://doi.org/10.1080/02692171.2017.1342776

Rallo, J.R. (2018). Some Fundamental Problems with Thomas Piketty's."*Capital in the Twenty-First Century*". *The Independent Review, 22*(4), 599-607.

Reynolds, P.D. (2011). Informal and Early Formal Financial Support in the Business Creation Process: Exploration with PSED II Data Set. *Journal of Small Business Management*, *49*(1), 27-54.

Rovira, J.R. (2015). Piketty on Growth and Distribution. *Hacienda Publica Espanola / Review of Public Economics, 214*(3), 91-114. https://doi.org/10.7866/HPE-RPE.15.3.4

Rupasingha, A., & Goetz, S.J. (2013), Self-employment and local economic performance: Evidence from US counties. *Papers in Regional Science*, *92*(1), 141-162. https://doi.org/10.1111/j.1435-5957.2011.00396.x

Sanchez, A., & Perez-Corral, A.L. (2018). Government Social Expenditure and Income Inequalities in the European Union. *Hacienda Pública Espańola / Review of Public Economics, 227*(4), 133-156. https://doi.org/10.7866/HPE-RPE.18.4.5

Santarelli, E., & Vivarelli, M. (2007). Entrepreneurship and the process of firms' entry, survival and growth. *Industrial and Corporate Change, 16*(3), 455-488.

Schumpeter, J. (1960). *Teoria rozwoju gospodarczego.* Warszawa: PWN.

Seghers, A., Manigart, S., & Uanacker, T. (2012). The Impact of Human and Social Capital on Entrepreneurs' Knowledge of Finance Alternatives. *Journal of Small Business Management*, *50*(1), 63-86.

Sekliuckiene, J., Vaitkiene, R., & Vainauskiene, V. (2018). Organisational Learning in Startup Development and International Growth. *Entrepreneurial Business and Economics Review*, *6*(4), 125-144. https://doi.org/10.15678/EBER.2108.060407

Semieniuk, G. (2017). Piketty's Elasticity of Substitution: A Critique. *Review of Political Economy*. *29*(1), 64-79. https://doi.org/10.1080/09538259.2016.1244916

Simoes, N., Crespo, N., & Moreira, S.B. (2016). Individual Determinants of Self-Employment Entry: What Do We Really Know?. *Journal of Economic Survey*, *30*(4), 783-806. https://doi.org/10.1111/joes.12111

Soldatos, G.T. (2017). Inheritance and inequality, and aggregate demand and policy issues*. International Journal of Social Economics*, *44*(12), 1833-1845. https://doi.org/10.1108/IJSE-01-2016-0021

Sunajko, G. (2016). Rawls and Piketty: the philosophical aspects of economic inequality. *The Journal of Philosophical Economics: Reflections on Economic and Social Issues*, *IX*(2), 71-84.

Szarucki, M., Brzozowski, J., & Stankevičienė, J. (2016). Determinants of Self-Employment Among Polish and Romanian Immigrants in Germany. *Journal of Business Economics and Management*, *17*(4), 598-612. https://doi.org/10.3846/16111699.2016.1202313

Wiseman, T., & Young, A. (2014). Religion: productive or unproductive?. *Journal of Institutional Economics*, *10*(1), 21-45. https://doi.org/10.1017/S174413741300026X

Zygmunt, J. (2018). Entrepreneurial activity drivers in the transition economies. Evidence from the Visegrad countries. *Equilibrium. Quarterly Journal of Economics and Economic Policy*, 13(1), 89-103. https://doi.org/10.24136/eq.2018.005

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The Relationship between Institutional Environments and Entrepreneurial Intention in Estonia: Mediating Roles of Desirability and Feasibility

Wisuwat Wannamakok, Yu-Yu Chang, Marge Täks

ABSTRACT

Objective: The objective of the article is to examine the influence of institutional environment on potential future entrepreneurs and the mediating role of perceived desirability and feasibility.

Research Design & Methods: On the basis of institutional theory, we applied structural equation modelling to test a model of the relationship between three dimensions of institutional environment (regulatory, cognitive, and normative) and Estonian university students' entrepreneurial intentions through the mediating role of perceived feasibility and desirability. Hypotheses were proposed and evaluated using data obtained from a survey of 265 Estonian university students.

Findings: Results suggest that each dimension of institutional environment plays a decisive role in Estonian university students' entrepreneurial intentions, except for cognitive dimension, which does not exhibit a significant effect on entrepreneurial intentions through perceived desirability.

Implications & Recommendations: The results of this study elucidate university students' entrepreneurial intentions from an Estonian perspective. On the basis of our findings, policymakers and entrepreneurship researchers may better understand how to cultivate entrepreneurial endeavours to facilitate economic development.

Contribution & Value Added: This study offers a direction for future investigation by underscoring the importance of cultural differences in determining the validity of institutional theory as a means of testing entrepreneurial intentions.

Article type: research article

Keywords: desirability; feasibility; entrepreneurial intention; institutional environment; Estonia

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INTRODUCTION

Unemployment is a major challenge in EU countries such as Estonia (Michoń, 2019; Mursa *et al.*, 2018; Organisation for Economic Co-operation and Development, 2018). Unemployment has been an economic reality since the beginning of the global financial crisis in 2008, and it affects the welfare and happiness of the Estonian society. Because of the economic recession, people are forced to adapt to dynamic situations for survival. Nevertheless, the highly uncertain market resulting from economic crises also offers many hidden opportunities that may lead to entrepreneurial business ideas (Melin, 2002). Consequently, according to reports of the Small Business Act Europe (SBA, 2017, 2018), early-stage entrepreneurial activity in Estonia has substantially increased and has been the highest in the European Union since 2014. Moreover, the Estonian government also continues to support entrepreneurial activities. Therefore, Estonia has the third-highest established business ownership rate in the European Union, which increased from 5.0% in 2013 to 11.4% in 2017 (SBA, 2018). Besides, the Estonian government has endeavoured to forge a favourable environment for entrepreneurs. As revealed by the World Bank, Estonia ranked 12th out of 190 countries for the ease of starting and running a business (SBA, 2018). Furthermore, Estonian entrepreneurs constitute the backbone of the start-up ecosystem, and their new venture initiatives consistently boost the country's economy. At the beginning of 2017, approximately 450 start-ups were founded in Estonia (SBA, 2018).

Franco and Haase (2019) indicate the importance of entrepreneurship to job creation and economic growth in a country. Moreover, the disruptive changes engendered by start-up firms may rejuvenate a stagnant economy, substantially increasing the competitiveness of a region, state, or country (Murphy & Dyrenfurth, 2019). Thus, in highly uncertain and volatile situations, many governments worldwide devote considerable efforts to nurturing entrepreneurship so as to reap the economic benefits that accompany new venture activities (Busenitz, Gomez, & Spencer, 2000; Urban & Kujinga, 2017). For example, the United States of America and several European countries have attempted to develop industrial ecosystems that facilitate open innovation and knowledge exchange among university, industry, and research institutes to ultimately contribute to the establishment of entrepreneurial companies (Díaz-Casero *et al.*, 2009).

To ensure continued economic growth, policymakers should embrace an entrepreneurial mindset by providing a more supportive institutional environment for innovative activities that stimulate individuals' enterprising spirit (Busenitz *et al.*, 2000; Ferreira, Hernández, & Barata, 2009; Urban & Kujinga, 2017). Entrepreneurship has been the backbone of technology advancement and the evolution of existing industries. As a Baltic nation, Estonia has long been recognised as a proactive market with well-established advanced information and communications technology and network infrastructures. Furthermore, the government's exploratory attitude towards radical industrial development has rendered the nation an ideal venue for pioneering projects and entrepreneurial businesses (Dutta, Geiger, & Lanvin, 2015). Although a growing body of research has explored individuals' entrepreneurial motivations, little is known about people's intentions to start a new venture from an Eastern European or a Baltic perspective (Shneor, Jenssen, & Vissak, 2016).

Research has extensively adopted the lens of institutional theory to understand why people from various countries differ in their entrepreneurial intentions and behaviours

(Busenitz *et al.*, 2000; Urban & Kujinga, 2017). A country's institutional environment is embodied in three major dimensions: regulatory, cognitive, and normative institutions (Busenitz *et al.*, 2000; Scott, 1995). Empirical research demonstrated that the three institutional dimensions considerably shape individuals' entrepreneurship and their intentions to start a business by regulating their perceptions of new venture creation processes (Ahlstrom & Bruton, 2010; Heilbrunn, Itzkovitch, & Weinberg, 2017; Manolova, Eunni, & Gyoshev, 2008). From the intentionality perspective, perceptions that determine individuals' entrepreneurial intention include perceived feasibility and desirability towards entrepreneurial activities (Ajzen, 1991; Bruno & Tyebjee, 1982; Shapero & Sokol, 1982). When individuals have positive perceptions of an enterprising career and their self-efficacy in running a start-up firm, they are more likely to have the propensity to act (Heilbrunn *et al.*, 2017).

To obtain a clearer understanding of individuals' entrepreneurship in a Baltic context, this study investigated Estonian university students' new venture intentions by adopting institutional theory and the intentionality perspective of entrepreneurship. Specifically, we explored how the institutional environment affects Estonian students' entrepreneurial intentions through perceived desirability and feasibility. The findings of this study provide implications for policymakers and elucidate directions for future research on entrepreneurship. The paper is organised according to the following. The next section addresses the development of literature and hypotheses. We then describe the research design, process of data collection, and the analytic approach. The following section illustrates the findings. Lastly, we include summary of our results and their implications.

LITERATURE REVIEW

According to Whitley (1999), institutional theory explains how and why countries perform differently in economic activities. Entrepreneurship has been the driving force behind economic growth and social development. To understand people's enterprising spirit, studies have often adopted the view of institutional theory to explore the origin and motivation of new venture creation (Ahlstrom & Bruton, 2010; Jennings *et al.*, 2013). Accordingly, the Estonian government formulated its 2014-2020 Estonian entrepreneurship growth strategy, which prioritises entrepreneurship and start-ups. The goals of this strategy include establishing training programmes for new businesses, attracting foreign investors to Estonia, and accelerating early-stage capital within the country (SBA, 2018). The government plays a key role in spurring the entrepreneurship sphere in the country. Minniti (2008) also establish that government actions and policies can influence entrepreneurship in the country. Brush *et al.* (2003) and Katz (2003) confirm as well that entrepreneurship-friendly institutional infrastructure and government actions and policies can influence the desire to promote entrepreneurship and innovation, which in many countries reduce unemployment. Thus, factors related to institutional environments cannot be ignored and should be considered as crucial determinants in the measurement of entrepreneurial intentions at the country level. On the basis of the concepts presented by Scott (1995) and Busenitz *et al.* (2000), we divided institutional environment determinants into three dimensions: regulatory, cognitive, and normative. These dimensions are explained as follows.

Firstly, the regulatory environment dimension reflects a codified set of laws, legislation, and government policies formally designed to implement a country's entrepre-

neurial activity support system. The desire to become an entrepreneur depends on factors such as the legal system in the country and the global economic situation (Shane, Locke, & Collins, 2003). According to Busenitz *et al.* (2000), the regulatory environment dictates the degree to which entrepreneurial innovation and creative thinking are appreciated by a country's residents. Secondly, the cognitive environment dimension refers to peoples' beliefs, skills, and knowledge with regard to founding new businesses. This dimension includes beliefs about the expected persistence of a particular behaviour that is specific to a culture, community, and society. Therefore, according to Busenitz *et al.* (2000), the ability of people in a country to recognise the cognitive dimension can reflect their knowledge and skills to establish and operate a new business. Accordingly, the perspective of entrepreneurial cognition can be employed to understand how and why entrepreneurs think and act as they do (Krueger, Reilly, & Carsrud, 2000). Thirdly, the normative environment dimension includes the predominant sets of standards and norms supporting entrepreneurial action in the country (Scott, 2007). In line with the findings of Veciana, Aponte, and Urban (2002), cultural, social, political, and economic factors are powerful predictors of entrepreneurial intention. In summary, all three institutional environment dimensions are powerful factors that shape a country's entrepreneurship (Ahlstrom & Bruton, 2010; Manolova *et al.*, 2008). Notably, the favourable environment or societal legitimisation perspective suggests that individuals' prevailing beliefs and values might make them more inclined towards new venture creation, which seems to vary among countries (Vaillant & Lafuente, 2007).

On the basis of the theory of planned behaviour, perceived desirability and feasibility have been important factors that explain or predict entrepreneurial intention. Dodd, Dodd, Komselis, and Hassid (2009) argue that entrepreneurial intention can also be determined by other factors. For example, according to the concept of moral obligation described by Ajzen (1991), perceptions of social obligation might influence or determine an individual's intention to adhere to certain social behaviours. That is, if individuals believe that other people will engage in a behaviour in their immediate environment, they will experience a greater desire to engage in that behaviour. Similarly, according to Fayolle and Francisco (2014) and Shane (2008), individuals' perceptions of desirability and feasibility are influenced by regulatory, normative, and cognitive institutional environments. Thus, from the perspective of institutional environments, entrepreneurial intention can be described as the willingness to create new ventures that is determined by individuals' perceived feasibility and desirability (Krueger *et al.*, 2000). Perceived desirability refers to the degree to which people identify the prospect of pursuing their own new venture as desirable (Dodd *et al.*, 2009). On the basis of perceived desirability, people may doubt whether they want to have their own venture. This is consistent with Shane's (2003) observation that normative and cognitive foundations influence the level of individuals' entrepreneurial desirability. Therefore, we propose the following hypotheses:

H1a: A regulatory institutional environment is positively related to entrepreneurial intentions through perceived desirability.

H1b: A cognitive institutional environment is positively related to entrepreneurial intentions through perceived desirability.

H1c: A normative institutional environment is positively related to entrepreneurial intentions through perceived desirability.

Similarly, perceived feasibility refers to the degree to which individuals believe that they are capable of becoming entrepreneurs. This can be measured by perceptions of business success, levels of self-efficacy, and knowledge about new businesses (Krueger & Brazeal, 1994). In accordance with institutional theory, several scholars have found that the regulatory institutional environment affects perceived feasibility and new venture creation (Heilbrunn *et al.*, 2017; Urban, 2013). Researchers have suggested that the regulatory environment should be included in a broader framework for entrepreneurship (e.g. Bernardino, Santos, & Ribeiro, 2016). Moreover, behavioural and cognitive aspects are linked with entrepreneurial intention (Urban, 2008). Therefore, the cognitive dimension can also boost people's self-belief, through which they eventually perceive their capability of performing actions with the feasible entrepreneurial perspective (Shane, 2008). Thus, institutional environment determinants can influence people's perceptions of the feasibility of entrepreneurial processes. Therefore, feasibility is a crucial predictor of entrepreneurial intentions. Accordingly, we propose the following hypotheses:

H2a: A regulatory institutional environment is positively related to entrepreneurial intentions through perceived feasibility.

H2b: A cognitive institutional environment is positively related to entrepreneurial intentions through perceived feasibility.

H2c: A normative institutional environment is positively related to entrepreneurial intentions through perceived feasibility.

According to Ajzen's (1991) theory, perceived desirability and feasibility can be considered powerful predictors of new venture formation. Similarly, Krueger *et al.* (2000) observe a positive influence of desirability and feasibility on entrepreneurial intentions. Therefore, to be an entrepreneur, a person must perceive themselves as capable of entrepreneurial actions. Specifically, individuals' perceived feasibility and desirability can lead to entrepreneurial activity in a country. Accordingly, this study could contribute to the literature on entrepreneurial intention. Thus, we propose the following hypotheses:

H3: Perceived feasibility is positively related to entrepreneurial intention.

H4: Perceived desirability is positively related to entrepreneurial intention.

MATERIAL AND METHODS

On the basis of the literature review (Ajzen, 1991; Busenitz *et al.*, 2000), we developed and tested a structural model. The model explains the relationship between institutional environment and Estonian students' entrepreneurial intention under the mediating role of perceived desirability and feasibility. Figure 1 illustrates the theoretical framework.

Data Collection

Measurement items were initially developed in English and then translated into the Estonian language by an Estonian professor of management. The questionnaire was sent online to Estonian universities. All items were rated on a five-point Likert scale. After incomplete data were excluded, the sample comprised 265 valid responses. Because universities are considered the source of the future workforce, the use of students as research sample to investigate career aspiration and entrepreneurial intentions is a common approach in the literature

(e.g. Entrialgo & Iglesias, 2016; Lourenço, Sappleton, & Cheng, 2015). The Global Entrepreneurship Monitor Report also suggested that the young people who study at universities are potential candidates for entrepreneurs in the near future (GEM, 2015).

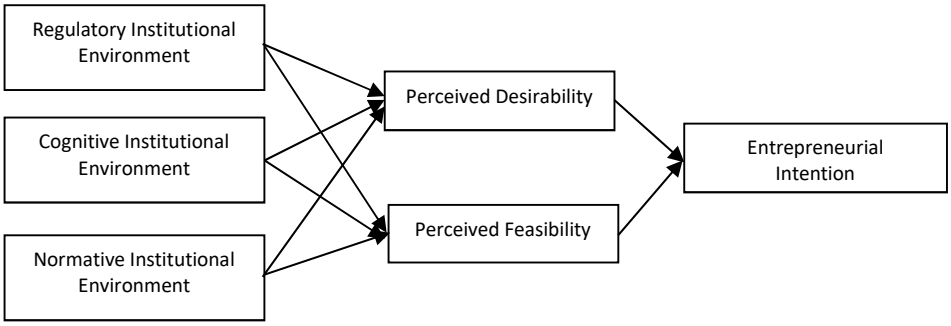

Figure 1. Theoretical Framework
Source: adapted from Ajzen (1991) and Busenitz *et al.* (2000).

In this study, the institutional environment determinants were measured using the scale developed by Busenitz *et al.* (2000). By contrast, questionnaire items pertaining to perceived desirability and feasibility were adapted from other previous studies (Busenitz *et al.*, 2000; Krueger *et al.*, 2000). The 265 Estonian students were from different degree courses such as business management, medicine, engineering, and humanities. Of the respondents, 44.2% were determined to be aged 18-20 years, 53.2% were determined to be female, and more than 70.9% were determined to be studying for their bachelor's degrees. Finally, students were asked to identify themselves as business or non-business students to further examine the differences in business and non-business school students' perceptions of institutional environment, entrepreneurship (desirability and feasibility), and entrepreneurial intentions by using independent samples t-test analysis.

Analytical Approach

The initial step in our analysis was to examine the relationships between constructs. Hence, we first assessed Pearson's correlation coefficients (Table 1). We examined Cronbach alpha values, the Kaiser-Meyer-Olkin (KMO) and Bartlett tests, average variance extracted (AVE), and composite reliability (CR) to determine the validity of the items in each construct. Subsequently, we tested the hypotheses and model fit using structural equation modelling (Arbuckle, 2006) and confirmatory factor analysis through Amos. Confirmatory factor analysis has frequently been used to assess construct validity in structural equation modelling (Jöreskog, 1969). All constructs were tested to assess scale validity, and the results are listed in Table 2.

In Table 1, the results obtained from Pearson's correlation analysis indicate that the variables in our study are significantly correlated. Therefore, we included all variables in our subsequent analyses.

Table 2 presents the scale assessment results, indicating the confirmatory factor analysis (CFA), Cronbach alpha, KMO and Bartlett test, AVE, and CR values used to evaluate scale validity. Factor loadings observed for all items are above the 0.4 cut-off (Nunnally,

Table 1. Variables correlation using Pearson's correlation analysis (n=265)

Constructs	1	2	3	4	5	6
Regulatory	1					
Normative	0.830**	1				
Cognitive	0.829**	0.868**	1			
Desirability	0.731**	0.790**	0.770**	1		
Feasibility	0.756**	0.817**	0.815**	0.876**	1	
Entrepreneurial intention	0.746**	0.790**	0.777**	0.868**	0.886**	1
Mean	4.16	4.22	4.18	4.23	4.20	4.19
Standard Deviation	0.827	0.861	0.882	0.821	0.833	0.877

Significant codes: **Correlation is significant at the 0.01 level (2-tailed)
Source: own calculations in SPSS.

Table 2. Scale assessment results (n=265)

Constructs	Items	Factors Loading	α	KMO	AVE	C.R.
1. Regulatory Institutional Environment	REG1	0.82	0.91	0.88	0.67	0.92
	REG2	0.79				
	REG3	0.79				
	REG4	0.82				
	REG5	0.86				
2. Normative Institutional Environment	NOR1	0.82	0.92	0.89	0.64	0.90
	NOR2	0.78				
	NOR3	0.84				
	NOR4	0.81				
	NOR5	0.89				
3. Cognitive Institutional Environment	COG1	0.86	0.91	0.83	0.71	0.91
	COG2	0.84				
	COG3	0.86				
	COG4	0.83				
4. Perceived Desirability	DEA1	0.90	0.91	0.88	0.66	0.91
	DEA2	0.81				
	DEA3	0.76				
	DEA4	0.82				
	DEA5	0.81				
5. Perceived Feasibility	FEA1	0.91	0.93	0.89	0.72	0.93
	FEA2	0.83				
	FEA3	0.81				
	FEA4	0.80				
	FEA5	0.87				
6. Entrepreneurial Intention	EI1	0.85	0.92	0.85	0.73	0.91
	EI2	0.83				
	EI3	0.83				
	EI4	0.89				

Source: Busenitz, Gomez, and Spencer (2000) and Ajzen (1991).

1978). Moreover, the Cronbach alpha values are above 0.7. These values comply with the minimum acceptable level suggested by Nunnally (1978), thus confirming scale validity.

Similarly, the KMO and Bartlett test values are above the 0.50 cut-off, which represents an acceptable level (Gerbing & Anderson, 1988).

According to the criteria suggested by Fornell-Larcker (1981), the AVE and CR can be used to calculate the convergent validity of a model. The AVE measures the level of variance captured by a construct versus the level of variance due to measurement errors. Accordingly, we applied these measures to assess the degree of shared variance between the latent variables of the model. As presented in Table 2, the AVE values are above the 0.5 cut-off, which is acceptable. Moreover, the CR values are above 0.7, which is also considered acceptable. Therefore, the institutional environment items are valid in European countries such as Estonia.

RESULTS AND DISCUSSION

Structural equation modelling (SEM) was used to examine the hypotheses and the fit between the implied structural model and empirical data. Table 3 lists the results.

Table 3. Structural equation modelling results (n=265)

Causal relationship	β	t-value[a]	p-value	Hypothesis
Regulatory environment – Desirability	1.97	3.77	***	H1a: Supported
Normative environment – Desirability	1.77	3.42	***	H1b: Supported
Cognitive environment – Desirability	1.00	1.81	0.071	H1c: Not Supported
Regulatory environment – Feasibility	1.85	3.57	***	H2a: Supported
Normative environment – Feasibility	1.49	2.68	0.007**	H2b: Supported
Cognitive environment – Feasibility	1.23	2.45	0.014*	H2c: Supported
Desirability – Entrepreneurial intention	0.208	2.17	0.030*	H3: Supported
Feasibility – Entrepreneurial intention	0.772	7.63	***	H4: Supported

Note: GFI = 0.885; CFI = 0.975; IFI = 0.976; RMSEA = 0.047; CMIN/df = 1.585

[a] t-value>1.96 for p<0.05 and >2.33 for p<0.01 (Kline, 1998)

Significant codes: *** p<0.001,**p<0.01, *p<0.05

Source: Based on own research conducted in 2019.

Table 3 reveals that regulatory and cognitive institutional environments have a positive relationship with entrepreneurial intention through perceived desirability, so H1a and H1c are supported (H1a: β= 1.97, $p < 0.001$; H1c: β= 1.77, $p < 0.001$). However, the results reveal no positive relationship between a cognitive institutional environment and entrepreneurial intention through perceived desirability, so H1b is not supported (H1b: β = 1.00, n.s.). Furthermore, the three dimensions of institutional environment (regulatory, normative, and cognitive) are significantly related to entrepreneurial intention through perceived feasibility, so H2a, H2b, and H2c are supported (H2a: β = 1.85, $p < 0.001$; H2b: β = 1.23, $p < 0.05$; H2c: β = 1.49, $p < 0.01$). Moreover, the results indicate positive effects of perceived desirability and perceived feasibility on entrepreneurial intentions, which supports H3 and H4 (H3: β = 0.208, $p < 0.05$; H4: β = 0.772, $p < 0.001$).

The institutional theory provides a useful perspective for explaining why entrepreneurs in some countries are more active and competitive than their counterparts in other countries and why some cities may become strongholds of entrepreneurship that attract investors, entrepreneurs, and talent from all over the world (Busenitz *et al.*, 2000). Fayolle and Francisco (2014) suggest that regulatory, normative, and cognitive

institutional environments can both constrain and promote individuals' perceived desirability and feasibility of entrepreneurship. Notably, prior research has generated inconsistent findings on the relationship between the institutional environment and individuals' perceived desirability and feasibility.

A growing body of research – conducted mostly in developed economies – widely acknowledges the pivotal role of bureaucratic systems, social norms, and entrepreneurial cognition in individuals' entrepreneurial motivation (Heilbrunn *et al.*, 2017; Stenholm, Acs, & Wuebker, 2013; Veciana & Urbano, 2008). By contrast, studies conducted in developing economies make different discoveries. For example, Urban and Kujinga (2017) investigated college students' entrepreneurship in South Africa to determine that only the regulatory environment has a positive impact on perceived feasibility and desirability. Similarly, an empirical study conducted in Thailand suggests that the institutional environment (i.e. government regulation, social norms, and people's entrepreneurial cognition) has a positive influence only on perceived feasibility and not on perceived desirability (Wannamakok & Chang, 2020).

In the present study, we used a unique sample from Estonia in an attempt to reconcile this inconsistency in the literature. Our results indicate that – in the Estonian context – a favourable institutional environment may generally motivate people to engage in new venture initiatives by reinforcing their positive perceptions of entrepreneurial processes. In addition, our results suggest that the cognitive environment is the only dimension that does not exert a significant effect on Estonian university students' perceived desirability of an entrepreneurial career. Culture may explain the differences in findings between our study and the Thai study (Wannamakok & Chang, 2020). Although collectivism and short-term orientation in Thailand's national culture make institutional systems effective in boosting people's perceived feasibility, they cannot easily arouse their perceived desirability for entrepreneurship. By contrast, Estonia is a country characterised by high levels of long-term orientation and individualism (Hofstede Insights, 2020). The findings of this study imply that national institutions play a more critical role in citizens' entrepreneurship in countries where the culture is high in individualism and long-term orientation. Echoing prior research (Welter & Smallbone, 2011), our findings not only highlight the complicated role of national culture in the institution entrepreneurship nexus but reflect the need for a cross-cultural investigation to yield more context-dependent results.

This study was conducted using data gathered from a survey of Estonian university students. Because of the disparity in the ease of job hunting, students from different majors may have diverse perceptions of the institutional environment and their career aspirations. Entrepreneurship and new venture management are common courses in most business schools. Therefore, through an independent samples t-test, we examined the differences in students' perceptions of institutional environment, entrepreneurship (desirability and feasibility), and entrepreneurial intentions between business and non-business school students. The results are listed in Table 4.

According to Table 4, the results of the t-test suggest that significant differences exist in the perceptions of normative and cognitive environments, perceptions of desirability, perceptions of feasibility, and entrepreneurial intentions between business and non-business school students. Students from business schools have higher scores in these factors than students from other disciplines. As observed by Grassl and Jones

(2005), business students have more opportunities to learn about entrepreneurship and experience new venture activities. These findings are consistent with those of a previous study that revealed that non-business school students are likely to have lower levels of entrepreneurial intention (Doe, 2017). Thus, although the institutional environment is essential in determining entrepreneurial intentions, its degree of importance may vary depending on the individuals' profession and specialty.

Table 4. Independent samples t-test result (Academic Major)

Sample groups	Business (N=122)		Non-Business (N=143)				
Construct	M	S.D.	M	S.D.	T	P-value	Df
Regulatory environment (REG)	4.240	0.708	4.107	0.903	1.303	0.194	261
Normative environment (NOR)	4.345	0.746	4.127	0.934	2.099	0.037*	261
Cognitive environment (COG)	4.314	0.780	4.090	0.937	2.111	0.036*	261
Perceived Desirability (DEA)	4.393	0.687	4.092	0.900	3.070	0.002**	261
Perceived Feasibility (FEA)	4.365	0.699	4.092	0.897	2.766	0.006**	261
Entrepreneurial intention (EI)	4.320	0.765	4.111	0.922	2.007	0.046*	261

Significant codes: **p<0.01, *p<0.05
Source: based on own research conducted in 2019.

CONCLUSIONS

The relationship between a nation's institutional environment and its citizens' entrepreneurship has been extensively tested in different cultural contexts, but the findings remain inconclusive (Klapper & Love, 2010). This study adds to the literature on the relationship between national institutions and entrepreneurial intentions. From the Estonian perspective, our results contribute to the growing body of knowledge about how governments may facilitate entrepreneurship by cultivating an institutional environment, in which regulations, norms, and public cognition favour individuals' entrepreneurial initiatives. For policymakers in Eastern Europe or the Baltic regions, the findings of this study may provide useful guidance on establishing an entrepreneurship-munificent environment to boost the prosperity of small businesses and spur economic growth. According to the path analysis results, institutional environment dimensions may help explain individuals' entrepreneurial intentions by affecting their perceived desirability and feasibility (Boris, 2013). This study indicates the profound impacts of institutional systems on university students' entrepreneurial intentions in Estonia. Due to the unique research context, our findings may serve as a springboard for future investigative efforts regarding entrepreneurial intentions in Eastern European or Baltic countries such as Estonia, Latvia, and Lithuania.

Our findings also have policy and practical implications. Stimulating entrepreneurship is an effective strategy to minimise unemployment rates and facilitate economic growth (Castaño, Méndez, & Galindo, 2016). To achieve this goal, a country's government may seek to develop an entrepreneurial ecosystem that promotes start-up establishment, encourages a pro-entrepreneurial financial system, and fosters entrepreneurial training and education. When citizens are exposed to an environment full of entrepreneurial spirit, they are more likely to acquire knowledge about running a new business and enthusiasm for a self-employed career. Moreover, government bureaucracy is a common hindrance to new venture creation. Reducing unnecessary administrative procedures may increase

the ease of founding and running a start-up firm. In particular, a supportive and efficient regulatory environment may enable entrepreneurs to focus on the issues that truly matter to the core values of their start-up firms instead of satisfying performance goals that do not pertain to the growth of their new venture.

Our study has four limitations. Firstly, our sample includes only 265 Estonian students, constraining its representativeness. Secondly, the survey was administered through the Internet, making it challenging to verify the identities of the respondents. Thirdly, the use of self-report questionnaires may lead to the threat of common method bias. Future research may adopt a longitudinal design to observe actual entrepreneurial behaviour to investigate the causal relationship between institutional environment, perceptions, and entrepreneurship. Moreover, we encourage future work to explore how individuals' demographic characteristics affect the way they perceive their institutional environment and develop entrepreneurial motivation. Finally, although our use of the unique Estonian sample is valuable for understanding individuals' entrepreneurship in a Baltic context, our findings may have low generalisability to countries with different cultures.

REFERENCES

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179-211.

Anderson, J.C., & Gerbing, D.W. (1988). Structural equation modeling in practice: A review and recommended two step approach. *Psychological Bulletin*, *103*(3), 411.

Arbuckle, J.L. (2006). *AMOS 7 User's Guide*. Chicago: SPSS.

Bernardino, S., Santos, J.F., & Ribeiro, J.C. (2016). Social entrepreneurship: Does institutional environment make a difference?. In *Handbook of Research on Entrepreneurial Success and its Impact on Regional Development* (pp. 513-538). IGI Global.

Bruno, A.V., & Tyebjee, T.T. (1982). The environment for entrepreneurship. *Encyclopedia of Entrepreneurship, 2*(4), 288-315.

Brush, C.G., Duhaime, I.M., Gartner, W.B., Stewart, A., Katz, J.A., Hitt, M.A., Alvarez, S.A., Meyer, G.D., & Venkataraman, S. (2003). Doctoral education in the field of entrepreneurship. *Journal of Management*, *29*(3), 309331.

Bruton, G.D., Ahlstrom, D., & Li, H.L., (2010). Institutional theory and entrepreneurship: Where are we now and where do we need to move in the future?. *Entrepreneurship: Theory and Practice*, *34*(3), 421-440

Busenitz, L.W., & Barney, J.B. (1997). Differences between entrepreneurs and managers in large organizations: Biases and heuristics in strategic decision-making. *Journal of Business Venturing, 12*(1), 9-30.

Busenitz, L.W., Gomez, C., & Spencer, J.W. (2000). Country institutional profiles: Unlocking entrepreneurial phenomena. *Academy of Management Journal, 43*(5), 994-1003.

Díaz-Casero, J.C., Ferreira, J.J.M., Hernández Mogollón, R., & Barata Raposo, M.L. (2009). Influence of institutional environment on entrepreneurial intention: a comparative study of two countries university students. *International Entrepreneurship and Management Journal, 8*(1), 55-74.

Castaño, M.S., Méndez, M.T., & Galindo, M.Á. (2016). The effect of public policies on entrepreneurial activity and economic growth. *Journal of Business Research, 69*(11), 5280-5285.

Dodd, Σ. Δ., Κομσέλης, Α., Χασσίδ, Ι., Dodd, S.D., Komselis, A., & Hassid, J.(2009). The comperative perceived desirability and feasibility of entrepreneurship within Greek schools. *SPOUDAI-Journal of Economics and Business*, *59*(1-2), 38-56.

Doe, R. (2017). Entrepreneurship among Non-Business Students: Implications for Entrepreneurship Education. *American Journal of Management, 17*(7), 24-32.

Dutta, S., Geiger, T., & Lanvin, B. (2015). *The Global Information Technology* (Report 2015: ICTs for Inclusive Growth). Geneva, World Economic Forum.

Entrialgo, M., & Iglesias, V. (2016). The moderating role of entrepreneurship education on the antecedents of entrepreneurial intention. *International Entrepreneurship and Management Journal*, *12*(4), 1209-1232.

Fayolle, A., & Liñán, F. (2014). The future of research on entrepreneurial intentions. *Journal of Business Research, 67*(5), 663-666.

Fornell, C., & Larcker, D.F. (1981). Structural equation models with unobservable variables and measurement error: Algebra and statistics. *Journal of Marketing Research, 18* (3), 328-388.

Franco, M., & Haase, H. (2019). Sustainable Development of Small and Medium-Sized Enterprises in Disadvantaged Regions: Impact of Knowledge and Innovation. In *Knowledge, Innovation and Sustainable Development in Organizations* (pp. 39-59). Cham: Springer.

GEM (2015). *GEM 2014 Global Report*. Retrieved from http://gemconsortium.org/report on October 12, 2018.

Grassl, W., & Jones, J. (2005). Entrepreneurial intent among students: Are business undergraduates different?. *St. Norbert College, USA*. Retrieved from https://www.snc.edu on October 20, 2018.

Heilbrunn, S., Itzkovitch, Y., & Weinberg, C. (2017). Perceived feasibility and desirability of entrepreneurship in institutional contexts in transition. *Entrepreneurship Research Journal*, *7*(4), 785-796.

Hofstede Insights (2020). *Compare countries*. Retrieved from https://www.hofstede-insights.com/ on April 15, 2020.

Jennings, P.D., Greenwood, R., Lounsbury, M.D., & Suddaby, R., (2013). Institutions, entrepreneurs, and communities: A special issue on entrepreneurship. *Journal of Business Venturing, 28*(1), 1-9.

Jöreskog, K.G. (1969). A general approach to confirmatory maximum likelihood factor analysis. *Psychometrika, 34*(2), 183-202.

Katz, J.A. (2003). The chronology and intellectual trajectory of American entrepreneurship education 1876-1999. *Journal of Business Venturing, 18*(2), 283-300.

Klapper, L., & Love, I. (2010). *The impact of business environment reforms on new firm registration*. The World Bank.

Kline, R.B. (1998). *Principles and Practice of Structural Equation Modelling*. Montreal: The Guilford Press.

Krueger Jr, N.F., & Brazeal, D.V. (1994). Entrepreneurial potential and potential entrepreneurs. *Entrepreneurship Theory and Practice, 18*(3), 91-104.

Krueger Jr, N.F., Reilly, M.D., & Carsrud, A.L. (2000). Competing models of entrepreneurial intentions. *Journal of Business Venturing, 15*(5-6), 411-432.

Lourenço, F., Sappleton, N., & Cheng, R. (2015). Gender and business ethics of enterprise students and nascent entrepreneurs engaged in entrepreneurship education. *The Journal of Entrepreneurship*, *24*(2), 186-203

Manolova, T.S., Eunni, R.V., & Gyoshev, B.S. (2008). Institutional environments for entrepreneurship: Evidence from emerging economies in Eastern Europe. *Entrepreneurship Theory and Practice, 32*(1), 203-218.

Melin, K. (2002). The Entrepreneurial Intentions and Their Background in Estonia and Finland – A Comparative Study in Selected Vocational Schools. *Europa Liiduga liitumise m~ oju Eesti majanduspoliitikale*, 529-536.

Michoń, P. (2019). The Baltic miracle? The economic crisis and its consequences for young people in the labor market of the Baltic states, 2007-2017. *Journal of Baltic Studies, 50*(1), 7-20.

Minniti, M. (2008). The role of government policy on entrepreneurial activity: productive, unproductive, or destructive?. *Entrepreneurship Theory and Practice, 32*(5), 779-790.

Murphy, M., & Dyrenfurth, M. (2019). The Expanding Business of the Entrepreneurial University: Job Creation. In *The Engineering-Business Nexus* (pp. 207-230). Cham: Springer.

Mursa, G.C., Iacobuta, A.O., Socoliuc, O.R., Clipa, R.I., & Butiseaca, A. (2018). Youth Unemployment among EU Countries – A Challenge for Sustainable Growth and Social Cohesion. *Transformations in Business & Economics*, *17*, 701-720.

Nunnally, J.C. (1978). *Psychometric Theory* (2nd ed). New York, NY: McGraw-Hill.

OECD (2018). *OECD Employment Outlook 2017*. Paris: OECD.

SBA (Small Business Act for Europe) (2017). SBA Fact Sheet: Estonia (Brussels: European Commission).

SBA (Small Business Act for Europe) (2018). SBA Fact Sheet: Estonia (Brussels: European Commission).

Scott, R. (1995). *Institutions and organizations*. Thousand Oaks, CA: Sage.

Shane, S.A. (2003). *A general theory of entrepreneurship: The individual-opportunity nexus*. Edward Elgar Publishing.

Shane, S.A. (2008). *The illusions of entrepreneurship: The costly myths that entrepreneurs, investors, and policy makers live by*. Yale University Press.

Shane, S., Locke, E.A., & Collins, C.J. (2003), Entrepreneurial motivation. *Human Resource Management Review, 13*, 257-279.

Shapero, A., & Sokol, L. (1982). The social dimensions of entrepreneurship. *Encyclopedia of Entrepreneurship*, 72-90.

Shneor, R., Jenssen, J. I., & Vissak, T. (2016). Current challenges and future prospects of Entrepreneurship in Nordic and Baltic Europe. *Baltic Journal of Management*, *11*(2), 134-141.

Urban, B. (2008). Social entrepreneurship in South Africa: delineating the construct with associated skills. *International Journal of Entrepreneurial Behaviour and Research, 14*(5), 46-364.

Urban, B. (2013). Influence of the institutional environment on entrepreneurial intentions in an emerging economy. *The International Journal of Entrepreneurship and Inno-vation*, *14*(3), 179-191.

Urban, B., & Kujinga, L. (2017). The institutional environment and social entrepreneurship intentions. *International Journal of Entrepreneurial Behavior & Research*, *23*(4), 638-655.

Vaillant, Y., & Lafuente, E. (2007). Do different institutional frameworks condition the influence of local fear of failure and entrepreneurial examples over entrepreneurial activity?. *Entrepreneurship and Regional Development, 19*(4), 313-337.

Veciana, J.M., Aponte, M., & Urbano, D. (2002). Institutions and support programmes for entrepreneurship: a two countries comparison. *Proceedings, International Council for Small Business, Puerto Rico (2002).*

Veciana, J.M., & Urbano, D. (2008). The institutional approach to entrepreneurship research. Introduction. *International Entrepreneurship and Management Journal, 4*(4), 365-379.

Wannamakok, W., & Chang, Y.Y. (2020). Institutional Environments and Social Entrepreneurial Intentions: A Case of Thailand. *Review of Integrative Business and Economics Research, 9*(1), 97-111.

Welter, F., & Smallbone, D. (2011). Institutional perspectives on entrepreneurial behavior in challenging environments. *Journal of Small Business Management, 49*(1), 107-125.

Whitley, R. (1999). *Divergent capitalism: The social structuring and change of business systems.* New York: Oxford University Press.

Appendix A: Items constituting

1. Regulatory environment / Õigusruum
1. Government organisations assist individuals starting their own businesses /
Riigiasutused abistavad ettevõtlusega alustavaid inimesi.
2. Government sets aside government contracts for new and small businesses /
Riik sõlmib uute ja alustavate ettevõtetega riiklike tellimuste täitmiseks lepinguid.
3. Local and national government have special support for individuals starting a new business /
Kohalik omavalitsus ja riik pakuvad inimestele ettevõtlusega alustamiseks toetust.
4. Government sponsors organisations that help new businesses develop /
Riiklik rahastab organisatsioone, mis toetavad uute ettevõtete arengut.
5. Even after failing, government assists entrepreneurs starting again /
Riik aitab ettevõtjatel isegi pärast ebaõnnestumist uuesti alustada.

2. Normative environment / Väärtusruum
1. Turning new ideas into businesses is admired in this country /
selles riigis väärtustatakse uute ideede elluviimist ettevõtlustegevuses.
2. Innovative and creative thinking is viewed as a route to success in Estonia /
Eestis peetakse uuenduslikku ja loovat mõtlemist edu pandiks.
3. Entrepreneurs are admired in this country / Selles riigis peetakse ettevõtjatest lugu.
4. People in Estonia greatly admire those who start their own businesses /
Eesti inimesed imetlevad neid, kes alustavad oma ettevõttega.

3. Cognitive environment / Kognitiivne, ehk tunnetuslik keskkond
1. Individuals know how to protect a new business legally /
Inimesed teavad, kuidas uut ettevõtet õiguslikult kaitsta.
2.Those who start new businesses know how to deal with risk /
Uue ettevõttega alustajad teavad, kuidas riskiga toime tulla.
3. Those who start new businesses know how to manage risk /
Uue ettevõttega alustajad teavad, kuidas riske juhtida.
4. Most people know where to find info about markets for their products /
Enamik inimesi teab, kust leida infot oma toodete turgude kohta.

4. Feasibility / Teostatavus
1. I am ready to start a prospective business /
Ma olen valmis tulevikus ettevõtlusega alustama.
2. I can control the process of creating a new business firm /
Mul saan kontrollida uue ettevõtte asutamise protsessi.
3. I know the necessary practical details about starting a new business/firm /
Ma tean, millised on uue ettevõtte asutamiseks vajalikud praktilised üksikasjad.
4. I know how to develop my business if I have my own business/firm /
Kui mul on oma ettevõte, siis ma tean, kuidas seda arendada.
5. I have a high probability of success /
Mul on suur tõenäosus edu saavutada.

5. Desirability / Kirg
1. Being an entrepreneur implies more advantages than disadvantages to me /
Ettevõtja staatusel on minu jaoks rohkem eelised kui puudusi.
2. An entrepreneurial career is interesting to me /
Ettevõtja karjäär huvitab mind.

3. If I had opportunities, capital and abilities, I will start a new business /
Kui mul oleks võimalusi, kapitali ja võimeid, asutaksin ettevõtte.
4. Being an entrepreneur will give me enormous satisfaction /
Ettevõtlusega tegelemine pakub mulle tohutut rahuldust.
5. Among various options, I would rather be an entrepreneur /
Eri võimalusi kaaludes eelistaksin olla ettevõtja.

6. Entrepreneurial Intentions / Ettevõtluskavatsused
1. I am thinking to be an entrepreneur in the future /
Ma soovin tulevikus ettevõtjaks saada.
2. I have very seriously thought of starting a business in the future /
Ma olen väga tõsiselt mõelnud oma ettevõtte loomisele.
3. I have a strong intention to start a business in the future /
Mul on kindlasti kavas tulevikus oma ettevõte luua.
4. I am ready to do anything to be an entrepreneur /
Ma olen kõigeks valmis, et ettevõtjaks saada.

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The Impact of Access to Finance and Environmental Factors on Entrepreneurial Intention: The Mediator Role of Entrepreneurial Behavioural Control

Thu Thuy Nguyen

ABSTRACT

Objective: The objective of the article is to test the direct and indirect impact of environmental and individual determinants on entrepreneurial intention with perceived entrepreneurial behavioural control as a mediating variable.

Research Design & Methods: A cross-sectional quantitative research was conducted using structural equation modelling analysis with a sample consisting of 635 students in 11 universities in Vietnam.

Findings: The results reveal that perceived environmental factors are significantly related to students' perceived entrepreneurial behavioural control so that entrepreneurial behavioural control becomes a mediator through which those environmental factors influence entrepreneurial intention. Access to finance is insufficient to influence entrepreneurial intention unless combined with entrepreneurial behavioural control.

Implications & Recommendations: The research findings have implications for policymakers in fostering graduates' entrepreneurship in emerging countries.

Contribution & Value Added: The survey provides evidence supporting the theoretical arguments that exogenous factors affect perceived entrepreneurial behavioural control and impact entrepreneurial intention through the individual's perceptions of behavioural control.

Article type: research article

Keywords: access to finance; entrepreneurial intention; perceived environment barriers; perceived behavioural control; university environment; SEM

JEL codes: L26, M13

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INTRODUCTION

Entrepreneurship has recently been recognised as the critical driving force of economic development and national prosperity (Khan, 2013). The governments of many countries view small and medium-sized enterprise development as the key success factor in their country's strategy toward economic growth and job creation (Lim, Morse, Mitchell, & Seawright, 2010). Entrepreneurship promotion is an important component in that strategy. Since then, fostering entrepreneurship has become a topic of the highest priority in economics and management (Bae, Miao, & Fiet, 2014). Since scholars with a cognitive approach argue that entrepreneurial intention plays a significant role in the decision to start a new business, recent studies in entrepreneurship place increasing emphasis on the entrepreneurial intention of university students on the basis that younger people are more willing to be entrepreneurs (Florin & Rossiter, 2007).

Despite the widespread discussion of entrepreneurial intention in the literature, very few studies integrate the impact of individual and environment perspectives on entrepreneurial intention in single framework (Clercq, Lim, & Oh, 2011). Previous studies focus on contextual factors and intention-based models, which indicate that entrepreneurship is not the result of individual and external factors in separation (Dolce, Molino, & Ghislieri, 2018). Entrepreneurship cannot be explained solely by characteristics of certain people without making reference to the ecosystem in which they operate (Gnyawali & Fogel, 1994). A comprehensive model consisting of both individual and institutional perspectives should be suggested to more accurately explain entrepreneurial intention (Clercq *et al.*, 2011). Fayolle and Liñán (2014) suggest the further examination of the combined impact of individual and structural context on entrepreneurship. The current study will examine the impact of such variables as the access to finance as an individual factor and two external environment factors such as university environment, and environment barriers – on the entrepreneurial intention of university students, neglected in the entrepreneurial literature.

Moreover, prior studies document the impact of environment and personal factors on entrepreneurs' cognition of behavioural control and intention. However, findings on the impact of access to finance, university environment, and environmental barriers on college students' entrepreneurial intentions are inconsistent in the literature. A positive relationship between perceived university environment and students' entrepreneurial intention appears in Turker and Selcuk (2009) and Lüthje and Franke (2003), while Sesen (2013), Yurtkorua, Kuşcub, and Doğanayc (2014) find no significant relationship. Schwarz, Wdowiak, Jarz, and Breitenecker (2009); Hadjimanolis (2016); Shahid, Imran, and Shehryar (2017) find that entrepreneurial environment does not affect students' entrepreneurial intentions, while Lüthje and Franke (2003) find that the relationship between entrepreneurial environment barriers and students' entrepreneurial intentions is significant. The inconsistent evidences on the relationship between those factors and students' entrepreneurial intention reinforce the need for a deeper examination of the case, particularly in other contexts or with a mediator (Clercq *et al*., 2011; Yurtkorua *et al*., 2014).

In this research, I choose to focus on perceived entrepreneurial behavioural control as a mediator of the relationship among finance, university environment, environment barriers, and entrepreneurial intention. Perceived entrepreneurial behavioural control is predictor of intention (Ajzen, 1991); and perceived behavioural control plays an important role in

career development (Krueger, Reilly, & Carsrud, 2000). Although perceived entrepreneurial behavioural control is used as mediator in several intention studies – e.g. by Dolce *et al.* (2018) and Yurtkorua (2014) – this is the first empirical article to examine perceived entrepreneurial behavioural control as the mediator of relationship among access to finance, university environment, and environment barriers with entrepreneurial intention.

This empirical study's main objective is to test the direct relationship among the three proposed determinants – entrepreneurial environment barriers, access to finance, university environment – and entrepreneurial intention. Moreover, we test the indirect impact of the above factors on entrepreneurial intention with perceived entrepreneurial behavioural control as the mediator, which for now has been a gap in the literature. This study contributes to entrepreneurial literature in two ways. Firstly, while previous studies only focus on the direct effect of entrepreneurial environmental factors on entrepreneurial intention, this research investigates the mediating effect of entrepreneurially perceived behavioural control in the relationship between entrepreneurial environmental factors and entrepreneurial intention by using structural equation modelling analysis. Secondly, this study contributes to entrepreneurial literature by applying the entrepreneurship contextual theory and planned behavioural theory to the emerging context of Vietnam.

This article consists of four parts: literature review, methodology, discussion of results, and conclusion.

LITURATURE REVIEW

Entrepreneurial Behavioural Control and Intention

There are several approaches in the field of entrepreneurship research. Numerous studies investigate individual differences as determinants of entrepreneurial behaviours. Since this approach yields ambiguous results, the cognitive approach with the planned behaviour theory or intention base model received considerable interests (Krueger *et al.*, 2000). The theory of planned behaviour (TPB) states that entrepreneurship is a planned, intentional behaviour. Entrepreneurial intention is a reliable and best predictor of entrepreneurial behaviours and activities (Ajzen, 1991). Entrepreneurial intention is the internal driving force that leads individuals to seize opportunities and implement entrepreneurial actions (Cha & Bae, 2010). Therefore, study of entrepreneurial intention offers us a chance to understand and predict entrepreneurial activity (Linan & Chen, 2009).

According to the TPB proposed by Ajzen (1991), entrepreneurial intention is a conviction self-acknowledged by the individual that s/he intends to set up a new business venture and consciously plans to do so at some point in the future.

Perceived behavioural control is someone's perception of the ease or difficulty of performing a behaviour (Ajzen, 1991). Perceived behavioural control indicates an individual's feel of how easily it would be to implement entrepreneurial activities. Perceived behavioural control bases on the evaluation of one's controllability of the process of developing a new venture. This concept is not the same but very similar to perceived feasibility or self-efficacy concepts, as all of them reflect the personal judgment of an individual about own ability to perform a behaviour (Krueger *et al.,* 2000).

The TPB assumes that perceived behavioural control is the proximal predictor of intention. Perceived behavioural control precedes the formation of entrepreneurial inten-

tion, then precedes entrepreneurial behaviour (Ajzen, 1991). The impact of perceived entrepreneurial behavioural control on entrepreneurial intention is widely confirmed in the literature and tested in empirical studies that apply the TPB (Liñán & Chen, 2009; Yurtkorua, 2014; Wach & Wojciechowski, 2016).

H1: Perceived entrepreneurial behavioural control is positively related to entrepreneurial intention.

Access to Finance versus Perceived Behavioural Control and Intention

Entrepreneurial intention is influenced by multiple factors including individual factors such as people's resources and characteristics (Clercq *et al.,* 2011). Potential entrepreneurs gather capital from various sources as they hardly manage to finance a new venture only by themselves (Smith & Beasle, 2011). The capital needed to start a new business can be obtained from personal savings, loans from friends, family or extended family networks, credit systems, or through sharing partnership with outside investors and venture funds (Urban & Ratsimanetrimanana, 2019). In developing countries, informal sources of loans with high interest rates from black financial market substantially contribute to business start-ups (Kwong & Evans, 2012).

The perception of access to finance is defined as an assessment of the individual's ability to effectively find, access, and utilise capital (Pham, 2019). Access to finance is crucial for every subsequent entrepreneurial activities (Kristiansen & Indarti, 2004). A considerable number of people gave up on their intention of nascent entrepreneurial careers because of the inability to gather finance capital (Sesen, 2013). Blanchflower and Oswald (1990) indicate that if governments want to foster entrepreneurship, they need to generate various financial sources and make it accessible to potential entrepreneurs (Kwong & Evans, 2012). Some empirical studies show that the lack of access to finance and difficulties in reimbursing loans in the official financial system is more a major barrier among entrepreneurs in developing countries than in developed countries with effective financial infrastructure (Kristiansen & Indarti, 2004). Access to finance is a typical obstacle to start-ups, especially in countries with weak credit and limited venture capital institutions.

Clercq *et al.* (2011) and Urban and Ratsimanetrimanana (2019) indicate that individuals with access to financial capital are more likely to become entrepreneurs. Finance is probably the most supportive trigger event of entrepreneurial intention (Schwarz *et al.,* 2009). Thus:

H2: Perceived access to finance is positively related to entrepreneurial intention.

Previous studies show that individuals with high opportunities to access to financial capital are more confident about becoming entrepreneurs, because entrepreneurs confront various challenges during their efforts to deal with high levels of uncertainty in new business creation process. Research of Pham (2019) finds a positive relationship between access to finance and the perception of entrepreneurial behavioural control in social entrepreneurs. Several empirical studies conclude that the main hindrances to business innovation and success of potential entrepreneurs in developing countries are the lack of access to credit schemes and the constraints of financial systems. The lack of access to finance is a major obstruction that hinder entrepreneurs' self-efficacy (Kristiansen & Indarti, 2004).

H3: Access to finance is positively related to perceived entrepreneurial behavioural control.

Environment Barriers with Perceived Behavioural Control and Intention

Entrepreneurship process is a complex phenomenon and is impacted by numerous actors in the entrepreneurship environment (Khan, 2013). Sociological theories emphasise that entrepreneurship is a process involving economic, social, and cultural contexts. Entrepreneurship cannot be fully understood without reference to the institutional and socio-cultural context in which it arises, develops, and operates (Lim *et al.*, 2010). Gnyawali and Fogel (1994) note that there are both supporting and hindering factors in entrepreneurial environment. Schwarz *et al*. (2009) treat "environment barriers" as an important factor in the model of students' entrepreneurial intentions.

Environment barriers are discussed by several studies. Lüthje and Frank (2003) suggest that individuals are less inclined towards entrepreneurship in environments that disapprove of their choices; and environment barriers can also ruin optimism and may even convert students originally interested in an entrepreneurship career into graduates who seek a career in established large companies. A student may not intend to start his own business due to the negative perception of entrepreneurial environment. Fini, Meoli, Sobrero, Ghiselli, and Ferrante (2016) emphasise that perceived environmental barriers influence entrepreneurial intention; these barriers may emerge from characteristics of local context (competition, availability of logistic infrastructure, market entry barrier) and government policies (support programs, legal frameworks). In developing countries, business informality is considered to be a considerable barrier in the entrepreneurship environment. Informality causes the lack of information, unfair competition, and those barriers appear are obstacles for entrepreneurial intention (Robertson, Collins, Medeira, & Slater, 2003). Franke and Lüthje (2004), Schwarz *et al.* (2009) also develop a model that considers contextual barriers as directly affecting entrepreneurial intentions.

H4: Environment barriers are positively related to entrepreneurial intentions.

Recently, most entrepreneurship studies assume that a business mindset is transferred in education and human thinking can be shaped by the surrounding environments. Entrepreneurial event theory states that life path changes impact individual perceptions of feasibility (Krueger *et al.,* 2000). Therefore, the perception of behavioural control is proposed to be probably dependent on the individual perception of immediate environment. Student might believe they are incompetent to set up a business, regardless of their comparatively good attitude towards entrepreneurship, because they perceive the environmental conditions as very unfavourable. Krueger *et al*. (2000) indicate that the environment factor is an adjustable variable, which directly impacts the perception of behavioural control, as graduates with negative a perception of barriers in the environment may believe they are incapable to be an entrepreneur.

H5: Environment barriers are positively related to the perception of behavioural control.

University Support Environment and Entrepreneurship-Perceived Behavioural Control and Intention

Researchers find that innovative and creative entrepreneurial universities environment like the Massachusetts Institute of Technology (MIT), Harvard University, or Stanford University successfully foster entrepreneurial activities. A remarkable number of start-ups was founded by graduates of selected US business schools, while there is a limited number from other universities, this fact raises the question of whether university environments impact entrepreneurship (Lüthje & Franke, 2003). Although some researchers have argued that entrepreneurship is an innate behaviour, many others believe it is an attitude that can be learned (Bae *et al.,* 2014). The impact of university environment on the creation of future entrepreneurs is broadly discussed in the literature. Turker and Selcuk (2009) and Schwarz *et al*. (2009) propose that students who perceive university environment as supportive of entrepreneurship likely have stronger entrepreneurial intentions. In terms of the general university context, the presence of an entrepreneurship supportive environment and the positive image of entrepreneurs within educational institutions encourage student intention to start a new business (Shahid *et al.*, 2017).

H6: University entrepreneurial environment is positively related to entrepreneurial intention.

The influence of the university environment on self-efficacy (feasibility) necessary to become an entrepreneur is considered by a few studies in the entrepreneurship literature (Guerrero & Urbano, 2015). Although Fayolle (2006) fails to evidence the impact, the research of Guerrero and Urbano (2015) recognises the existence of a direct, positive, and significant relationship between university environment conditions and entrepreneurship self-efficacy. Thus,

H7: University entrepreneurial environment is positively related to perceived entrepreneurial behavioural control.

The Mediator Role

In the TPB model, exogenous factors indirectly influence intention through personal-situation perceptions of perceived behavioural control *(*Ajzen, 1991). Lüthje and Franke (2003) stipulate that perceived behavioural control is a determinant of entrepreneurial intention, and the perception of behavioural control is in fact a product of combined effects of several other exogenous variables such as personal, demographical, and external elements. Accordingly, I propose the next three hypotheses of the mediator role:

H8a: The perception of behavioural control mediates the relationship between access to finance and entrepreneurial intention.

H8b: The perception of behavioural control mediates the relationship between environment barriers and entrepreneurial intention.

H8c: The perception of behavioural control mediates the relationship between university entrepreneurial environment and entrepreneurial intention.

MATERIAL AND METHODS

This empirical study seeks to quantitatively test the model of the relationships between selected environment and individual factors and the perception of entrepreneurial behavioural control and intention. Before quantitative research, I implemented an additional exploratory qualitative study with five in-depth interviews to check, confirm, and revise the theoretical model and scales. After the exploratory study, I conducted the official quantitative study with a questionnaire table.

All measures are borrowed from previous studies (Table 1). All use five-point Likert scales. Surveys were administered to final year undergraduate college students in two academic majors, engineering and economics-business, at 11 universities in Hanoi, Vietnam. Questionnaires were randomly distributed to target respondents with control of sex, major, and universities.

Statistical analysis was conducted with the SPSS 22.0 and the AMOS 22.0 software. First, Cronbach's alpha, explorative factor analysis (EFA), confirmatory factor analysis (CFA) were implemented to assess the validity and reliability of variables. Second, the structural equation modelling (SEM) was applied to estimate path coefficients for proposed relationships (Hair, Black, Anderson, & Babin, 2009). In order to investigate mediating impacts of factors on entrepreneurial intention, I applied the bootstrapping method, because it is more effective than Sobel test if using original data (Preacher & Hayes, 2008).

Total responses consisted of 638 questionnaires, in which 62.7% are men and 37,3% are women. 18% of sample respondents create a business or invest in a new business; 82% do not have entrepreneurship experiences. 36.4% of respondents have parents with business related jobs; 63.6% of students' parents are doing other careers. 55.8% of sample respondents study business and economics major.

RESULTS AND DISCUSSION

Measures Assessment

To test the reliability of scales, I conducted Cronbach's Alpha analysis. All scales showed Cronbach's Alpha from 0.776 to 0.850. All the research variables have "Cronbach's Alpha if item deleted" of each item are lower than a scale's Cronbach's Alpha. All the value of "Corrected item total correlation" of individual items are bigger than 0.3 (Table 1).

To test the validity of the study's instrument, EFA analysis was done at the same time for five variables, including independent and dependent variables with 24 items using promax rotation method. All items loaded in original factors with factor loading in all cases above 0.5; initial Eigenvalues = 60.921 > 50%; KMO = 0.887; Sig. (Bartlett's Test) = 0.000. The validity of measurement instruments is confirmed.

Then, the confirmatory factor analysis (CFA) was performed with survey data. The measurement models exhibited a reasonably good level of fit: $\chi 2 = 482.244$, $df = 241$, $p = 0.000 < 0.5$; $\chi 2/df = 2.001 < 3$; GFI = 0.939, CFI = 0.960, TLI = 0.954 > 0.9, RMSEA = 0.040; standardised regression weights of all items are higher than 0.5 (Hair *et al*., 2009). Thus, validity is proven for all scales, as all scales are internally consistent and reliable for using in next steps.

Table 1. Measures

Variables	Number of items	Code	Sources	Cronbach's alpha
Entrepreneurial intention	6	EI	Linan and Chen (2009)	0.847
Access to finance	3	FS	Sesen (2013)	0.776
Entrepreneurial environment barriers	6	EB	Franke and Lüthje (2004)	0.827
Entrepreneurship university environment	3	UE	Schwarz *et al.* (2009)	0.828
Perceived entrepreneurial behavioural control	6	PBC	Linan and Chen (2009)	0.850

Source: own study.

The Result of Hypothesis Testing

Goodness-of-Fit indicators show the overall compatibility of the model. The model meets the required Goodness-of-Fit criteria. The overall fit statistics of the model illustrate an acceptable level of good fit: $\chi 2 = 562.149$, df=242, $p = 0.000 < 0.05$; CMIN/df = 2.323 < 0.3, CFI = 0.947, GFI = 0.930, TLI = 0.940 > 0.9, RMSEA = 0.046 (Hair *et al*., 2009). Therefore, the design of the model is compatible with the sample data, as the original model is used to test the relationship between variables.

Table 2. Regression Weights

Hypothesis				Estimate	S.E.	C.R.	P	Description
H5:	PBC	<---	EB	-0.123	0.041	-3.008	0.003	Supported
H7:	PBC	<---	UE	0.256	0.042	6.115	***	Supported
H3:	PBC	<---	FS	0.201	0.048	4.155	***	Supported
H2:	EI	<---	FS	0.089	0.059	1.509	**0.131**	Not Supported
H6:	EI	<---	UE	0.130	0.052	2.496	0.013	Supported
H4:	EI	<---	EB	-0.109	0.050	-2.180	0.029	Supported
H1:	EI	<---	PBC	0.649	0.067	9.666	***	Supported

Source: own study.

A total of seven direct relationships were tested. Six out of seven hypotheses are statistically significant, and only one is not significantly supported by the research data (Table 2).

The hypotheses test shows that the relationship between entrepreneurial perceived behavioural control and entrepreneurial intention is very strong ($\beta = 0.649$; sig. < 0.001). This result is consistent with the theoretical establishment of TPB intention model and previous studies based on the TPB model (Linan & Chen, 2009; Yurtkorua, 2014; Wach & Wojciechowski, 2016). Moreover, the result proves the argument of Sesen (2012) that there is a strong influence in developing economies of perceived control on the intention to be an entrepreneur. Perceived behavioural control is a critical factor in predicting entrepreneurial intention. Students who are more convinced that a start-up is not a difficult task are more inclined to create a new venture (Brice *et al.,* 2007). This result also supports cognitive theory and Ajzen's TPB model (1997). The TPB can be seen as a detailed and decisive instrument for examining and identifying the factors and relations that motivate

entrepreneurship at the university. This agrees with the recommendations of Brice and Spencer (2007) that one of the key elements of entrepreneurship process is forming the beliefs regarding the chances to succeed in a given venture.

Entrepreneurship university environment directly effects in the positive and significant correlation on entrepreneurial intention (β = 0.130; sig. < 0.05). This analysis of effect is consistent with the studies conducted by Turker and Selcuk (2009), Schwarz *et al*. (2009), and Shahid *et al*. (2017), which affirm that socially supportive environment in universities predicts entrepreneurial intention. While entrepreneurship education alone does not significantly influence entrepreneurial intention – as indicated in two studies by Yurtkorua *et al.* (2014; 2014) – what is really important is the entrepreneurial environment at universities. This study emphasises the role of a supportive university environment by providing not only entrepreneurship education courses but also encouragement, inspiration, role models, and a creative and innovative atmosphere to develop students' entrepreneurial intention.

Moreover, an entrepreneurial university environment has a positive significant correlation with perceived entrepreneurial behavioural control (β = 0.256; sig. < 0.001). The analysis of effect is supported by the study conducted by Guerrero and Urbano (2015), who find that educational factors in university environment are significantly associated with key beliefs of entrepreneurship-perceived behavioural control. This is consistent with a recent argument of management scholars that business behaviours are learned and that the human mind is a blank slate that can be shaped by schools and education (Bae *et al.,* 2014). This is supportive for the proposal of Verzat and Bachelet (2006) that entrepreneurship can be taught and learned, as educational determinants can help students deal with business complexity and the development of capacities particularly important for classes of young, not to mention undergraduate students who have no or very limited business experience.

The entrepreneurial environment barriers negatively influence entrepreneurial intention (β = -0.109; sig. < 0.05). This agrees with the evidence obtained by previous studies (Lüthje & Franke, 2003; Benhabib *et at.,* 2014). The results confirm the existence of a direct and significant relationship between the environment and entrepreneurial intention, which supports the claim of Gnyawali and Fogel (1994) that it is insufficient and incomplete to disregard environment in an entrepreneurship study. Limitations in entrepreneurship environment and the lack of an effective support scheme discourage students from developing entrepreneurial intentions.

The next hypothesis test confirmed that entrepreneurial environment barriers had negative and significant correlation with perceived entrepreneurial behavioural control (β = -0.123; sig. < 0.005). This supports the argument of the Shapero Model of entrepreneurial event that a socially unsupportive institutional environment deters or prevents potential entrepreneurs to access important resources to create their businesses, which has a negative motivating effect and also unconsolidated nascent entrepreneurs' self- believe of behavioural control (Krueger *et al*., 2000).

The current study disagrees with previous studies of Clercq *et al.* (2011), Urban, and Ratsimanetrimanana (2019), who find that access to financial capital increased the intention to start a new venture, as the direct effect of access to finance on entrepreneurial intention in this research is positive but insignificant (sig. > 0.05). However, the result confirms the direct, positive, and significant correlation effects of perceived access to finance

on entrepreneurial behavioural control (β = 0.201; sig. < 0.001). Thus, in contrast to developed countries, the developing context of Vietnam economy shows that access to finance does not directly associate with a business start-up intention. The result again proves the findings of Pham (2019) about social entrepreneurs, which were conducted in Vietnam. A possible explanation about the difference is that individuals in other contexts may raise their start-up capital from borrowing from formal institutions, which they may have difficulty accessing, because entrepreneurs typically lack reliable performance data, collateral, and legitimacy, thus making it difficult for them to secure financing from external sources (Urban & Ratsimanetrimanana, 2019). With the current Vietnam government's campaign to foster entrepreneurship, students receive many financial opportunities offered by country programs and venture funds. Another reason for the difference is that students relatively lack the experience of securing financing and establishing a business, so they may be optimistic about their capital access capabilities, as proposed by Sesen (2013). Therefore, other barriers in environments (e.g. competition or business opportunities) may be more important for students than financial issues when considering future entrepreneurship careers. Further studies are needed to properly assess this hypothesis.

Table 3. Indirect effects using bootstrapping (2000 replications): unstandardised coefficients

Indirect effects	Est.	S.E.	p	CI 95% (lower and upper bounds)
EB-PBC-EI	-0.080	-0.071	0.009	(-0.154, -0.018)
UE-PBC-EI	0.166	0.155	0.001	(0.102, 0.242)
FS-PBC-EI	0.131	0.118	0.001	(0.058, 0.233)

Source: own study.

In order to investigate the indirect effect of factors on entrepreneurial intention with the mediator role of perceived behavioural control, we apply the bootstrapping method (Tables 3 and 4). The result shows that although finance do not directly influence entrepreneurial intention, it plays a significant role in building perceived behavioural control (β indirect 0.131, sig. 0.01). The result is similar with the study by Pham (2019) on social entrepreneurship in Vietnam and by Kristiansen and Indarti (2004). The results confirmed that entrepreneurship university environment and entrepreneurial environment barriers have both significant indirect and direct effect on entrepreneurial intention (Table 4). This evidence supports the theoretical argument of Lim *et al*. (2010). Thus, hypotheses H8a, H8b, H8c are supported by the research data.

Table 4. Total, direct, and indirect effects: unstandardised coefficients

Total, direct and indirect effects		FS	UE	EB	PBC	EI
Total effect	PBC	0.201	0.256	-0.123	0.000	0.000
	EI	0.220	0.296	-0.189	0.649	0.000
Direct	PBC	0.201	0.256	-0.123	0.000	0.000
	EI	0.089	0.130	-0.109	0.649	0.000
Indirect	PBC	0.000	0.000	0.000	0.000	0.000
	EI	0.131	0.166	-0.080	0.000	0.000

Source: own study.

The results confer the assumption of Krueger *et al.* (2000) in entrepreneurial intention model, which posits that exogenous factors – environmental or personal – influence individual intention through perceived behavioural control.

CONCLUSIONS

The survey provides evidence supporting theoretical arguments that perceived contextual barriers, supportive entrepreneurship university environment, and individual perceived access to finance play significant roles in the development of entrepreneurial perceived behavioural control and the intention of university students. Previous studies show that entrepreneurial intention could be influenced by environment but they do not clarify the role of entrepreneurial perceived behavioural control. We understand the case better now. The entrepreneurial perceived behavioural control is important if we want to influence entrepreneurial intention, because it mediates the relationship between environment factors and access to finance with intention.

This knowledge is important for policy-makers and universities in designing entrepreneurship support scheme in a more targeted and effective manner. Firstly, encouraging students' entrepreneurial intention should be done not only in universities but also in a whole society and in communities. Secondly, public policy should intensify activities to remove obstacles in government regulations, the availability of qualified new venture consultants, the level of competition, and general support infrastructure. The design of intervention should not only focus on factors that could change intentions but also obstacles that are antecedents of actual behavioural control, such as access to finance.

This research has limitations. Firstly, this cross-sectional study limits us to seeing changes in perceived behavioural control and intention over time. Longitudinal studies are better for understanding the process of becoming new entrepreneurs. Future studies should scrutinise the relationship between environment, entrepreneurship-perceived behavioural control, intention, and entrepreneurship behaviours; in process, actions can occur after much time passes. Secondly, this study only focuses on three major factors without considering other supportive factors, such as government and university policies, facilities, or education methods. Entrepreneurial intention may be influenced by a myriad of factors, including individual psychological traits and other environmental attributes. A comprehensive model of various factors might have a better explanation for the case. This study recommends more research using other mediating or moderating variables in order to better explain the variation in the influence of environmental factors on students' entrepreneurial intention.

REFERENCES

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179-211.

Bae, T.J., Qian, S., Miao, C., & Fiet, J.O. (2014). The Relationship between Entrepreneurship Education and Entrepreneurial Intentions: A Meta-Analytic Review. *Entrepreneurship Theory and Practice, 38(*2), 217-254.

Benhabib, A., Merabet, A., Benachenhou, M., Grari, Y., Boudia, F., & Merabet, H. (2014). Environmental and Individual Determinants of Female Entrepreneurship in Algeria: Applying the Structural Equation Modeling. *Entrepreneurial Business and Economics Review*, *2*(1), 65-80.

Brice, J., & Spencer, B. (2007). Entrepreneurial profiling: A decision policy analysis of the influence of entrepreneurial self-efficacy on entrepreneurial intent. *Academy of Entrepreneurship Journal, 13(*2), 47-67.

Cha, M., & Bae, Z. (2010). The entrepreneurial journey: From entrepreneurial intent to opportunity realization. *Journal of High Technology Management Research, 21*(1), 31-42

Clercq, D.D., Lim, D.S.K., & Oh, C.H. (2011). Individual-Level Resources and New Business Activity: The Contingent Role of Institutional Context. *Entrepreneurship Theory and Practice, 37(*2), 303-330.

Dolce, V., Molino, M., Cortese, C.G., & Ghislieri, C. (2018). Personality and social support as determinants of entrepreneurial intention. Gender differences in Italy. *PLOS ONE*, *13*(6), 1-19.

Fayolle, A., & Liñán, F. (2014). The future of research on entrepreneurial intentions. *Journal of Business Research. Elsevier*, *67*(5), 663-666.

Fini, R., Meoli, A., Sobrero, M., Ghiselli, S., & Ferrante, F. (2016). Student Entrepreneurship: Demographics, Competences and Obstacles. *Technical Report - Almalaurea Consortium*, *February 2016*, 1-35.

Florin, J., Karri, R., & Rossiter, N. (2007). Forstering entrepreneurial drive in business education: an attitudinal approach. *Journal of Management Education, 31*(1), 17-42.

Franke, N., & Lüthje, C. (2004). Entrepreneurial intentions of business students: a benchmarking study. *International Journal of Innovation and Technology Management, 1*(3), 269-288.

Gnyawali, D., & Fogel, D. (1994). Environments for entrepreneurship development: key dimensions and research implications. *Entrepreneurship Theory and Practice*, *18*(4), 43-62.

Guerrero, M., & Urbano, D. (2015). The effect of university and social environments on graduates' start-up intentions: an exploratory study in Iberoamerica. In R. Blackburn, U. Hytti, & F. Welter (Eds), *Context, Process and Gender in Entrepreneurship: Frontiers in European Entrepreneurship Research* (pp. 55-86). Northampton, MA: Edward Elgar Publishing.

Hadjimanolis, A. (2016). Perceptions of the institutional environment and entrepreneurial intentions in a small peripheral country. *International Journal of Entrepreneurship and Small Business*, *28*(1), 20-35.

Hair, J.F.J., Black, W.C., Anderson, R.E., & Babin, B.J. (2009). *Multivariate Data Analysis*. Essex: Pearson Education Limited.

Khan, M.R. (2013). Mapping entrepreneurship ecosystem of Saudi Arabia. *World Journal of Entrepreneurship*, *Management and Sustainable Development, 9*(1), 28-54.

Kristiansen, S., & Indarti, N. (2004). Entrepreneurship intentions among Indonesian and Norwegian students. *Journal of Enterprising Culture, 12*(1), 55-78.

Krueger, N.F., Reilly, M.D., & Carsrud, A.L. (2000). Competing models of entrepreneurial intentions. *Journal of Business Venturing, 15*(5/6), 411-432.

Kwong C., Jones-Evans, D., & Thompson, P. (2012). Differences in perceptions of access to finance between potential male and female entrepreneurs: Evidence from the UK. *International Journal of Entrepreneurial Behaviour & Research, 18(*1), 75-97.

Lim, D.S.K., Morse, E.A., Mitchell, R.K., & Seawright, K. (2010). Institutional environment and entrepreneurial cognitions: A comparative business systems perspective. *Entrepreneurship Theory and Practice, 34*(3), 491-516.

Liñán, F., & Chen, Y.W. (2009). Development and Cross-Cultural Application of a Specific Instrument to Measure Entrepreneurial intentions. *Entrepreneurship Theory and Practice*, *33*(3), 593-617.

Lüthje, C., & Franke, N. (2003). The 'making' of an entrepreneur. Testing a model of entrepreneurial intent among engineering students at MIT. *R & D Management, 33*(2), 135-47.

Pham, T.L. (2019). The Relationship between Perceived Access to Finance and Social Entrepreneurship Intentions among University Students in Vietnam. *The Journal of Asian Finance, Economics and Business, 55*(1), 63-72.

Preacher, K.J., & Hayes, A.F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behaviour Research Methods, 40*, 879-891.

Robertson, M., Collins, A., Medeira, N., & Slater, J. (2003). Barriers to start-up and their effect on aspirant entrepreneurs. *Education & Training, 45(*6), 308-316.

Schwarz, E., Wdowiak, M., Almer-Jarz, D., & Breitenecker, R. (2009). The Effects of Attitudes and Perceived Environment Conditions on Students Entrepreneurial Intent. *Education + Training*, *51*(4), 272-291.

Sesen, H. (2013). Personality or environment? A comprehensive study on the entrepreneurial intentions of university students. *Education + Training, 55*(7), 624-640.

Shahid, M.S., Imran, Y., & Shehryar, H. (2017). Determinants of entrepreneurial intentions: An institutional embeddedness perspective. *Journal of Small Business & Entrepreneurship, 30*(2), 139-156.

Smith, K., & Beasle, M. (2011). Graduate entrepreneurs: intentions, barriers and solutions. *Education & Training, 53*(8/9), 722-740.

Turker, D., & Selcuk, S.S. (2009). Which Factors Affect Entrepreneurial Intention of University Students?. *Journal of European Industrial Training*, *33(2)*, 142-159.

Urban, B., & Ratsimanetrimanana, F.A. (2019). Access to finance and entrepreneurial intention. An empirical study of Madagascan rural areas. *Journal of Enterprising Communities: People and Places in the Global Economy, 13*(4), 455-471.

Verzat, C., & Bachelet, R. (2006). Developing and Entrepreneurial Spirit among engineering college students: what are the educational factors?. In A. Fayolle, H. Klandt, & E. Elgar (Eds.), *Entrepreneurship education* (pp. 191-217). Northampton, MA: Edward Elgar Publishing.

Wach, K., & Wojciechowski, L. (2016). Entrepreneurial Intentions of Students in Poland in the View of Ajzen's Theory of Planned Behaviour. *Entrepreneurial Business and Economics Review, 4*(1), 83-94.

Yurtkorua, S.E., Kuşcub, Z.K., & Doğanayc, A. (2014). Exploring the antecedents of entrepreneurial intention on Turkish university students. *Procedia – Social and Behavioral Sciences, 150(*2014), 841-850.

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Company Image as an Employer on Poland's Mobile Telecommunication Market and Its Relationship with Consumer Recommendations

Maria Rybaczewska, Łukasz Sułkowski

ABSTRACT

Objective: The objective of the article is to answer the research question whether there exists any correlation between the image of a company as an employer and consumers' recommending its offer.

Research Design & Methods: Survey questionnaire conducted on a group of 896 respondents provided quantitative data analysed with the application of statistical methods.

Findings: The research focused on current and potential customers in the dynamic market of telecommunications services. The analysis demonstrated that respondents who perceive the service provider as a good employer are more willing to recommend its offer.

Implications & Recommendations: While the employer image is believed to be powerful from the human capital perspective, it is also a meaningful intangible factor for offer recommendations.

Contribution & Value Added: This research contributes to both human resources and marketing literature by providing a new perspective on the value of company's image as an employer.

Article type: research article

Keywords: employer image; consumer recommendations; service marketing; mobile telecommunications sector; Poland

JEL codes: M31, M30

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INTRODUCTION

As Lievens and Slaughter (2016) suggest, while employer image is a topic that has been analysed in the literature, more insight and new perspectives are still needed. This article aims to contribute towards this by investigating consumer recommendations. The power of company image as an employer is underlined in the context of numerous sectors, e.g. tourism (Bednarska & Olszewski, 2013; Jakab & Happ, 2017), nursing (Van Hoye, 2008), or retail (Keeling, McGoldrick, & Sadhu, 2013). The literature explicitly emphasises its meaning and power in the context of human resources, including applicant attraction (Uggerslev, Fassina, & Kraichy, 2012), recruitment (Moss & Tilly, 2003), and job satisfaction and engagement (Helm, 2013). What follows is that employer image is frequently perceived as the moderator of the quality of service offered to final customers (App, Merk, & Buttgen, 2012). The relationship of employer image with consumers remains under researched. Therefore, we address the dimension of customer-based brand equity in this context. To the best of our knowledge, this article belongs to one of the first attempts to explore the power of a company's external image as an employer in terms of customer recommendations of its offer. We consider whether the positive image of a company as an employer motivates its customers to recommend its offer. Such an approach reveals the shared goals and benefits for human resources, retail, and marketing connected with the positive employer image. Thus, the theoretical implications and practical applications resulting from this article are wide and discussed further in the conclusions.

The article includes several sections: the introduction is followed by the literature review, which presents the current state of the art in the analysed field and highlights the addressed gaps in knowledge. Material and methods explain and justify the applied research approach, including primary data and their quantitative analysis. The results and discussion section focuses on the presentation and contextualisation of findings within the field, followed by conclusions that address the theoretical implications and managerial applications of the research outcome, including also research limitations and future recommendations.

LITERATURE REVIEW

The significance of competitive advantage is growing, especially from the perspective of market competition, which is dynamically increasing (e.g. Gebauer, Gustafsson, & Witell, 2011; Štůsek, Kubata, & Očenášek, 2017; Fertö, 2018). Such a situation on the market produces easy offer duplication processes – depending on the sector but observed in various contexts – which lead to the 'sameness' of available offers and difficulties with purchase decisions (Skawińska, 2010). Environment like that underpins the necessity to seek supplementary motivation for target groups to choose a particular offer.

Tangible indicators like offer and price (e.g. mentioned by Djatmiko & Pradana, 2016; Kotler & Armstrong, 2010) and intangible factors – such as marketing campaigns, loyalty, image as a service/product provider (e.g. mentioned Liu, 2007; Saeidi *et al.*, 2015; Alic, Agic, & Cinjarevic, 2017) – provide such reasons both directly and indirectly; that is, via the subjective external image of the company as an employer or as a moderator of the will to recommend the company's offer. Word-of-mouth marketing (specifically recommendations) may play a role of the 'detail' the changes the final purchase decision, especially when all

options seem to be equally available and attractive. Literature underlines the meaning of offer recommendations (East, Hammond, & Lomax, 2008; Lin & Lu, 2010; Kim & Chao, 2019), but until now it has concentrated on the general image of the company or its image as a producer or service provider (Balmer, & Greyser, 2006; Diallo, 2012). The number of studies on offer recommendations has increased over the recent years and increasingly refers to intellectual products, networks, and social networking sites (Puncheva-Michelotti, Hudson, & Jin, 2018; Tsimonis, Dimitriadis, & Omar, 2019; D'lima, 2018; MacGregor, Pelikánová, & Cvik, 2018; Lenart-Gansiniec, & Sułkowski, 2018; Csordás, 2020).

While corporate social responsibility aspects are discussed in the literature (Aguinis & Glavas, 2012; Carroll & Shabana, 2010; Fernandez-Kranz & Santalo, 2010; Flammer, 2015), not much attention is directed to company image as an employer from the consumers' standpoint. Scholars usually focus on human resources aspects, as this element is considered the most direct and powerful in this context (e.g. Uggerslev, Fassina, & Kraichy, 2012). However, other approaches might provide a more holistic understanding and new insights of the matter. The perspective of consumers' recommendations has been neglected in research so far. Moreover, the overall brand equity topic is only rarely contextualised within the human resources field. A paper by Anselmsson, Bondesson, and Melin (2016) – who study retail customers' interests in HRM and employer branding – is an exception that emphasises the existing gap in knowledge. Our study contributes towards bridging the gap identified by Anselmsson, Bondesson, and Melin (2016), since we address customer recommendations in the service sector (considering its peculiarity) and the interdependencies between the image of the service provider as an employer and word-of-mouth marketing among its customers. Therefore, this article joins two powerful concepts, primarily connected with separate fields of human resources and marketing, to test the existence of shared goals and benefits. We hypothesise that a positive external image of the company as an employer enhances consumer recommendations for that company. On the basis of the above literature, we formulated the following hypothesis:

H: The positive company image as an employer on Poland's mobile telecommunication market motivates its users to recommend its offer.

MATERIAL AND METHODS

The mobile telecommunications market was chosen for this study due to several reasons, including its reputation for being dynamic, modern, and very active in the field of Corporate Social Responsibility (CSR) and marketing campaigns (Dornisch, 2001; Sánchez & Asimakopoulos, 2012). Moreover, this market is unified by laws and regulations, which effects in similarities of prices and conditions of offered services. Furthermore, the Polish context of an economy transformed after a transition process underpins consumer sensitiveness to intangible (marketing) criteria; this is particularly explicit in the context of the commonly used mobile telecommunications services: relatively new and highly desired technologies.

In Poland, this sector consists of four main mobile network operators – Polkomtel, P4, Orange Poland, and T-Mobile Poland – and many mobile virtual network operators connected with the four main ones; e.g. Netia connected with P4 or Sferia connected with Polkomtel. Since our research focused on the users in the context of the four main mobile

network operators, we follow the names commonly presented in the marketing campaigns, i.e. the names of four main networks: Plus (instead of Polkomtel), Play (instead of P4), Orange (instead of Orange Poland), and T-Mobile (instead of T-Mobile Poland). Moreover, we should note that the full names of the operators are often unknown to the users.

Whereas we recognise the benefits of an in-depth qualitative investigation, it remains a task for the future (Bryman & Bell, 2015). In this study, we chose the quantitative approach to receive the overall picture of correspondences between the company image as an employer and customer recommendations. Such an approach was confirmed to be beneficial by a pilot questionnaire study conducted in 2013 on a group of 100 respondents studying in Lodz. This also contributed to the structure and the final form of the questionnaire.

The second stage of primary research was conducted on a group of 896 respondents who use mobile telecommunications services in Poland and do not working for any of the providers; the high response rate resulted from face-to-face method applied by trained pollsters, which equalled 92%, i.e. 824 survey analysed questionnaires. To ensure that the returned questionnaires were representative of the wider population group characteristics, the respondents were chosen according to simple random sampling, while data was tested against census data. The survey questionnaire provided data concerning, among other things, the respondents' perception of the mobile telecommunications service providers as employers and the respondents' will to recommend the services offered by their provider.

To verify the assumed hypothesis, we applied such statistical calculations as the analysis of variance, the T-student test, the Bonferroni correlation, and the Games-Howell correction.

RESULTS AND DISCUSSION

Research Sample included both female (52.1%) and male (47.9%) inhabitants of three voivodeships in Poland: Mazowieckie (53%), Lodzkie (26%), and Kujawsko-Pomorskie (21%). All of them were divided into four age categories: below 20 years old, 20-40 years old, 41-60 years old, and over 60 years old (as shows Figure 1). Furthermore, we established four categories of personal professional circumstances: student, employed person, unemployed person, and pensioner (Figure 2); and five categories of net monthly income per person in the household: below 1000 PLN, 1000-1500 PLN, 1501-2000 PLN, 2001-3000 PLN, over 3000 PLN (Figure 3).

Figure 2 reveals that Plus is the most popular mobile telecommunications service provider among students (34.4% of respondents), the unemployed group (40.9% of respondents), and pensioners (42.6% of respondents). Orange is the leading service provider among the employed persons (31.8% of respondents).

Figure 3 shows that Orange and Plus are the most popular mobile telecommunications service providers among the respondents with the highest income, while Plus managed to attract also the respondents with the lowest income but not Orange. T-Mobile is the leading provider among the respondents with the monthly net income per person at the level between 1501-2000 PLN.

The study revealed differences in the perception of mobile telecommunications service providers in Poland as employers. Respondents described their opinion about each of the four networks on a five-point Likert scale, from 1 to 5, in which 1 means very negative and 5 means very positive. The most positive average perception of company image as an

employer among all respondents was achieved by T-Mobile (3.13) and the worst by Plus (3.05), but they were all relatively close (Figure 1).

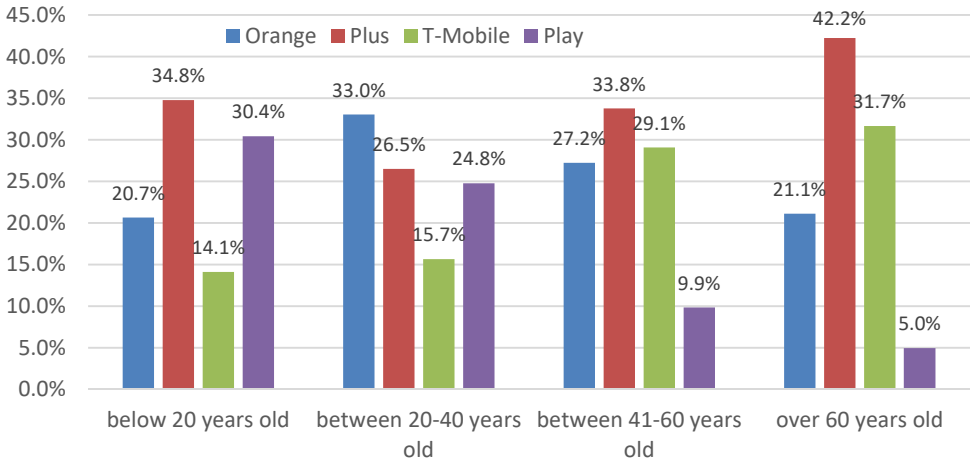

Figure 1. Age characteristics of respondents by their service provider
Source: own survey (n = 824).

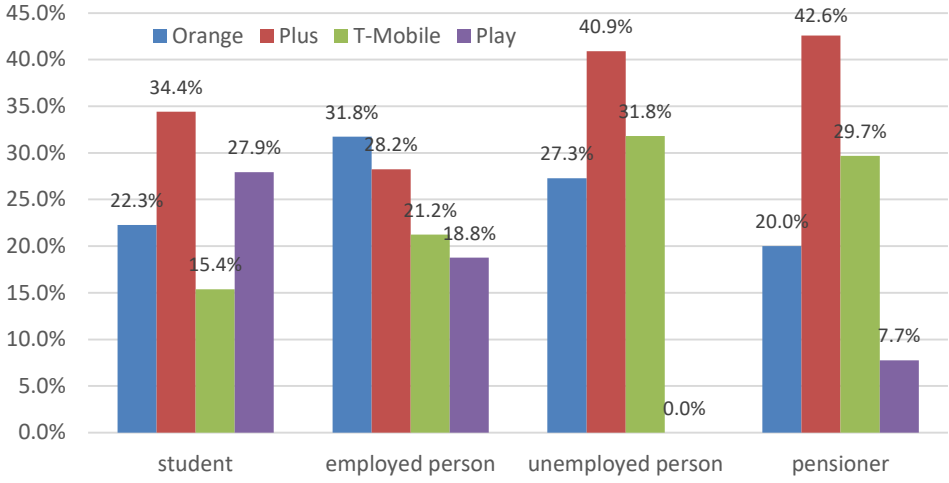

Figure 2. Professional circumstances of respondents by their service provider
Source: own survey (n = 824).

A more explicit diversity appears among users of particular network services. The most positive average perception of company image as an employer is achieved by T-Mobile (3.52 among its users), whereas Plus received 3.22. In every case the opinion about the provider as an employer was more positive among users than among non-users. The T-student test showed that these differences were statistically significant ($p<0.001$).

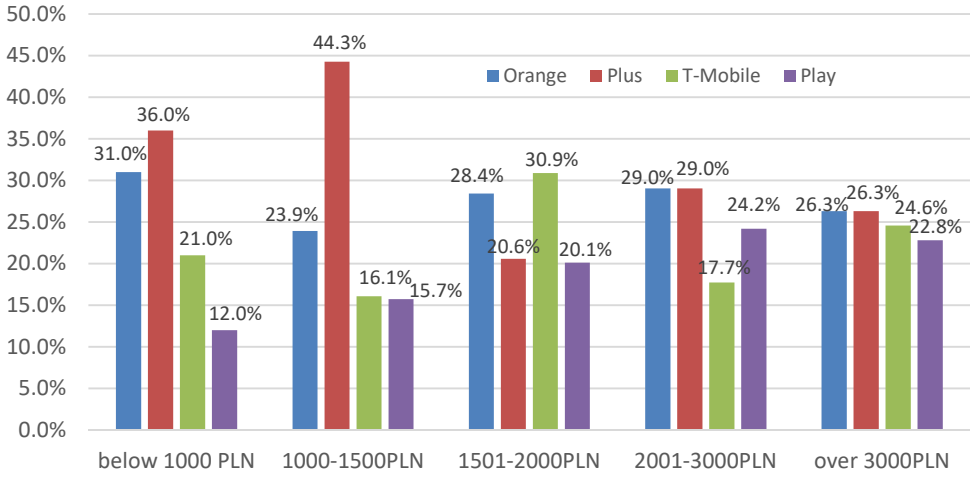

Figure 3. Net monthly income per person of respondents by their service provider
Source: own survey (n = 824).

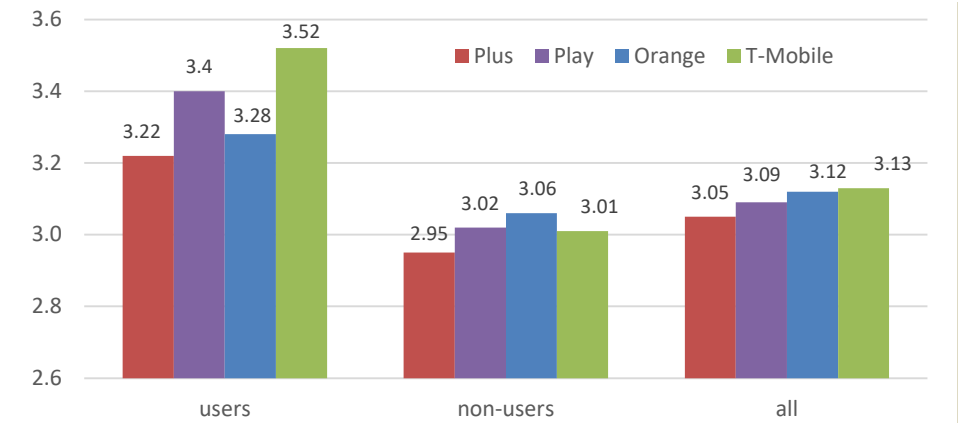

Figure 4. The average respondents' perception of Poland's four leading networks image as employers
Source: own survey (n = 824).

Data revealed that the most frequently recommended mobile telecommunications network by the respondents who are its users is Play (2.88). The least recommended company is T-Mobile (2.37), as shown in Figure 2.

In further analysis, company image as an employer was described as positive, neutral, and negative with a five-point Likert-scale data gathered from the respondents. We tested the hypothesis that positive company image as an employer enhances its users to recommend its offer in the context of the four mobile telecommunications service providers. Descriptive statistics concerning the conducted investigation are available in Table 1. Investigation incorporated a between groups analysis of variance, using the frequency of

recommendations as a dependent variable and employer image as an independent variable, which was conducted for every company.

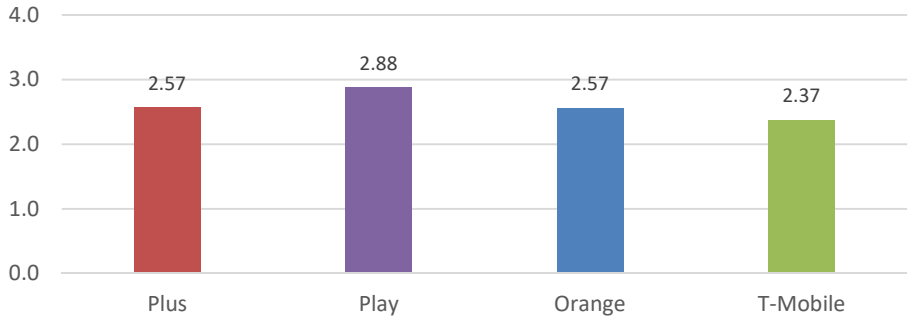

Figure 5. The average frequency of respondents' recommending of the services of their current network
Source: own survey (n = 824).

Table 1. The average frequency of network recommendation by its users in terms of its perception as an employer

Perception of the company as an employer		Mean	Standard deviation
Plus	Negative	1.80	1.34
	Neutral	2.62	1.25
	Positive	3.15	1.29
Play	Negative	1.94	1.59
	Neutral	2.91	1.33
	Positive	3.52	1.39
Orange	Negative	1.87	1.22
	Neutral	2.61	1.17
	Positive	3.03	1.15
T-Mobile	Negative	2.33	0.91
	Neutral	1.88	1.18
	Positive	3.08	1.47

Based on a five-point Likert scale, in which 1 means never and 5 means very often.
Source: own survey (n = 824).

As shows Table 2, in the case of Plus the analysis revealed a statistically significant main effect: $F(2,294) = 20.67$; $p < 0.001$. Multiple tests (with the application of the Bonferroni correction) showed that the participants who positively perceive Plus as the employer and are its users recommend it more frequently than those who neutrally perceive Plus as the employer ($p = 0.005$) and more often than those who negatively perceive Plus as the employer($p < 0.001$). Moreover, persons who neutrally perceive Plus as the employer and are its users recommend it more frequently than persons who have a negative opinion of Plus as an employer ($p < 0.001$). In the case of Play, the analysis of variance proved a statistically significant main effect of $F(2,169) = 9.75$, $p < 0.001$, while multiple tests provided findings similar to Plus ($p = 0.022$, $p = 0.002$, and $p = 0.021$, respectively). In the case of Orange, the analysis of variance revealed a statistically significant main effect of $F(2,243) = 11.92$,$p < 0.001$, while the results of multiple tests corresponded to those of Plus and Play ($p = 0.026$ and $p < 0.001$;

p = 0.007, respectively). The analysis of variance concerning the context of T-Mobile provided a statistically significant main effect: F(2,191) = 18.53; p < 0.001. Multiple tests (with the application of the Games-Howell correction) showed results similar to three other networks with only one exception (p < 0.001, p = 0.020, and p = 0.185, respectively). In other words, users who positively perceive the image of investigated companies as employers differed from the users who neutrally and negatively perceive this image in terms of offer recommendations. If one believes a company has a good image of employment, they are more likely to be positive in recommending the company's products/ services.

Table 2. The results of the one-way analysis of variance concerning consumer recommendations in the context of Plus, Play, Orange, and T-Mobile

Brands		Sum of squares	df	Mean square	F	Significance
Plus	Between groups	67.919	2	33.959	20.668	0.000
	Within Groups	483.078	294	1.643		
	Total	550.997	296			
Play	Between groups	37.122	2	18.561	9.750	0.000
	Within Groups	321.733	169	1.904		
	Total	358.855	171			
Orange	Between groups	32.608	2	16.304	11.923	0.000
	Within Groups	332.290	243	1.367		
	Total	364.898	245			
T-Mobile	Between groups	63.125	2	31.562	18.532	0.000
	Within Groups	325.293	191	1.703		
	Total	388.418	193			

Source: own survey (n = 824).

While the average perception of Poland's mobile telecommunications companies as employers does not differ much, we observe far larger and statistically significant dissimilarities among service users and non-users. This might result from the phenomenon described, among others, by Brooks (2011) as confirmation bias; which concerns both tangible and intangible characteristics of the chosen provider. Irrespective of its origin, the confirmation bias encourages buyers to be more committed to the company. Moreover, these observations correspond with suggestions widely presented in the literature that a company's perception is connected with its values – including respect for employees and how they are treated – especially in the context of growing CSR awareness among the buyers (Carroll & Shabana, 2010; Fernandez-Kranz & Santalo, 2010; Flammer, 2015). This study proves that the meaning of employer image should not be restricted to human resources aspects, as its exploration should include the marketing perspective.

We positively verified the tested hypothesis – that the positive company image as an employer motivates its users to recommend its offer– in the context of all four leading mobile telecommunications networks in Poland, i.e. Plus, Play, Orange, and T-Mobile. Therefore, we proved that the image of a company as an employer is a significant stimulus increasing the positive word-of-mouth marketing as it moderates the frequency of recommendations and, assumedly, the users' will to recommend a company. The significance of this result is reinforced by the current situation on the market, i.e. very strong and still rapidly growing competition and the growing 'sameness' of available offers (Lin & Lu,

2010; Sánchez & Asimakopoulos, 2012; Skawińska, 2010). While product/ company recommendations as a meaningful, complex, and interdisciplinary concept have been investigated in the marketing literature (Sheppard, Hartwick, & Warshaw, 1988), further studies, especially introducing new dimensions, are still needed. Our research showed that we should include human resources aspects in such dimensions.

CONCLUSIONS

The research concludes that the linking of two concepts – in the literature connected primarily with separate fields of human resources (employer image) and marketing (consumer recommendations) – develops their understanding. For practitioners, such an approach also contributes towards the exploration of shared benefits and goals, in most cases focused on different perspectives. Moreover, this study provides not only the conclusion of existence of these shared interests but also presents a way to stimulate them.

The proposed approach of linking human resources and marketing aspects can contribute to the desired differentiation between competitors on the market and play a decisive role during a purchase decision process. Furthermore, its added value for practitioners is associated with encouragement to information sharing with consumers. Therefore, this study provides new insights on investments connected with intangible assets development, i.e. activities in employer image building and strengthening.

This study, as any other, has also its limitations. It was conducted in the specific context of the Poland's mobile telecommunications market. There is still a need to test the formulated hypothesis in other places, countries with different consumer sensitivity to marketing stimuli and social responsibility aspects.

We see a potential for further research in this field, as it is worth considering a study to test whether the obtained results are sector-dependent. Hence, cross-country and cross-sector analyses remain tasks for future research. Moreover, the obtained results encourage a longitudinal study to identify the trends and tendencies over time concerning the enhancement of recommendations by a company's positive image as an employer.

REFERENCES

Aguinis, H., & Glavas, A. (2012). What We Know and Don't Know About Corporate Social Responsibility: A Review and Research Agenda. *Journal of Management, 38*(4), 932-968. https://doi.org/10.1177/0149206311436079

Alic, A., Agic, E., & Cinjarevic, M. (2017). The Importance of Store Image and Retail Service Quality in Private Brand Image-Building. *Entrepreneurial Business and Economics Review, 5*(1), 27-42. https://doi.org/10.15678/eber.2017.050102

Anselmsson, J., Bondesson, N., & Melin, F. (2016). Customer-based brand equity and human resource management image: Do retail customers really care about HRM and the employer brand?. *European Journal of Marketing, 50*(7/8), 1185-1208.

App, S., Merk, J., & Buttgen, M. (2012). Employer Branding: Sustainable HRM as a Competitive Advantage in the Market for High-Quality Employees. *Management Revue, 23*(3), 262-278. https://doi.org/10.1688/1861-9908_mrev_2012_03_App

Balmer, J.M., & Greyser, S.A. (2006). Corporate marketing: Integrating corporate identity, corporate branding, corporate communications, corporate image and corporate reputation. *European Journal of Marketing, 40*(7/8), 730-741.

Bednarska, M.A., & Olszewski, M. (2013). Organisational Determinants Of Employer Image: A Case Of The Tourism Industry In Poland. *Anuario Turismo Y Sociedad, 14*, 17-31.

Brooks, M.E. (2011). Management indecision. *Management Decision, 49*(5), 683-693. https://doi.org/10.1108/00251741111130788

Bryman, A., & Bell, E. (2015). *Business research methods*: Oxford University Press, USA.

Carroll, A.B., & Shabana, K.M. (2010). The Business Case for Corporate Social Responsibility: A Review of Concepts, Research and Practice. *International Journal of Management Reviews, 12*(1), 85-105. https://doi.org/10.1111/j.1468-2370.2009.00275.x

Csordás, A. (2020). Diversifying Effect of Digital Competence. *AGRIS on-line Papers in Economics and Informatics*, *12*(1), 3-13. https://doi.org/10.7160/aol.2020.120101

Diallo, M.F. (2012). Effects of store image and store brand price-image on store brand purchase intention: Application to an emerging market. *Journal of Retailing and Consumer Services, 19*(3), 360-367.

Djatmiko, T., & Pradana, R. (2016). Brand Image and Product Price; Its Impact for Samsung Smartphone Purchasing Decision. *Procedia – Social and Behavioral Sciences, 219*, 221-227. https://doi.org/10.1016/j.sbspro.2016.05.009

Dornisch, D. (2001). Competitive dynamics in Polish telecommunications, 1990-2000: growth, regulation, and privatization of an infrastructural multi-network. *Telecommunications Policy, 25*(6), 381-407.

East, R., Hammond, K., & Lomax, W. (2008). Measuring the impact of positive and negative word of mouth on brand purchase probability. *International Journal of Research in Marketing, 25*(3), 215-224.

Fernandez-Kranz, D., & Santalo, J. (2010). When Necessity Becomes A Virtue: The Effect Of Product Market Competition On Corporate Social Responsibility. *Journal of Economics & Management Strategy, 19*(2), 453-487.

Fertö, I. (2018). Global Agri-food Trade Competitiveness: Gross Versus Value Added Exports. *AGRIS on-line Papers in Economics and Informatics*, *10*(4), 39-47. https://doi.org/10.7160/aol.2018.100404

Flammer, C. (2015). Does product market competition foster corporate social responsibility? Evidence from trade liberalization. *Strategic Management Journal, 36*(10), 1469-1485. https://doi.org/10.1002/smj.2307

Gebauer, H., Gustafsson, A., & Witell, L. (2011). Competitive advantage through service differentiation by manufacturing companies. *Journal of Business Research, 64*(12), 1270-1280. https://doi.org/10.1016/j.jbusres.2011.01.015

Helm, S. (2013). A Matter of Reputation and Pride: Associations between Perceived External Reputation, Pride in Membership, Job Satisfaction and Turnover Intentions. *British Journal of Management, 24*(4), 542-556. https://doi.org/10.1111/j.1467-8551.2012.00827.x

Jakab, P., Happ, É. (2017), Impact Assessment between the City and the Company Reputation, *Economics and Sociology*, Vol. 10, No. 1, 279-289. https://doi.org/10.14254/2071-789X.2017/10-1/

Keeling, K.A., McGoldrick, P.J., & Sadhu, H. (2013). Staff Word-of-Mouth (SWOM) and retail employee recruitment. *Journal of Retailing, 89*(1), 88-104. https://doi.org/10.1016/j.jretai.2012.11.003

Kim, R. B., & Chao, Y. (2019). Effects of brand experience, brand image and brand trust on brand building process: The case of Chinese millennial generation consumers. *Journal of International Studies*, *12*(3), 9-21. https://doi.org/10.14254/2071-8330.2019/12-3/1

Kotler, P., & Armstrong, G. (2010). *Principles of marketing*. Pearson Education.

Lenart-Gansiniec, R., Sułkowski, Ł. (2018). Crowdsourcing – A New Paradigm of Organizational Learning of Public Organizations. *Sustainability, 10*(10), 3359. https://doi.org/10.3390/su10103359

Lievens, F., & Slaughter, J.E. (2016). Employer Image and Employer Branding: What We Know and What We Need to Know. In F.P. Morgeson (Ed.), *Annual Review of Organizational Psychology and Organizational Behavior* (pp. 407-440). Palo Alto: Annual Reviews.

Lin, L.-Y., & Lu, C.-Y. (2010). The influence of corporate image, relationship marketing, and trust on purchase intention: the moderating effects of word-of-mouth. *Tourism Review, 65*(3), 16-34.

Liu, Y. (2007). The long-term impact of loyalty programs on consumer purchase behavior and loyalty. *Journal of Marketing, 71*(4), 19-35.

Moss, P., & Tilly, C. (2003). *Stories employers tell: Race, skill, and hiring in America*. Russell Sage Foundation.

Saeidi, S P., Sofian, S., Saeidi, P., Saeidi, S.P., & Saaeidi, S.A. (2015). How does corporate social responsibility contribute to firm financial performance? The mediating role of competitive advantage, reputation, and customer satisfaction. *Journal of Business Research, 68*(2), 341-350. https://doi.org/10.1016/j.jbusres.2014.06.024

Sánchez, B.U., & Asimakopoulos, G. (2012). Regulation and competition in the European mobile communications industry: An examination of the implementation of mobile number portability. *Telecommunications Policy, 36*(3), 187-196.

Sheppard, B.H., Hartwick, J., & Warshaw, P.R. (1988). The Theory Of Reasoned Action – A Meta-Analysis Of Past Research With Recommendations For Modifications And Future-Research. *Journal of Consumer Research, 15*(3), 325-343. https://doi.org/10.1086/209170

Skawińska, E. (2010). *Competitiveness Management: Monograph*. Publishing House of Poznan University of Technology.

Štůsek, J., Kubata, K., & Očenášek, V. (2017). Strategic Importance of the Quality of Information Technology for Improved Competitiveness of Agricultural Companies And Its Evaluation. *AGRIS on-line Papers in Economics and Informatics*, 9(4), 109-122. https://doi 10.7160/aol.2017.090411

Uggerslev, K.L., Fassina, N.E., & Kraichy, D. (2012). Recruiting through the stages: A meta-analytic test of predictors of applicant attraction at different stages of the recruiting process. *Personnel Psychology, 65*(3), 597-660. https://doi.org/10.1111/j.1744-6570.2012.01254.x

Van Hoye, G. (2008). Nursing recruitment: Relationship between perceived employer image and nursing employees' recommendations. *Journal of Advanced Nursing, 63*(4), 366-375. https://doi.org/10.1111/j.1365-2648.2008.04710.x

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Assessing and Comparing Top Accelerators in Brazil, India, and the USA: Through the Lens of New Ventures' Performance

Snehal Shetty, Ranjany Sundaram, Krishnashree Achuthan

ABSTRACT

Objective: The objective of this article is to assess and compare the factors influencing the performance of new ventures within top business accelerators across three countries using the Resource Based View (RBV) theory.

Research Design & Methods: The key analysed parameters are funding dimensions, survivability, acquisition, and growth of 1286 new ventures that graduated from the top two accelerators in Brazil, India, and the USA, i.e. countries from developed and emerging economies. Methods we used were machine learning and two independent sample t-tests.

Findings: Input seed funding by accelerators played a dominant role and improved funding trajectories. The external ecosystem was an important differentiator and impacted new ventures' survivability, growth, and funding outcomes. Capabilities and competencies of accelerators differentiated outcomes within the same ecosystem while external environment dampened accelerator outcomes in emerging economies.

Implications & Recommendations: Accelerators from emerging ecosystems should strive to augment their human capital and network capabilities, including seed funding, while policy-makers should improve ecosystem index values mentioned in this study.

Contribution & Value Added: This is the first of its kind study that extended the RBV theory to accelerators and disentangled the effect of the external environment and RBV on accelerators across three ecosystems with a comprehensive framework of measures. It provides value to practitioners in India and Brazil by highlighting lacunae in their accelerator programs and possible approaches to address them successfully.

Article type: research article

Keywords: accelerators; Resource Based View; start-ups; funding; performance

JEL codes: M13, L26, O57

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INTRODUCTION

New ventures stimulate economic growth by driving innovations, improving productivity, and creating jobs (Acs & Armington, 2004). During the early stages of their development, new ventures need a constant flow of funds to meet the capital and operational requirements to sustain and scale operations. But these firms face the liability of newness and the colossal task of gaining legitimacy with various stakeholders, especially investors who hesitate to invest (Hsu, 2007). Over the past decade, new ventures have increasingly joined accelerators to obtain legitimacy and initial funding. Accelerators have become a stimulating phenomenon yielding unique and astounding successes. Furthermore, accelerators have overcome many of the inadequacies of prior business incubators and are viewed as the new generation incubation model (Pauwels *et al.*, 2016).

Accelerators provide input seed funding, mentorship, network connections, and increased exposure to investors. Moreover, accelerators have clearly outpaced business incubators as the preferred choice for input seed funding and exposure to future investors (Cohen & Hochberg, 2014). Using a multiple case study approach, Radojevich *et al.* (2012) found that resources provided to accelerated start-ups help them become sustainable businesses with close to 70% increase in future funding, getting acquired, and having decreased failure rates.

Although accelerators have rapidly emerged as critical players in the start-up ecosystem, there is a paucity of literature on accelerators and limited study on their efficacy (Cohen & Hochberg, 2014). The extant literature on accelerators focuses mostly on theoretical aspects, exploratory case studies, and selection criteria (Uhm *et al.*, 2018). Multiple past studies cite only a partial understanding of accelerators, and these studies primarily focus on the USA and accelerators based in developed economies (Smith & Hannigan, 2015; Hallen *et al.*, 2014). The literature lacks a theoretically grounded study of accelerators in emerging economies and their comparison to accelerators in developed economies. Since emerging economies are transitional in nature and have higher degrees of uncertainties (Lyles *et al.*, 2004), the application of similar resources by accelerators would have different impacts. Considering the impact that accelerators have on new ventures in terms of survival and growth (Radojevich *et al.*, 2012), we should study their characteristics and compare and contrast their offerings and performances across both developed and emerging economies.

Thus, the research questions we posit are the following:

1. Do new ventures benefit from accelerator programs when more resources are invested in them, and is it irrespective of the economic status of the country from which they operate?
2. What role does external environment play in the growth and survival of accelerated new ventures?

The study makes several contributions. Firstly, by examining the leverage provided by resources and competencies of accelerators, we explore the extent by which accelerators impact the performance of new ventures. The lack of a comprehensive set of performance measures has hitherto led to contradictory results, as the focus on specific measures delivered varied results due to constricted view (Hallen *et al.*, 2014). Accelerators are heterogeneous in nature with different design elements and diverse goals, so the same set of

measures cannot be used to analyse all accelerators (Pauwels *et al.,* 2016). A government-backed accelerator has different objectives compared to a deal-flow accelerator that receives funding from private investors. The evaluation of a homogenous set of accelerators and building an inclusive set of success measures to assess them is recommended. Pauwels *et al.* (2016) state the need to understand the impact of accelerators through the analysis of portfolio ventures performance as there is limited literature in this area. Using a comprehensive set of measures, we analysed the efficacy of a homogenous set of six deal-flow accelerators, assessed the resources provided by them, and quantified the performance of their 1286 graduated new ventures across four major dimensions, viz. funding, survivability, acquisition, and growth. Since deal-flow accelerators receive funding from private investors like business angels or venture capital funds (VC), their core objective is to identify and fund investable ventures (Yang *et al.*, 2018), so we introduced four variables to focus on the ventures' funding performance. These approaches overcome the abovementioned three limitations, viz. 1) homogenous assessment, 2) need for an inclusive set of measures, and 3) the lack of portfolio ventures' analysis.

Secondly, from a practitioner and policy perspective, we explored the importance of three-dimensional human capital, network capabilities, and external ecosystems for accelerators. Most past studies consider network capabilities in terms of seed funding and investor/mentor network, and that too from a qualitative perspective, but they do not view it from the other two dimensions, viz. human capital and external ecosystem (Radojevich *et al.*, 2012; Cohen *et al.*, 2019). Using the abovementioned resources and performance parameters, our study proposes a framework applicable in the multi-dimensional assessment of accelerators. This article is the first to present a study on accelerators across three different ecosystems: one mature/developed (in the USA) and the other two in the emerging stages (Brazil and India).

Thirdly, from a research perspective, this study is among the first few that apply RBV theory to accelerators. Although there is significant literature on the application of RBV to incubators, there is very few on accelerators (Eveleens *et al.*, 2017). This is possibly the first study to extend RBV by analysing the external environment effect on accelerators and propose that it plays an intrinsic role in the resources offered by them and creates a dampening effect on the performance of accelerators.

From a methodological perspective, we first scrutinise the resource distribution across accelerators, followed by comparisons for various output performance measures using machine learning techniques and two independent sample t-tests. Robustness tests were also completed using resampling method and machine learning.

The rest of the paper is organised as follows. The next section explores the literature review, followed by incorporated methodology, results, discussion, implications, and limitations of study.

LITERATURE REVIEW

The Need for Accelerators

The emergence of accelerators has transmuted traditional mechanisms of enterprise support that occur through incubation, business support institutions, and venture capitalist investment (Cohen & Hochberg, 2014; Dahms & Kingkaew, 2016; Lisowska, 2016). Accel-

erators are either organisations or programs offered within them with structured and intensive mentorship to a set of selected start-ups as cohorts (Goswami *et al.*, 2018). Through immersive engagement and their networks, accelerators can overhaul several aspects of start-up's strategy such as legitimacy, financial sustainability, scaling plans, human capital, the applicability of innovation in unexplored domains in syncopated timeframes spanning between three to six months (Hochberg, 2016).

Intensive mentorship and social networking are pivotal to the successes of accelerated companies, which improves sustainability (Radojevich *et.al.,* 2012) due to the resources they receive in comparison to non-accelerated start-ups (Hallen *et al.*, 2014). Accelerators offer services that propel the growth of new venture firms, which increases the latter's profitability by 12% at advanced stages of development. (Cacciolatti *et al.* 2020). However, the question remains unanswered what are the broad set of performance measures of new venture firms that directly map the objectives of deal-flow accelerators.

The Assessment of Accelerators and New Venture Firm Performance

The literature on accelerators can be classified into two major streams with some focusing on exploratory case studies, theoretical aspects, and role in the entrepreneurial ecosystem (Kim & Wagman, 2014; Battistella, 2016, Kanbach *et al.*, 2016), while others on the impact of accelerator programs on its portfolio ventures (Hallen *et al.*, 2014; Smith & Hannigan, 2015). The stream that analyses impact is undermined by the lack of data, due to the fact that accelerators are a recent phenomenon, which requires a gestation period to study the effects leading to two major gaps.

Firstly, due to the reliance of single measures and the use of subjective methods, most studies are limited in how they capture the performance of new ventures (Eveleens *et al.*, 2017; Murphy *et al.*, 1996, Xu *et al.* 2020). Subjective methods do not directly measure performance but utilise theoretical assumptions of improved resources, learning, and social capital. Hence, a comprehensive set of measures is necessary (Bøllingtoft, 2012).

Secondly, past studies on performance measurements compare different types of accelerators on the same platform, which creates misleading results in terms of contributing factors and outcomes of accelerators (Hallen *et al.*, 2014; Gonzalez-Uribe & Leatherbee, 2018), as the homogenous assessment of accelerators is important. Three types of accelerators based on the differences in the obligations of respective sponsoring organisations (Pauwels *et al.,* 2016), viz. deal-flow, corporate, and welfare accelerators cannot be compared with the same set of measures.

In their diffusion studies, Xu *et al.* (2020) effectively show the large impact investors have on new venture firms, when the latter explicitly defines their focus areas. Accelerators improvised the time velocity of funding (Hallen *et al.,* (2014) and increased the speed of exit (Smith & Hannigan, 2015). Though the above studies conclusively proved that accelerators improve the speed of funding, we should consider if this impacts total funding. We require multiple factors to comprehensively measure the funding performance of new ventures (Hsu, 2007; Zur, 2013). As new ventures grow and scale their businesses, they continuously scout for sources of funding, which leads to multiple rounds of funding, the number of investors attracted, and later investment stages that, in turn, become important parameters to measure funding performance (Mayer-Haug *et al.*, 2013; Shetty & Sundaram, 2019). The higher the investor's prominence, the more the future funding

raised by the new ventures (Ko & McKelvie, 2018), as the entity's prominence signals future investors to also invest. The prominence of top accelerators included in our study should act as signals to investors and enable the ventures to raise more funding by attracting a large number of investors through multiple rounds of funding.

In summary, the impact of accelerators could be better understood by choosing a homogenous set and analysing the performance of portfolio ventures across various factors listed above.

The Resource Based View Theory and Its Application to Accelerators

The RBV theory advocates the concept of a firm as a bundle of resources and capabilities that drive firms' competitive advantages, revenues, and profits (Penrose & Penrose, 2009). Resources can vary from financial, physical, human, and technological to reputational and organisational values (Grant, 1991). However, at a higher level of aggregation, in addition to resources, firm competencies play a more distinct role in how the resources are managed and these drive different results (Grant, 1991). This explains why two firms with similar resources and within the same ecosystems may perform differently based on their individual competencies (Toni & Tonchia, 2003).

This study explores RBV to understand both tangible and intangible resources of accelerators and whether the accelerators capitalise on these resources effectively to drive performance. Considering accelerators essentially are firms, it becomes clear they need to extend resources that have valuable characteristics to the new ventures they nurture so as to create an impact (Amit & Schoemaker, 1993).

Besides internal resources, the external environment and its interaction with accelerators is also an influential factor that we should considered (Hart, 1995). Accelerators have proliferated across multiple ecosystems with distinct traits and characteristics that are specific to their regional environments. The ecosystem, the linkages that the accelerators have built with partners and mentors, and the investment climate in that specific ecosystem could impact their performance.

We analyse the application of RBV on accelerators by examining the factors related to human capital, network capabilities, and the ecosystem.

Human Capital. The human capital theory examines the capabilities of people involved in a firm (Bryl & Truskolaski, 2017). Our study extended the human capital theory to accelerators to view it as a resource by integrating its interplay with the RBV theory by specifically measuring the human capital of accelerators' founders and validating how the resources translate into better management and competence of accelerators. Since accelerators are structured as fixed-length and time-compressed programmes, human capital at accelerators will largely determine how the internal processes are designed to be efficient and goal-oriented with respect to the performance of the ventures (Wise & Valliere, 2014). Teams with a strong industry and management expertise enable accelerators to build strong associations within the industry for market access, influence potential partnerships, and build social networks with important stakeholders. Prior start-up experience is another important aspect of human capital that relies on the premise of experiential learning and is a crucial resource for new ventures (Hsu, 2007).

Network Capabilities. The most prominent added value provided as part of the network capabilities are seed funding, mentorship, and access to a large investor network

(Hochberg, 2016). Since accelerators make the first round of investment in these new ventures, they are driven to increase the value of their investment or obtain an exit for investment with superior returns in the near future (Yang *et al.*, 2018).

Ecosystem. The external environment that firms interact with to substantiate their offerings plays a major role in the RBV theory (Toni & Tonchia, 2003). If the external environment is weak, then the resources and capabilities of firms are affected (Porter, 1991). Accelerators moderate the relationship of new ventures with the external environment by acting as a bridge to external contextual contingencies (Amezcua *et al.*, 2013, Bloom *et al.*, 2012). To understand how external ecosystems influence the performance of accelerators (Cohen *et al.*, 2019), we must compare and contrast mature ecosystem: the USA with emerging ecosystems, in our case India and Brazil.

Deal-flow accelerators are funded by private investors (business angels and VC funds) with specific goals to find attractive investment opportunities, mentor them and eventually exit these investments for profitable returns (Smith *et al.*, 2015). In a study of Indian new ventures, Shetty and Sundaram (2019) found that the amount of funding raised in subsequent rounds improved significantly when the funding raised in the first round was higher. It is important for accelerators to increase the amount of input seed funding to raise funding outcomes (Gonzalez-Uribe & Leatherbee,2018).

We selected top accelerators in Brazil and India to represent weak ecosystems. These emerging ecosystems are transitional in nature and have higher degrees of uncertainties (Lyles *et al.*, 2004). From the costs of starting a business to difficult regulatory frameworks and limited salvage recovery from investments in failed ventures, these ecosystems significantly increase the risk of these investments (Stel *et al.*, 2007). In a study of VC investment across five countries, Manigart *et al.* (2002) found investors resisted to invest in less promising ecosystems. Investors would invest in ventures from top accelerators that are capable of scouting new ventures, providing a higher amount of resources such as input seed funding and mentoring only if the local ecosystem is also favourable. Therefore, we propose the first hypothesis:

H1: New ventures accelerated in accelerators that provide higher resources and operate from a better ecosystem will raise large funding.

Ecosystems have a direct bearing on the growth and, eventually, survival of ventures. New ventures rely on the health of the local ecosystem for venture development, and they are adversely affected by environmental uncertainties. The proposition that environmental uncertainty is a determining factor for the survival of an organisation is well-researched (Scherer, 1980). Developing ecosystems grapple with environmental uncertainties from both economic and political perspective. Changes in the regulatory framework, restrictions on exports, complicated tax structures, and the instability of political institutions are multiple issues faced in emerging countries (Meschi & Riccio, 2008). Founders at high-technology ventures directly compete with other ventures in developed ecosystems and the intricacies of the local ecosystem could distract and affect their performance. Although good accelerators provide excellent support systems through various resources such as mentoring and network connections, they could alleviate only some of the hurdles faced by new ventures. Nevertheless, for superior growth and survival, ventures not only need a top accelerator but eventually also a favourable local ecosystem. Therefore, we propose the following hypotheses:

H2: New ventures accelerated in accelerators that provide higher resources and operate from better ecosystems will see stronger growth.

H3: New ventures accelerated in accelerators that provide higher resources and operate from better ecosystems will survive longer.

Summarising the literature and its gaps, many studies on accelerators focus on either theoretical aspects or exploratory case studies, possibly due to the limited availability of data (Radojevich *et al.*, 2012; Goswami *et al.*, 2018). Secondly, studies on critical accelerator parameters (Hochberg, 2016, Hallen *et al.*, 2014) are not directly linked to new ventures' performance. Thirdly, the impact of the external ecosystem on the resources offered by accelerators is neglected (Cohen *et al.*, 2019). Finally, there also remains a significant bias in the literature towards the study of accelerators in mature and advanced entrepreneurial ecosystems. Almost 90% of the literature observes accelerators and startups primarily based in the USA and Europe (Smith & Hannigan, 2015; Wise & Valliere, 2014). The contribution of our study addresses these gaps by: 1) discerning the role of accelerators homogenous in nature to ensure comparisons are precise and accurate with respect to four major performance-output parameters, i.e. the funding, survivability, growth, and acquisition performance of new ventures over a two-year gestation period; 2) utilising the RBV framework to analyse the theoretical underpinnings of accelerators and their resources' functional roles; and 3) performing a quantitative analysis of over 1200 ventures across six accelerator programs in three countries with a widely varying ecosystems so as to draw insights on distinctive features and critical parameters towards accelerator strategies, their performance, and their impact on new venture firms.

MATERIAL AND METHODS

The objective of the methodology is to theoretically ground the study on RBV theory and compare and contrast multiple ventures that are part of the accelerator programs across developed and emerging economies.

Empirical Context and Data

Empirical analysis was completed on a sample of 1286 new ventures that went through six accelerator programmes across three countries during the four-year period from January 1, 2013, to December 31, 2016. To analyse the new ventures post-acceleration, we observed their performance over a two-year gestation period (Hallen *et al.*, 2014) until December 31, 2018.The study included 1145 new ventures from the USA, 77 from Brazil, and 63 from India.

Based on a defined set of criteria (Hallen *et al.*, 2014), the top two accelerators from each country were selected for this study. Accelerators were shortlisted based on the following criteria: 1) the design theme and architecture of a deal-flow accelerator; 2) at least four graduate ventures that closed more than one round of funding; 3) provision for seed capital upon acceptance; 4) well established presence in their respective countries; 5) in existence at least a year before the study period; 6) hold a demonstration day with external investors.

The firms selected for the study were Y-Combinator (YCOM) and Techstars from the USA, Ace Startups (ACE) and Wow Accelerator (WOW) from Brazil, and Global Super Angels Forum (GSF) Accelerator and TLABS from India. In this work, we compare and contrast the performance of only top two accelerators in each country. Comparing the top accelerators served the purpose of understanding the gap in accelerator resources and performance among accelerators that have demonstrated consistent impact on start-ups in their respective environments. Considering mediocre accelerators would have made the study challenging due to a multitude of factors that impact their poor longevity and inconsistent performance in Brazil and India. This work directly impacts practitioners in India and Brazil and helps to provide an understanding of gaps in their accelerator programmes that they must address to create successful ventures.

The Crunchbase database was used for this study, as it is a comprehensive database of investments, funding, acquisitions, and investors for new ventures (Eugene & Yuan, 2012). Crunchbase is viewed as one of the most prominent and comprehensive databases of new ventures (Block & Sander, 2009). We also validated our data through individual accelerator websites, new venture firm websites, media articles, and LinkedIn. Global Entrepreneurship Monitor (GEM) and World Bank's Doing Business database for the four years of study was obtained to analyse ecosystem offerings in each of the three countries.

The Global Entrepreneurship Monitor database is developed by one of the largest and most developed research programs on entrepreneurship in the world (Bosma, 2013). Doing Business is a World Bank Group flagship publication currently in the 17th series, an annual study that presents quantitative indicators measuring the regulations that enhance business activity and constraints across 100+ economies (Business D, 2013). Both these databases have been widely used for research in entrepreneurship and ecosystem offerings of various countries (Wong *et al.*, 2005; Corcoran & Gillanders, 2015).

Measures

We conducted the following analyses for this article:

1. Two independent sample t-test to differentiate performance. Robustness test was done through a resampling method.
2. Prediction models across three Machine Learning techniques, namely Support Vector Machine (SVM), Random Forest, and Neural Networks.

We used two independent sample t-test, meaning an inferential statistical test that determines whether there is a statistically significant difference between the means in two unrelated groups. In this study, we compared top two accelerators in each country under study to understand which one between performs better. Next, we compared the accelerators' performance among the three scrutinised countries.

To learn complex mapping from input to the output space and to understand the regression relationships, we analysed the data using three machine learning techniques, viz. Support Vector Machine, Random Forest, and Neural Network methods.

Scree plot was used to understand the number of variables influencing the outcome. Scree Plot is a simple line segment plot that shows the fraction of total variance in the data as explained by each principal component. A clear separation point called 'elbow' separates the most important from the least important components. After finding out the number of important variables, we used Random Forest to attribute importance and

analyse which variables played a significant role in the funding, growth, and survival outcomes of accelerated ventures.

We conducted the Ryan-Joiner normality test to assess if the data is normally distributed. The Ryan-Joiner test passed normality with a p-value above 0.10. Levene's test for equality of variances showed p-value greater than 0.05, which indicates that the group variances are equal in the population.

Variables: Accelerator Resources

Industry experience was calculated as the sum of years each founder spent in the industry in technical and managerial roles prior to the study period. Prior start-up experience refers to the total number of years the founders gained at founding new ventures before the study period.

As in previous studies, this article characterises network capabilities by input seed funding, mentor network, and investor network (Hallen *et al.*, 2014; Eveleens *et al.*, 2017).

Ecosystem variables are viewed from two perspectives in this study: 1) the macro perspective (Klyver, 2008), characterised by Total Entrepreneurship Activity (TEA) and Total Innovation, and 2) the business perspective (Business D, 2013) that includes 'starting a business score,' 'starting a business cost,' 'getting a credit score,' 'recovery rate (cents on the dollar).' TEA and Total Innovation values were obtained from the Global Entrepreneurship Monitor(GEM) database. All the Business perspective variables were obtained from the World Bank's Doing Business database.

Figure 1 represents the three input resource categories representing 12 variables and four output/performance categories representing eight variables.

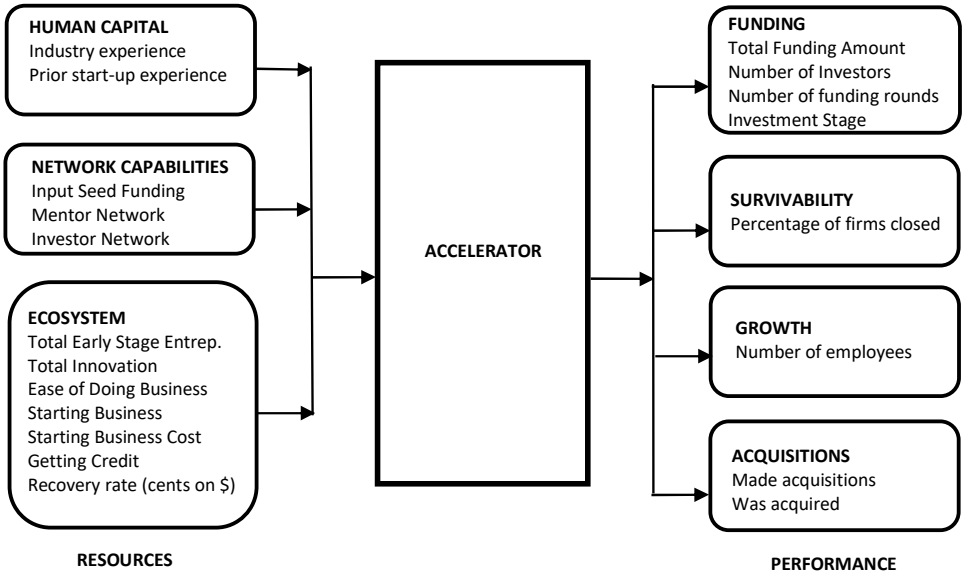

Figure 1. The performance assessment of accelerators
Source: own elaboration based on literature review and data collected.

Variables: Accelerator Performance

The variables used for the measurement of performance are classified into four major categories, viz. Funding Dimensions, Survivability, Acquisition, and Growth variables.

Funding Dimension is a critical performance parameter for deal-flow accelerators (Pauwels *et al.* 2016), so it is important to comprehensively analyse multi-funding parameters to obtain a complete picture (Ko & McKelvie, 2018; Shetty & Sundaram, 2019). The multiple parameters are Total funding amount, Number of funding rounds, Number of Investors, and Investment Stages. Survivability is the measure of the firm's operational status. Brazil and India face challenging regulatory issues related to the closure of businesses, both in terms of resolving insolvencies and the time taken to officially shutdown a firm. For example, in both Brazil and India, it takes up to four years to close a business (Business D, 2013). Our study used website traffic as an additional metric to validate the operation of business. Acquisition dimension has two variables, viz. Made Acquisitions and Was Acquired. The growth of a firm is measured by the number of employees. The measurement of the number of employees is an effective firm growth measure (Hallen *et al.*, 2014).

RESULTS AND DISCUSSION

Resources of Accelerators

Table 1 highlights the homogenous nature of the selected accelerators and their various characteristics.

Table 1. Accelerator descriptions

Parameters	YCOM	Techstars	ACE	WOW	GSF	TLABS
Location	Silicon Valley, the USA	Multiple cities, the USA	Multiple cities, Brazil	Porto Alegre, Brazil	New Delhi, India	Bengaluru, India
Program Type	On-site	On-site & virtual	On-site	On-site	On-site	On-site
Cohorts per year	2	Multiple	Multiple	2	1	2
Length	3 months	3 months	6 months	6 months	5.5 months	4 months
Equity stake taken by accelerator	7%	6%*	up to 15%	up to 12%	up to 15%	8%
Focus Area	Technology	Technology	Technology	Technology	Technology	Technology
Software/Platforms	83.20%	78.53%	92.31%	84.00%	89.47%	90.91%
Major categories	Internet, E-commerce, Mobile	Internet, Mobile, SAAS	Internet, E-commerce, Information Technology	Internet, SAAS, Information Technology	Internet, Mobile, E-commerce	Internet, Mobile, Information Technology

* for first tranche of 18 000 USD

YCOM – Y-Combinator, ACE – ACE start-ups, GSF – Global Super Angels Forum

Source: own elaboration on collected data.

Table 2 includes the resources and capabilities of the six selected accelerators. From a human capital perspective, prior start-up experience is higher in both the USA and Brazil than in India, which portrays the fact that start-up culture is very nascent in India. The industry experience of the founders of US accelerators is comparable to that of Brazil and India. The Techstars accelerator had a significantly higher level of prior start-up experience in comparison to others.

Table 2. Resources across the six accelerators under study

Parameters	The USA		Brazil		India	
	YCOM	Techstars	ACE	WOW	GSF	TLABS
Human Capital						
Total Industry Experience	11	9	0	9	0	13
Prior Start-Up Experience	32	57	24	14	14	0
Network Capabilities						
Input Seed Funding (USD)	120000	18000**	50000	16000-50000	up to 200000	50000
Mentor Network	4000	4800	180	100	29	130
Investor Network	450*	2700	150	98	20	20
Ecosystem						
Total Early Stage Entrep.	12.76	12.76	18.77	18.77	9.47	9.47
TEA Total Innovation	36.01	36.01	11.37	11.37	35.88	35.88
Ease of Doing Business	82.43	82.43	57.07	57.07	53.45	53.45
Starting Business Score	91.16	91.16	64.11	64.11	64.23	64.23
Starting a Business Cost	1.16	1.16	5.40	5.40	24.13	24.13
Getting Credit Score	95	95	45	45	65	65
Recovery rate	82.30	82.30	22.57	22.57	25.6	25.6

* Investors on Demo Day.

** Plus an optional 100,000 USD in convertible note.

YCOM – Y-Combinator, ACE – ACE start-ups, GSF – Global Super Angels Forum

Source: own elaboration of collected data. Ecosystem data was collected from GEM and World Bank's Doing Business database.

The mentor and investor network capabilities of US accelerators are nearly 20 times higher than Brazilian accelerators and 30 times higher than Indian accelerators. Overall, the human capital and network capabilities parameters are much higher in the USA. Between Brazil and India, Brazil has higher resources in all listed parameters (Table 2) except for input seed funding. The accelerators that invest higher input seed funding are YCOM from the USA, ACE from Brazil, and GSF from India. As shown in later tables, these accelerators perform better.

The USA leads all ecosystem parameters followed by India in most parameters and then Brazil. It is very easy to start a business, with a very low cost, and get a very high recovery rate if the business closes in the USA. This indicates a very positive environment for founders to start a business in the USA. The cost of starting a business in India is significantly higher.

The Performance of Accelerators

As seen across various tables, in the mature US ecosystem, the differences are magnified across multiple parameters. Specifically, new ventures at YCOM can raise more funding and have better growth in terms of employees.

Table 3. Difference in accelerator performance measures in Brazil

Accelerator Performance Measures	Mean		t-value
	ACE	WOW	
Funding			
Total Funding amount	12.290	11.040	3.28 ***
Number of Investors	0.320	0.453	-0.970
Number of funding rounds	0.300	0.180	1.100
Investment Stage	0.731	0.737	-0.160
Survivability			
% of closed firms	13.462	24.000	
Growth			
Number of employees	2.193	2.069	0.590
Acquisitions			
Made acquisitions	1.923	–	
Was Acquired	9.615	–	

***p<0.01, **p<0.05, p<0.1

ACE – ACE start-ups

Source: own elaboration of statistical analysis.

The performance difference between accelerators in Brazil and India is not as high as in the USA. In Brazil (Table 3), ACE leads WOW in the funding amount (t=3.28, p<0.05), while all other differences are not statistically significant. In India (Table 4), GSF leads TLABS in the amount of funding and the number of investors (t= 5.14 and t=2.85 with p<0.01).

Table 4. Difference in accelerator performance measures in India

Accelerator Performance Measures	Mean		t-value
	GSF	TLABS	
Funding			
Total Funding amount	14.170	11.620	5.14***
Number of Investors	1.249	0.554	2.85***
Number of funding rounds	0.737	0.504	1.360
Investment Stage	0.915	0.830	1.250
Survivability			
% of closed firms	21.053	25.000	–
Growth			
Number of employees	2.865	2.840	0.080
Acquisitions			
Made acquisitions	–	6.818	–
Was Acquired	–	4.545	–

***p<0.01, **p<0.05, *p<0.1

GSF – Global Super Angels Forum

Source: own elaboration of statistical analysis.

Table 5. Difference in accelerator performance measures in the USA

Accelerator Performance Measures	Mean		t-value
	YCOM	Techstars	
Funding			
Total Funding amount	14.370	14.060	2.49 **
Number of Investors	1.630	1.739	-2.12**
Number of funding rounds	0.836	1.002	-4.71***
Investment Stage	0.957	0.940	0.900
Survivability			
% of closed firms	4.510	4.175	–
Growth			
Number of employees	2.850	2.530	4.69 ***
Acquisitions			
Made acquisitions	4.666	2.982	–
Was Acquired	9.331	10.736	–

***p<0.01, **p<0.05, *p<0.1
YCOM – Y-Combinator
Source: own elaboration of statistical analysis.

YCOM leads Techstars in terms of total funding amount raised by start-ups (t=2.49 and p<0.05). YCOM start-ups frequently progress to later investment stages. Moreover, YCOM start-ups lead in survival and growth (Employees growth t=4.69 with p<0.01). Techstars leads in the number of investors involved with their start-ups (t=-2.12, p<0.05) and funding rounds (t=-0.471, p<0.01) that their start-ups raised, but overall performance in terms of growth and survival is poor.

Table 6 shows compares accelerators in the USA, Brazil, and India. There appears a statistically significant difference between accelerator performance of US and Brazilian accelerators and between US and Indian accelerators. Variables under funding category between the two sets – i.e. total funding amount, number of investors, number of funding rounds, and investment stage – have highly significant t-values with p<0.01. This indicates a strong difference across all funding dimensions. US ventures have better survivability rates and superior growth in terms of the number of employees as well. Overall, the table reveals the strong and significant performance of US accelerators.

India is better than Brazil in terms of numbers of investors attracted (t=2.56, p<0.05), the number of funding rounds closed (t=3.38, p<0.01), and investment stages (t=3.52, p<0.01), but the t-value is not significant for the total funding amount. Both Indian and Brazilian firms have poor survivability rates compared to the USA. Moreover, new ventures in the USA have better acquisition performance.

The scree plot in Figure 2 shows that two variables are important in predicting the total funding amount raised by accelerated ventures. The clear separation point 'elbow' separates the most important components from the least important components. In this case, the most important components are two. This has been further explored by Random forest tests. The Cluster Dendogram highlights the close alignment of the two US accelerators. The US accelerators differ from the accelerators of the emerging economies. The Brazilian accelerators are more similar to the Indian GSF accelerator as compared to Indian TLABS accelerator.

Table 6. Difference in accelerator performance measures across countries

Accelerator Performance Measures	Mean			t-value the USA and Brazil	t-value the USA and India	t-value India and Brazil
	The USA	Brazil	India			
Funding						
Total Funding amount	14.230	11.550	12.090	12.38 ***	7.21***	1.510
Number of Investors	1.677	0.363	0.684	19.74 ***	8.76***	2.56**
Number of funding rounds	0.909	0.261	0.574	11.84 ***	4.24***	3.38***
Investment Stage	0.950	0.733	0.856	11.39***	2.93***	3.52***
Survivability						
% of closed firms	4.363	16.883	23.81	–	–	–
Growth						
Number of employees	2.710	2.154	2.850	5.07 ***	-0.930	3.81***
Acquisitions						
Made acquisitions	3.927	1.299	4.762	–	–	–
Was Acquired	9.948	6.494	3.175	–	–	–

***p<0.01, **p<0.05, p<0.1

Source: own elaboration of statistical analysis.

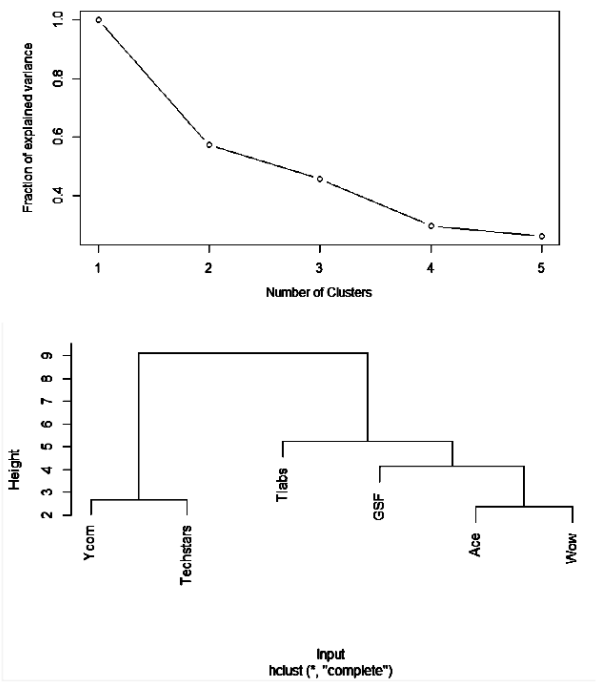

Figure 2. Scree plot and Cluster Dendogram for hierarchical clustering of accelerator characteristics

YCOM – Y-Combinator, ACE – ACE start-ups, GSF – Global Super Angels

Source: own elaboration of statistical analysis.

Table 7. Predicted output performance measures across various inputs

Model-Set-1: Accelerator-only inputs								
Methods	Funding				Survivability	Growth	Acquisitions	
	Total Funding amount	Number of Investors	Number of funding rounds	Investment Stage	% of closed firms	Number of employees	Made acquisitions	Was Acquired
SVM	1.29	0.55	0.27	0.08	0.4	0.25	0.04	0.06
Random Forest	1.71	0.69	0.36	0.11	0.75	0.39	0.02	0.04
Neural Networks	0.96	0.46	0.23	0.06	0.3	0.17	0.04	0.06
Model-Set-2: Accelerator-only and Ecosystem inputs								
Methods	Funding				Survivability	Growth	Acquisitions	
	Total Funding amount	Number of Investors	Number of funding rounds	Investment Stage	% of closed firms	Number of employees	Made acquisitions	Was Acquired
SVM	1.77	0.48	0.2	0.05	0.32	0.19	0.07	0.04
Random Forest	1.57	0.62	0.31	0.09	0.6	0.33	0.04	0.02
Neural Networks	1.02	0.45	0.18	0.05	0.27	0.16	0.06	0.04

Source: own elaboration of statistical analysis.

In order to accommodate for variations in machine learning (ML) techniques and to allow for a proper comparison across techniques, we have built prediction models in three ML techniques, namely Support Vector Machine (SVM), Random Forest, and Neural Networks. We modelled ML with the framework listed in Figure 1, with 12 variables used as input factors and categorised into three buckets for each of the output performance parameters across all three countries. We first applied only accelerator-inputs and then applied ecosystem inputs to observe the variation in outcomes. Model-Set-1 in Table 7 depicts the impact of accelerator-only inputs, namely the Human capital and Network capabilities input variables. Model-Set-2 in Table 7 depicts the impact of accelerator-only inputs and the external ecosystem variables.

We compared the predicted outcomes between the two Model-Sets to understand the influence of ecosystem. In Model-Set-2, which includes the ecosystem variables, cross-validation errors have reduced, thus indicating a better prediction for the output performance measures, which indicating the influence of ecosystem variables. The following funding parameters- number of investors, number of funding rounds and investment stage displayed better prediction outcomes when the ecosystem variable was introduced. The same effect is seen with Survivability, Growth, and Acquisitions-Was Acquired performance measures. These results validate the importance of the ecosystem on performances of accelerated ventures.

This is further validated with attribute importance by using Random Forest, which shows that the ecosystem variable plays a major role in predicting outcomes of accelerated ven-

tures. Table 8 shows important factors that contribute to total funding raised, along with the survival and growth of accelerated ventures. As per Scree Plot, only two variables play a significant role in accelerated ventures' total funding amount. We analysed further to bring out variables that have the highest impact. These are Recovery rate and Getting credit score. Table 8 below lists variables according to importance, and we should note that all ecosystem variables are in the top of the table, which shows their dominance over local accelerator inputs. Recovery rate, Ease of doing business, and Starting a Business cost are the most important ecosystem predictors for each of performance measures.

Hypothesis 1, 2, and 3 are proved by T-stat results in Table 6 and the variable importance list in Table 8. The new ventures accelerated in the US raise more total funding, have higher growth, and survive better due to the better accelerator inputs and ecosystem variables. This is because the mentor and investor network capabilities of US accelerators are nearly 20 times higher than Brazilian and 30 times higher than Indian accelerators. Overall, the human capital and network capabilities parameters are much higher in the USA. Since accelerator input and ecosystem variables are of higher value, new ventures accelerated in the US perform well, which proves our three hypotheses.

Table 8. Attribute importance using Random Forest

Parameters	Total Funding	Type	Parameters	% closed firms	Type	Parameters	Employees	Type
Recovery rate	8.86	ECOSYSTEM	Ease of Doing Business	2.65	ECOSYSTEM	Starting a Business Cost	0.75	ECOSYSTEM
Getting Credit Score	5.73		Getting Credit Score	2.46		TEA Total Innovation	0.57	
Total Early Stage Entrep.	5.59		Recovery rate	2.1		Recovery rate	0.56	
Starting Business Score	4.56		Starting a Business Cost	1.88		Starting Business Score	0.54	
Ease of Doing Business	4.13		Starting Business Score	1.71		Getting Credit Score	0.39	
TEA Total Innovation	3.66		TEA Total Innovation	1.36		Total Early Stage Entrep.	0.36	
Input Seed Funding (USD)	3.24	ACCL INPUT	Investor Network	1.11	ACCL INPUT	Mentor Network	0.13	ACCL INPUT
Total Industry Experience	2.89		Mentor Network	0.77		Total Industry Experience	0.12	
Prior Start-Up Experience	2.2		Total Early Stage Entrep	0.75		Investor Network	0.1	
Mentor Network	1.85		Prior Startup Experience	0.68		Input Seed Funding (USD)	0.09	
Investor Network	1.5		Input Seed Funding (USD)	0.24		Prior Start-Up Experience	0.05	
Starting a Business Cost	0.9	Ecosystem	Total Industry Experience	0.22	Ecosystem	Ease of Doing Business	0	Ecosystem

ACCL – Accelerator

Source: own elaboration of statistical analysis.

By focusing on a specific type of accelerators called the deal-flow accelerator, we ensured that the chosen performance parameters not only match design objectives of accelerators but also are sufficiently robust and broad to provide a holistic approach to the assessment of accelerators across various ecosystems. This validates the proposition put forth by Pauwels *et al.* (2016) to delineate and assess accelerators based on their objectives.

Despite the fact that the accelerators selected for the study had similar characteristics and offered similar structured programmes, the outputs varied widely within the ecosystem and across ecosystems. The impact within the ecosystem and across ecosystems are examined separately and in detail below.

Variations within the ecosystem can be explained by the competencies each firm brings in to drive the results, which resonates with the reasoning provided by the RBV competency theory (Amit & Schoemaker, 1993). More competent accelerators are adept at using the assets at their disposal and spreading resources through structured interventions with new ventures. Techstars in the USA offer a larger number of mentors and investors as resources to their ventures. Investors prefer to see commitment from other investors before they invest, so assembling a large pool of investors is crucial. Thanks to this, new ventures that graduated from Techstars were capable of attracting more investors and close more funding rounds. But the new ventures at YCOM attracted a larger amount of funding even though the resources in the form of investors were lower. As put forth by Toni and Tonchia (2003), this displays firms' strategic potential from two levels: 1) appraisal of rent-generating potential of resources, and 2) the exploitation of firm resources and competencies relative to external opportunities. Both Brazil and India need strong accelerator founders with good industry and start-up experience to successfully steer the allocated resources. These countries are highly deficient in Human capital resources. They should hire talented managers with prior experience in the technology industry, as these managers would have built connections in the industry through their professional networks, which could provide immense value to new ventures (Wise & Valliere, 2014). The management team also must have prior start-up experience, as it delivers the much needed experience associated with running a start-up (Ko & McKelvie, 2018). Accelerators should increase the amount of input seed funding given to new ventures, as it would serve two main purposes: 1) improving funding trajectories of their new ventures, and 2) providing better exits for the accelerator's investments.. The more the success of existing investments at a deal-flow accelerator, the higher the chance to attract future venture capital funds. This will eventually drive higher input seed funding for new ventures, thus completing the cycle.

Variations across ecosystems can be explained by the environment in which these accelerators operate. The external environment plays a major role in the RBV theory: weak environment drives tepid performance outputs of firms. Although the GSF accelerator in India provided substantial input funding (comparable to the US accelerators), the performance of its ventures in the areas of funding, survivability, and growth were inferior. This validates the explanation provided by Lyles *et al.* (2004) related to the transitional nature of emerging environment and the inability of firms to convert the resources acquired into superior performance. Even though the Indian ecosystem is rated well on the TEA innovation and almost comparable to the US ecosystem, the cost of starting a business in India is almost 24 times higher than in the USA. This is due to the difficult policy environment in the country. The new ventures in India spend more time dealing with regulatory hurdles

rather than on improvising the innovation and taking it to the market. On similar grounds, from an investor perspective, the environment in India and Brazil are not conducive for investors to get a return on their investments for two reasons. Firstly, high failure rate is coupled with four times worse recovery rate for failed investments compared to the USA. Secondly, India and Brazil have much fewer exits through initial public offerings (IPO) compared to the US market. These hurdles keep investors at bay from doing multiple further rounds of investment to accelerated new ventures after having raised initial seed funding from their accelerators. Indeed, bureaucratic structures, difficult policy environments, and external markets hamper entrepreneurial performances of new ventures. This provides evidence to the impact of external ecosystem on the RBV theory and helps to examine tepid impacts of accelerators in Brazil and India.

CONCLUSIONS

This is the first of its kind study assessing and contrasting six accelerators and their influence on the performance of 1286 new venture firms, both within and across three countries: the USA, Brazil, and India. Based on three important dimensions of accelerators – i.e. human capital, network capabilities, and external environment – with twelve contributing factors, the impact of the accelerators' influence on new venture firms was analysed with four metrics: funding, survivability, growth, and acquisitions. Accelerators can effectively improve funding performance outcomes through channelling input seed funding in both developed and emerging ecosystems. Accelerator founder human capital is severely deficient in Brazil and India and requires augmentation. The external environment in emerging ecosystems and its transitional nature impact the resources facilitated by the accelerators and also dampens the performance of accelerators and the new ventures that graduate from them. In order to overcome local ecosystem shortcomings and improve their efficacies, accelerators in emerging ecosystems should ameliorate their resources and capabilities by adding resources from mature ecosystems. However, the onus is on the policy makers in emerging countries so as to eventually ease the regulatory frameworks to avoid resource leakages in their accelerators.

The study has several implications for managers/practitioners. From a practitioner's perspective, this study provides insights into influencing the key metrics that impact new venture performances to leadership teams of accelerators. Input resources of accelerators should be increased by partnering with mature ecosystems so as to improve the network capabilities such as input seed funding or the number of mentors and investors. Accelerators in emerging ecosystems have deficient human capital, so they must scout for managers from their local ecosystems who previously developed start-ups and have sound industry experience.

From a research implication perspective, the variables and the framework explored in this study could be used, because we identified building blocks for future studies of accelerators as detailed set of parameters by looking at relevant literature on strategic management, the RBV theory, and new venture performance.

Ecosystem factors – viz. Recovery rate, Ease of doing business, and Starting a Business – played a major role in determining total funding, survival, and growth outcomes, respectively. This work draws the attention of policy-makers to examine the resilience of their regulatory frameworks in order to avoid resource leakages in their accelerators.

From a social implication perspective, successful structured accelerator programs create more entrepreneurs in society, as several uncertainties and risks are tackled by previous cohorts graduates. National economic growth is directly impacted by the growth of new ventures, in which external ecosystem plays an important role, as revealed by this study. The average total funding raised by YCOM ventures is 16 times that of Indian accelerated ventures. Policy-makers must be aware of the fact that an unfavourable ecosystem adversely impacts jobs and investments from global investors.

The limitation of this study is that although this work focused on building a model to assess the performance of deal-flow accelerators, the study was intentionally restricted to two successful accelerators per country. There is room to scale this work to a larger number of deal-flow accelerators and extend it to other categories of accelerators backed by corporates and governments. We would like to caution researchers to develop appropriate category-specific measures, as we did in this study. Moreover, our study should be extended to demarcate and analyse the roles of deal-flow accelerator stakeholders, specifically to explore the impact created by venture capital investors. Understanding the impact of weak ecosystems on founders and their response to mitigate ecosystem risks would be an interesting avenue for further research.

REFERENCES

Acs, Z., & Armington, C. (2004). Employment growth and entrepreneurial activity in cities. *Regional Studies*, *38*(8), 911-927. https://doi.org/10.1080/0034340042000280938

Amezcua, A.S., Grimes, M.G., Bradley, S.W., & Wiklund, J. (2013). Organizational sponsorship and founding environments: a contingency view on the survival of business-incubated firms, 1994-2007. *Academy of Management Journal*, *56*(6), 1628-1654. https://doi.org/10.5465/amj.2011.0652

Amit, R., & Schoemaker, P.J. (1993). Strategic assets and organizational rent. *Strategic Management Journal*, *14*(1), 33-46.

Battistella, C., De Toni, A.F., & Pessot, E. (2017). Open accelerators for start-ups success: a case study. *European Journal of Innovation Management*, *20*(1), 80-111. https://doi.org/10.1108/EJIM-10-2015-0113

Besley, T. (2015). Law, regulation, and the business climate: The nature and influence of the World Bank Doing Business project. *Journal of Economic Perspectives*, *29*(3), 99-120. https://doi.org/10.1257/jep.29.3.99

Block, J., & Sandner, P. (2009). What is the effect of the financial crisis on venture capital financing? Empirical evidence from US Internet start-ups. *Venture Capital*,*11*(4), 295-309. https://doi.org/10.1080/13691060903184803

Bloom, N., Genakos, C., Sadun, R., & Van Reenen, J. (2012). Management practices across firms and countries. *Academy of Management Perspectives*, *26*(1), 12-33. https://doi.org/10.5465/amp.2011.0077

Bøllingtoft, A. (2012). The bottom-up business incubator: Leverage to networking and cooperation practices in a self-generated, entrepreneurial-enabled environment. *Technovation*, *32*(5), 304-315. https://doi.org/10.1016/j.technovation.2011.11.005

Bosma, N. (2013). The Global Entrepreneurship Monitor (GEM) and its impact on entrepreneurship research. *Foundations and Trends in Entrepreneurship*, *9*(2), 143-248. http://dx.doi.org/10.1561/0300000033

Business, D. (2013). *Doing business 2014: Understanding regulations for small and medium-size enterprises*.Washington DC. Retrieved from https://www.doingbusiness.org/ on October 15, 2019.

Bryl, Ł., & Truskolaski, S. (2017). Human capital reporting and its determinants by Polish and German publicly listed companies. *Entrepreneurial Business and Economics Review*, *5*(2), 195. https://doi.org/10.15678/EBER.2017.050211

Cacciolatti, L., Rosli, A., Ruiz-Alba, J.L., & Chang, J. (2020). Strategic alliances and firm performance in startups with a social mission. *Journal of Business Research*, *106*, 106-117. https://doi.org/10.1016/j.jbusres.2019.08.047

Cohen, S., Fehder, D.C., Hochberg, Y.V., & Murray, F. (2019). The design of startup accelerators. *Research Policy*, *48*(7), 1781-1797. https://doi.org/10.1016/j.respol.2019.04.003

Cohen, S., & Hochberg, Y.V. (2014). *Accelerating startups: The seed accelerator phenomenon*. http://dx.doi.org/10.2139/ssrn.2418000

Dahms, S., & Kingkaew, S. (2016). University business incubators: An institutional demand side perspective on value adding features. *Entrepreneurial Business and Economics Review*, *4*(3), 41-56. https://doi.org/10.15678/EBER.2016.040304

De Toni, A., & Tonchia, S. (2003). Strategic planning and firms' competencies: Traditional approaches and new perspectives. *International Journal of Operations & Production Management*, *23*(9), 947-976. https://doi.org/10.1108/01443570310491729

Eveleens, C.P., van Rijnsoever, F.J., & Niesten, E.M. (2017). How network-based incubation helps start-up performance: a systematic review against the background of management theories. *The Journal of Technology Transfer*, *42*(3), 676-713. https://doi.org/10.1007/s10961-016-9510-7

Eugene, L.Y., & Yuan, S.T.D. (2012). Where's the money? the social behavior of investors in facebook's small world. In *Proceedings of the 2012 International Conference on Advances in Social Networks Analysis and Mining (ASONAM 2012)* (pp. 158-162). IEEE Computer Society. https://doi.org/10.1109/ASONAM.2012.36

Gonzalez-Uribe, J., & Leatherbee, M. (2018). The effects of business accelerators on venture performance: Evidence from start-up chile.*The Review of Financial Studies*, *31*(4), 1566-1603. https://doi.org/10.1093/rfs/hhx103

Goswami, K., Mitchell, J.R., & Bhagavatula, S. (2018). Accelerator expertise: Understanding the intermediary role of accelerators in the development of the Bangalore entrepreneurial ecosystem. *Strategic Entrepreneurship Journal*, *12*(1), 117-150. https://doi.org/10.1002/sej.1281

Grant, R.M. (1991). The resource-based theory of competitive advantage: implications for strategy formulation. *California Management Review*, *33*(3), 114-135. https://doi.org/10.2307/41166664

Hallen, B.L., Bingham, C.B., & Cohen, S. (2014). Do accelerators accelerate? A study of venture accelerators as a path to success?. In *Academy of Management Proceedings* (Vol. 2014, No. 1, p. 12955). Briarcliff Manor, NY 10510: Academy of Management. https://doi.org/10.5465/ambpp.2014.185

Hart, S.L. (1995). A natural-resource-based view of the firm. *Academy of Management Review*, *20*(4), 986-1014. https://doi.org/10.5465/amr.1995.9512280033

Hochberg, Y.V. (2016). Accelerating entrepreneurs and ecosystems: The seed accelerator model. *Innovation Policy and the Economy*, *16*(1), 25-51. https://doi.org/10.1086/684985

Hsu, D.H. (2007). Experienced entrepreneurial founders, organizational capital, and venture capital funding. *Research Policy*, *36*(5), 722-741. https://doi.org/10.1016/j.respol.2007.02.022

Kanbach, D.K., & Stubner, S. (2016). Corporate accelerators as recent form of startup engagement: The what, the why, and the how. *Journal of Applied Business Research (JABR)*, *32*(6), 1761-1776. https://doi.org/10.19030/jabr.v32i6.9822

Kim, J.H., & Wagman, L. (2014). Portfolio size and information disclosure: An analysis of startup accelerators. *Journal of Corporate Finance*, *29*, 520-534. https://doi.org/10.1016/j.jcorpfin.2014.10.017

Ko, E.J., & McKelvie, A. (2018). Signaling for more money: The roles of founders' human capital and investor prominence in resource acquisition across different stages of firm development. *Journal of Business Venturing*, *33*(4), 438-454. https://doi.org/10.1016/j.jbusvent.2018.03.001

Klyver, K. (2008). An analytical framework for micro-level analysis of GEM data. *International Journal of Entrepreneurship and Small Business*, *6*(4), 583-603. https://doi.org/10.1504/IJESB.2008.019503

Lisowska, R. (2016). The potential of business environment institutions and the support for the development of small and medium-sized enterprises. *Entrepreneurial Business and Economics Review*, *4*(3), 85-101. https://doi.org/10.15678/EBER.2016.040307

Lyles, M.A., Saxton, T., & Watson, K. (2004). Venture survival in a transitional economy. *Journal of Management*, *30*(3), 351-375. https://doi.org/10.1016/j.jm.2003.03.001

Mansoori, Y., Karlsson, T., & Lundqvist, M. (2019). The influence of the lean startup methodology on entrepreneur-coach relationships in the context of a startup accelerator. *Technovation*, *84*, 37-47. https://doi.org/10.1016/j.technovation.2019.03.001

Mayer-Haug, K., Read, S., Brinckmann, J., Dew, N., & Grichnik, D. (2013). Entrepreneurial talent and venture performance: A meta-analytic investigation of SMEs. *Research Policy*, *42*(6-7), 1251-1273. https://doi.org/10.1016/j.respol.2013.03.001

Meschi, P.X., & Riccio, E.L. (2008). Country risk, national cultural differences between partners and survival of international joint ventures in Brazil. *International Business Review*, *17*(3), 250-266. https://doi.org/10.1016/j.ibusrev.2007.11.001

Murphy, G.B., Trailer, J.W., & Hill, R.C. (1996). Measuring performance in entrepreneurship research. *Journal of Business Research*, *36*(1), 15-23. https://doi.org/10.1016/0148-2963(95)00159-X

Pauwels, C., Clarysse, B., Wright, M., & Van Hove, J. (2016). Understanding a new generation incubation model: The accelerator. *Technovation*, *50*, 13-24. https://doi.org/10.1016/j.technovation.2015.09.003

Penrose, E., & Penrose, E.T. (2009).*The Theory of the Growth of the Firm*. Oxford University Press.

Porter, M.E. (1991). Towards a dynamic theory of strategy. *Strategic Management Journal*, *12*(S2), 95-117. https://doi.org/10.1002/smj.4250121008

Radojevich-Kelley, N., & Hoffman, D.L. (2012). Analysis of accelerator companies: An exploratory case study of their programs, processes, and early results. *Small Business Institute Journal*, *8*(2), 54-70.

Smith, S.W., & Hannigan, T.J. (2015). Swinging for the fences: How do top accelerators impact the trajectories of new ventures. *Druid*,*15*, 15-17.

Shetty, S., & Sundaram, R. (2019). Funding acquisition drivers for new venture firms: Diminishing value of human capital signals in early rounds of funding. *Problems and Perspectives in Management*, *17*(1), 78. http://dx.doi.org/10.21511/ppm.17(1).2019.08

Van Stel, A., Storey, D.J., & Thurik, A.R. (2007). The effect of business regulations on nascent and young business entrepreneurship. *Small Business Economics*, *28*(2-3), 171-186. https://doi.org/10.1007/s11187-006-9014-1

Uhm, C.H., Sung, C.S., & Park, J.Y. (2018). Understanding the accelerator from resources-based perspective. *Asia Pacific Journal of Innovation and Entrepreneurship*, 12(3), 258-278. https://doi.org/10.1108/APJIE-01-2018-0001

Wise, S., & Valliere, D. (2014). The impact on management experience on the performance of start-ups within accelerators. *The Journal of Private Equity*, *18*(1), 9-19. https://doi.org/10.3905/jpe.2014.18.1.009

Wong, P.K., Ho, Y.P., & Autio, E. (2005). Entrepreneurship, innovation and economic growth: Evidence from GEM data. *Small Business Economics*, *24*(3), 335-350. https://doi.org/10.1007/s11187-005-2000-1

Xu, S., Zhang, Q., Lü, L., & Mariani, M.S. (2020). Recommending investors for new startups by integrating network diffusion and investors' domain preference. *Information Sciences*, *515*, 103-115. https://doi.org/10.1016/j.ins.2019.11.045

Yang, S., Kher, R., & Lyons, T.S. (2018). Where Do Accelerators Fit in the Venture Creation Pipeline? Different Values Brought by Different Types of Accelerators. *Entrepreneurship Research Journal*, *8*(4). https://doi.org/10.1515/erj-2017-0140

Yin, B., & Luo, J. (2018). How do accelerators select startups? Shifting decision criteria across stages. *IEEE Transactions on Engineering Management*, *65*(4), 574-589. https://doi.org/10.1109/TEM.2018.2791501

Żur, A. (2013). Entrepreneurial Orientation and Firm Performance: Challenges for Research and Practice. *Entrepreneurial Business and Economics Review*, *1*(2), 7-28.

Appendix

Table 9. Literature review of accelerator studies

Author/Date	Research Focus	Population	Region chosen for study	Theory used	Findings	Limitation/Future scope
Radojevich *et al.* (2012)	Exploratory case study of accelerator (ACCL) programs and processes.	5 ACCLs	the USA	RBV	Mentorship driven programs provide entrepreneurs with access to angel investors and venture capitalists thereby increasing start-up success rates.	Only a few major ACCLs existed in this period of study. Limited data availability.
Hallen *et al.* (2014)	The comparison of accelerated and non-accelerated ventures using speed to reach milestones. Studied portfolio ventures.	8 ACCLs and 164 start-ups	the USA and Europe	None	Some ACCLs accelerate venture gestation more than others.	Study based on a developed economy. More quantitative analysis recommended.
Cohen & Hochberg (2014)	The definition of seed ACCLs difference from incubators, angel investors, and benefits.	multiple ACCLs	the USA	–	ACCLs distinct from incubators. New model of assistance.	Claims rigorous research is much needed when data is available.
Kim & Wagman (2014)	The information gathering role of ACCL in certifying the value of portfolio ventures to outside investors.	generic study of ACCL programs	None	None	Potential inefficiency in certification process of ACCL.	Based on a theoretical framework.

Author/Date	Research Focus	Population	Region chosen for study	Theory used	Findings	Limitation/Future scope
Wise & Valliere (2014)	Exit of start-ups from North America accelerators.	Techstars and DMZ ACCL ventures	North America	Human Capital	Years of start-up founder experience available in the ACCL management team has a beneficial effect on the failure hazard of tenant firms.	Explanatory model using only two case studies.
Smith & Hannigan (2015)	Impact on the exit of venture based on received financing. Top angel-group-funded start-ups compared with top ACCL-funded start-ups.	619 ventures of YCOM and Techstars.	the USA	None	Participation in a top ACCL program increases the speed of exit.	Study limited to two of the most prominent ACCLs in the USA.
Pauwels *et al.* (2016)	Design lens as a theoretical framework for analysing accelerator elements and themes to understand their operating model.	13 ACCLs	London, Paris, and Berlin in Europe	Design lens	The identification of three different types of ACCLs. The importance of a homogenous study.	Develop measures for each type. Study portfolio ventures to understand ACCL impact.
Kanbach & Stubner (2016)	ACCL case study using the inductive research method.	13 corporate ACCLs	Germany	None	Corporate ACCLs insource innovations and aid in strategy and finance.	The effectiveness of corporate ACCLs needs to be studied.
Battistella (2016)	How the context of open innovation offered by ACCLs can affect the successful growth of start-ups.	ACCL Searchcamp	the UK	None	Open environment can mitigate start-up failures.	Single case study.
Hochberg (2016)	Introduction to ACCL model and its effect on regional entrepreneurial environment.	conceptual study of ACCLs	the USA	None	A summary previous studies. ACCL programs aid regional economic development with social benefit.	ACCL research in infancy. Role and efficacy of ACCLs must be studied. Ecosystem parameters to be explored.
Gonzalez Uribe *et al.* (2017)	The impact of Startup Chile on venture performance, education, and funding,	ACCL Startup Chile	Chile	None	Funding matters for new ventures. More resources should be provided.	Single ACCL.

Author/Date	Research Focus	Population	Region chosen for study	Theory used	Findings	Limitation/Future scope
Chul Hyun Uhm (2018)	Exploratory case study of ACCL comparisons: educational support, financial investment, network relation.	3 ACCLS each in 2 countries	South Korea and the USA	RBV	The number of differences between ACCLs in terms of the resources. Entrepreneurial talent limited in South Korea.	Emprical analysis to show statisitical significance of ACCLs needed. Rigorous case study needed.
Yin & Luo (2018)	Decision criteria of ACCLs while selecting start-ups. Scoreboard framework of 30 criteria.	Singapore JFDI ACCL	Singapore	None	Implicit decision criteria identified. Eight win criteria for initial screening important. Growth strategy and prior start-up experience critical.	Single ACCL. The utility of the prediction models for different stages are limited by their low accuracy (below 80%).
Yang *et al.* (2018)	Fit of ACCLs in the venture pipeline system. Placement in the three subsystems to develop entrepreneurs from lower-level to higher-level skills.	study of ACCL programs	None	None	It is important to conduct homogenous studies. ACCLs are early-stage finance providers.	Study limited to the clarification of ACCL models and their fit in the venture capital pipeline.
Goswami *et al.* (2018)	Effectiveness of six Bangalore based ACCLs in improving the ecosystem.	6 ACCLS	Bangalore, India	None	ACCL play an intermediary role by connecting founders to the regional ecosystem.	The analysis of a single geographic region.
Cohen *et al.* (2019)	Connections between design and performance.	Exploratory study of ACCLs	the USA	Human Capital, Design lens	The design of accelerators is tied to performance outcomes.	Explore impact of accelerators tied to business models adopted and objectives of ACCLs.
Mansoori *et al.* (2019)	Entrepreneur coach relationships in university-based ACCL using ethnographic study.	17 ventures	Sweden		Lean start-up methodology influences the entrepreneur-coach relationships.	Challenges due to legitimacy of methodology and nature of the accelerated ventures.

Source: own study.

Authors

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The Influence of Sufficiency Economy Philosophy Practice on SMEs' Performance in Thailand

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ABSTRACT

Objective: The objective of the article is to investigate the extent and level of sufficiency economy philosophy (SEP) practice, the performance measured by the balanced scorecard (BSC) of small and medium-sized enterprises (SMEs) in Thailand, and to test the influence of SEP practice on SMEs' performance measured by BSC.

Research Design & Methods: Using stratified sampling, 600 SMEs were adopted as the sample in this study. Self-reported data was collected using a mailed questionnaire containing items incorporating a five-point Likert scale. The data was initially analysed by descriptive analysis, correlation matrix, and multiple regression.

Findings: The study found that both SEP practice and performance measured by the BSC of SMEs were at a high level. Moreover, the moderation element was the most common SEP practice followed by the morality condition, the reasonableness element, the self-immunity element, and the knowledge condition. The multiple regression analysis indicated that all the elements and conditions of SEP positively and significantly influenced performance measured by the BSC. Using control variables, the study also found the significant relationship between firm size, firm age, and SMEs' performance.

Implications & Recommendations: Business owners and top management can use SEP as a practical management tool with which to operate their business instead of adopting Western management models.

Contribution & Value Added: The study findings can demonstrate that stakeholder theory can be used to explain SMEs in Thailand putting SEP into practice in order to satisfy stakeholder demands for better performance.

Article type:	research article
Keywords:	sufficiency economy philosophy; performance; balanced scorecard; small and medium enterprises; Thailand
JEL codes:	M10, M40, M41, N15, D41, D43, E58, G18, G21

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INTRODUCTION

One of the major causes of the Asian financial crisis in 1997, dubbed the Tom Yum Goong crisis was that most enterprises had adopted Western management methods in their businesses (the Anglo-American approach; Kantabutra, 2006; Mongsawad & Thongpakde, 2016), which leads to enterprises prioritising short-term performance by focusing only on certain groups of stakeholders, such as creditors, shareholders, and investors, rather than concentrating on long-term performance and the social and environmental impacts of their operations (Avery, 2005). Thailand was the first country affected by the crisis, which caused many economic problems. For example, a large number of enterprises went bankrupt, and a large number of workers were laid off. Thus, the Thai government derived insufficient revenue from corporate or personal income taxation. However, as a means of solving that crisis, the sufficiency economy philosophy (SEP) was adopted as a business model in Thailand. SEP focuses on long-term rather than short-term performance, balancing the economic, social, and environmental perspectives, and meeting the demands of all stakeholder groups (Suttipun, 2019). SEP, its concepts, and practice were created and developed by His Majesty the King of Thailand, Bhumibhol Adulyadej. SEP encompasses three elements: moderation, reasonableness, and self-immunity; along with two conditions of knowledge and morality. The main aim of the SEP in regard to business enterprises is to achieve sustainable development through what Thai Buddhists call the Middle Path (Mongsawad, 2010; Jitsuchon, 2019).

To put SEP into practice, business enterprises have to focus on long-term rather than short-term performance, but also on emphasising the maximisation of wealth rather than profit (Kantabutra, 2010). Furthermore, performance under SEP is based on the notion that one should attend to the demands of all stakeholders. The advantage of applying SEP in practice is that it leads enterprises to better financial and non-financial performance. The most common performance measurement tool by which both financial and non-financial performance can be measured is the balanced scorecard (BSC), developed by Kaplan and Norton (1992), which aims to evaluate business performance based on both its financial and non-financial aspects, taking into account strategic planning and management (Kaplan & Norton, 1996) and the notion of sustainable development. The BSC is divided into five perspectives: financial, customer, internal process, learning, and environmental. Thus, the BSC is concerned with the social and environmental impacts of the actions and activities of business enterprises (Garrison *et al.*, 2015).

However, although a number of previous studies examines the influence of SEP practice and disclosure on financial performance (Suriyankietkaew & Avery, 2016; Suttipun & Saefu, 2017; Suttipun, 2019), firm value (Kantabutra, 2006; 2010), and market price (Nuttavuthisit, 2005; Pruetipibultham, 2010), no published study investigates the influence of SEP practice on both financial and non-financial performance measured by the BSC. Therefore, there is currently no understanding of the direction of the relationship between SEP practice and performance as measured by the BSC. This may be because even though most prior studies find that SEP practice and disclosure positively influences financial performance (Pruetipibultham, 2010; Suriyankietkaew & Avery, 2016; Suttipun & Saefu, 2017; Suttipun, 2018), putting SEP into practice may entail higher costs for business

enterprises,which may result in their producing lower financial and non-financial performance. Moreover, previous studies of SEP practice and disclosure focus on large-scale enterprises in capital market (Kantabutra, 2006; 2010; Suttipun & Saefu, 2017; Suttipun, 2019), but there is limited research available that would focus on small and medium-sized enterprises (SMEs; Suriyankietkaew & Avery, 2016).

SMEs are considered to be one of the main drivers of the new-world economy with important implications for job creation and employment, new product and service generation, research and technology development, tax revenue collection, and business responsibility (Williams *et al*., 2018). Based on data from the OECD (2018), SMEs in developing countries around the world account for over 45% of total employment and over 33% of gross domestic product (GDP). However, the SME sector has suffered a high rate of bankruptcies of over 69% since 2002 (Veskaisri *et al.*, 2007), the main reasons for this being that SMEs lack clearly defined strategies and appropriate management tools, conduct insufficient research and development, and are insufficiently capitalised (Kulkalyuenyong, 2018). In Thailand, although SMEs account for over 40% of national GDP, 80% of total employment, and 99% of the total number of Thai enterprises (OSMEP, 2018), they still have limitations compared to large-scale enterprises and suffer a higher rate of failure (Kulkalyuenyong, 2018).

Based on the problems outlined above, the current study has two main objectives expressed as research questions:

1. What are the extent and level of SEP practice and corporate performance of SMEs in Thailand?
2. Does the practice of SEP by SMEs influence performance as measured by the BSC?

The study used an appropriate methodology adapted from prior related literature. Using stratified sampling, 600 SMEs from four main regions of Thailand (northern, north-eastern, central, and southern Thailand) were adopted as the sample in this study. A mailed questionnaire collected data in three sections as general information about SMEs, the SEP practice of SMEs, and the SMEs' performance according to the balanced scorecard (BSC), on a five-point Likert scale. The data was initially analysed by descriptive analysis, correlation matrix, and multiple regression. Sensitivity analysis was also used to confirm the finding.

The study can be expected to provide several contributions; in terms of its theoretical contribution, the study can demonstrate that the stakeholder theory is capable of explaining the advantages of businesses putting SEP into practice to satisfy their stakeholders' demands. The study will also shed light on SMEs using Eastern management practices in an emerging economic nation, with the benefits assessed with a Western performance measurement tool: the BSC. In terms of its practical contribution, by demonstrating the positive influence of putting SEP into practice on both financial and non-financial performance measured by the BSC, businesses will be encouraged to pursue the goal of sustainable development.

The following section will review the literature relevant to the theoretical background of the study, the SEP, its concept and practice, and performance measurement with the BSC, and will be concluded with hypotheses development. Next, the population, sampling method, and composition of the sample will be described, followed by the elaboration of data collection and analysis. The findings are then presented and discussed, and the paper concludes with a summary and suggestions for further research.

LITERATURE REVIEW

The review of previous literature relevant to this study is divided into three sub-sections: theoretical perspective, corporate performance as measured by the BSC, and the SEP practice, including hypothesis development.

Theoretical Perspective

Although different theoretical approaches have been used to explain the management strategies used by businesses – such as agency theory, institutional theory, legitimacy theory, and stakeholder theory – the theoretical perspective most often adopted to explain the motivation for businesses to employ SEP is stakeholder theory. This is because stakeholder theory is concerned with the ways that businesses manage their stakeholders (Freeman, 1984; Kantabutra, 2006; Suttipun & Saefu, 2017; Suttipun, 2018). Therefore, the current study used stakeholder theory to explain the extent and level of SEP practice and corporate performance of SMEs in Thailand, measured by the BSC and the influence of SEP practice on corporate performance as measured by the BSC.

Stakeholder theory is concerned with the relationship of a business's owners and its senior management with its diverse stakeholders and their responsibility towards those stakeholders (Freeman, 1984; Cheng & Fan, 2010). A good relationship can result in a positive reputation, higher firm value, competitive advantage, and better performance. The main reason is that all stakeholders have something at risk in a business as well as having the power to affect that business, its actions, activities, decisions, policies, or even management practices (Collier, 2008; Parmar *et al.*, 2010). Business's stakeholders may include not only shareholders, creditors, and investors, but also customers, workers, suppliers, competitors, regulators, the media, the local community, and even future generations (Carrol & Bucholtz, 2006). Therefore, all businesses need to satisfy the demands of numerous stakeholder groups and the interaction with each stakeholder group needs to be managed)Gray *et al.*, 1998(. Stakeholders are defined as those who can influence or be influenced by the achievement of business policies, goals, and decisions (Donaldson & Preston, 1995). Each stakeholder group has a right to receive information from the business in which it is interested, even though stakeholders may not use that information, nor have a direct influence on the business)Deegan, 2002; Parmar *et al.*, 2010(. Different groups of stakeholders have different degrees of power to compel and influence business actions and activities and different interests in business practices, and a business will tend to satisfy the demands of those stakeholders that are most important to its ongoing survival)Donaldson & Preston, 1995; Joshi & Gao, 2009(. Therefore, we conducted this study under the assumption that SEP is put into practice by SMEs in order to satisfy stakeholders and maintain good relationships with them)Suttipun, 2018(.

The notion of SEP practice in Thailand is accommodated by corporate stakeholder theory)Kantabutra, 2006; Suttipun & Saefu, 2017; Suttipun, 2018(because Thai businesses focus not only on the demands of certain stakeholder groups, such as investors, shareholders, and creditors, but they also need to attend to and satisfy the demands of other stakeholder groups, such as customers, employees, suppliers, competitors, society and communities, and environmental lobbies)Suttipun, 2019(. Moreover, Thai businesses, which put SEP into practice and follow its concepts, are better able to meet

stakeholders' demands and SEP also provides corporations with immunity from the results of uncontrollable events and the resilience to cope with new economic challenges)Suttipun, 2018(.

Performance Measured by the Balanced Scorecard

In the past, business performance was exclusively measured by financial performance because it can be easily expressed in monetary units, and the results can be compared with competitors in the same industry. However, there are several limitations of reporting only financial performance including that: (1) it does not account for competitive advantage, (2) it does not focus on long-term performance, (3) it cannot be used for business forecasting, and (4) it does not encourage sustainable business development (Suttipun & Sittidate, 2016). Therefore, non-financial performance has become a more common means of measuring corporate performance, but it is hard to express because it does not use monetary units (Norreklit, 2000). Moreover, it is hard to compare a company's non-financial performance with that of other enterprises because there are many different ways of gauging non-financial performance.

There are a number of performance measurement tools currently used to accommodate the reporting of non-financial performance, such as triple bottom line reporting and the BSC. This study used the BSC as its performance measurement tool because it is a more commonly used measurement tool in Thailand than triple bottom line reporting (Norreklit, 2000). The BSC was introduced by Kaplan and Norton (1992) as a means of measuring both financial and non-financial performance, which can support enterprises' strategic planning and management (Kaplan & Norton, 1996). Within the BSC – as originally envisaged – there were four perspectives: financial, customer, internal process, and learning (Kaplan & Norton, 1992). However, to accommodate the concept of sustainable development, Garrison *et al.* (2015) extended the model to incorporate environmental perspective into the BSC. Thus, the present study used the five perspectives of BSC to assess the reporting of corporate performance: financial, customer, internal process, learning, and environmental.

Sufficiency Economy Philosophy Practice

As noted in the introduction, SEP was adopted in Thailand as a means of recovering from the 1997 Tom Yum Goong crisis, which led to a large number of bankruptcies in Thailand, consequent upon companies prioritising short-term profitability at the expense of long-term performance (Mongsawad & Thongpakde, 2016). A brainchild of His Majesty the King of Thailand, Bhumibhol Adulyadej, SEP was first conceptualised four decades ago. It is a philosophy that stresses the Buddhist middle path as the overriding principle for appropriate conduct by the populace at all levels)Mongsawad, 2010(. The philosophy encompasses three principles, moderation, reasonableness and self-immunity, which are governed by two conditions, knowledge and morality. Kantabutra)2010(elaborated on those three principals and two conditions. For example, the moderation principle revolves around the idea of corporate survival via the middle path, without resorting to extreme behaviour. Within the principle of reasonableness, firms act reasonably if their actions are based on accumulated experience, self-awareness, foresight, empathy and compassion. Furthermore, within the principle of self-immunity, enterprises are protected against unpredictable and uncontrollable factors. The

condition of knowledge enables businesses to better understand the demands and expectations of their stakeholders, and morality refers to corporate responsibility, honesty, integrity, and trustworthiness, a characteristic crucial to long-term corporate sustainability (Jitsuchon, 2019).

Even though the SEP concept and practice is totally different to the traditional Anglo Saxon/US management approach which mainly focuses on (1) short-term performance rather than long-term performance, (2) some groups of stakeholder rather than all stakeholder groups, and (3) economic perspective rather than social and environmental impact (Mongsawad & Thongpakde, 2016), there is a similar idea in terms of outcome and goal between the SEP concept and the modern Anglo Saxon management concepts such as the triple bottom line concept (Elkington, 1997; Skouloudis, 2009) and the Rhineland capitalism theory (Avery, 2005). This is because their concept and theory also focused on sustainable development (Jitsuchon, 2019) so as to balance not only economic perspective but also social and environmental perspectives. Moreover, the concept and theory still pay attention to all stakeholders' demands as part of the broad society (Donaldson & Preston, 1995; Parmar *et al.*, 2010).

In more detail, the components of SEP are used and mentioned in the East within three elements and two conditions: the SEP practice is quite similar to business operational practice from the West, such as corporate social responsibility, triple bottom line, and corporate governance (Suttipun, 2019). For example, the reasonableness element of SEP practice is similar to the strategic plan element of the triple bottom line practice (Skoudis, 2009; Jitsuchon, 2019), while the self-immunity element is also similar to the risk management in corporate governance (Suttipun, 2018). Moreover, the moderation element and the knowledge and morality conditions of SEP practice are quite similar to the operational fairness of corporate social responsibility (Parmar *et al.*, 2010; Suttipun & Sittidat, 2016). Finally, both SEP practice in the East and corporate social responsibility, triple bottom line, and corporate governance from the West focus on long-term outcome and sustainable development (Elkington, 1997; Carrol & Bucholtz, 2006; Mongsawad & Thongpakde, 2016).

In 2006, the United Nations (UN) formally recognised the importance of SEP as a path to sustainable development (UNESCO, 2013), and the UN has also continued to advocate the implementation of SEP programs and practice in many countries around the world. Therefore, SEP is currently implemented not only in Thailand but also in other countries, particularly where Buddhism influences national culture and society, namely Bhutan, Nepal, Laos, and Timor-Leste (Noim Uddin *et al.*, 2006; Shone, 2014). For example, Bhutan's national philosophy has been developed from SEP (Noim Uddin *et al.*, 2006) and is focused on gross national happiness – which has many more dimensions than GDP – and calls for a multidimensional approach to sustainable development consisting of maintaining harmony, increasing happiness, and balancing economic, social, and environmental impacts. In Laos, an SEP approach has been adopted as the guideline for a national program of sustainable, stable, and balanced development (Shone, 2014) and the SEP approach in Laos also provides a rationale for decision makers (i.e., the government and senior management) looking to improve the country's development model.

As noted above, the adoption of SEP requires corporations to focus on long-term rather than short-term performance)Kantabutra, 2010(and emphasises long-term wealth creation

rather than myopic profit maximisation. Furthermore, corporate performance under SEP is based on the notion that the needs of all stakeholders are attended to, *i.e.* the needs of shareholders, investors, creditors, customers, employees, suppliers, competitors, society, communities and the environment. Thus, the demands of all stakeholders – not just those of the owners of financial resources – would be met by businesses practicing SEP. The philosophy also provides organisations with immunity from the results of uncontrollable events and the resilience to cope with new economic challenges.

Therefore, even though there has been no previous research reported about how putting SEP into practice influences performance measured by the BSC among SMEs in Thailand, some prior studies are relevant to the issues addressed in the present study. A number of previous studies finds a positive relationship between SEP practice and disclosure and financial performance (Pruetipibultham, 2010; Suriyankietkaew & Avery, 2016; Suttipun & Saefu, 2017; Suttipun, 2018). For example, Suttipun and Saefu (2017) and Suttipun (2018) both find that SEP disclosure has a positive relationship with financial performance as measured by the return on assets (ROA) of companies listed in the Stock Exchange of Thailand. Moreover, Suriyankietkaew and Avery (2016) reveal that there is a positive relationship between the sustainable development practice of Thai SMEs and their financial performance. As noted above, a positive relationship between SEP practice and firm performance can be explained by stakeholder theory because if businesses can satisfy all stakeholder demands, they derive benefits, such as an improved reputation, higher firm value, competitive advantage, and better financial performance (Cheng & Fan, 2010; Jitsuchon, 2019).

However, there are some reasons why SEP practice may have a negative or neutral effect on the performance of SMEs in Thailand. Firstly, putting SEP into practice may entail increased costs because it would involve an SME's management changing their strategies from those typical of Western business concepts to those more typical of Eastern philosophies. This may entail SMEs accepting lower levels of performance, particularly when measured in financial terms. Secondly, SEP is not a Western business philosophy, which generally focuses on maximising profit. Instead, SEP focuses on sustainable development and encourages firms to balance their economic, social, and environmental performance. On the other hand, the BSC is a primarily Western performance measurement model, which was not designed to evaluate Eastern management strategies, such as the SEP practice. Therefore, there may not be a relationship between SEP practice and performance measured by the BSC. Finally, although a number of studies investigated the influence of SEP practice and disclosure on financial performance, no previous studies reported a relationship between SEP practice and non-financial performance.

Therefore, so as to answer the research questions, the study tested five hypotheses relating to the five elements and conditions of SEP, the moderation, reasonableness, and self-immunity elements, and the knowledge and morality conditions. We present the hypotheses below:

H1: The SEP moderation element has a positive influence on performance of SMEs in Thailand as measured by the BSC.

H2: The SEP reasonableness element has a positive influence on the performance of SMEs in Thailand as measured by the BSC.

H3: The SEP self-immunity element has a positive influence on the performance of SMEs in Thailand as measured by the BSC.

H4: The SEP knowledge condition has a positive influence on the performance of SMEs in Thailand as measured by the BSC.

H5: The SEP morality condition has a positive influence on the performance of SMEs in Thailand as measured by the BSC.

MATERIAL AND METHODS

The population of this study was all SMEs located in Thailand (Revenue Department, 2018). SMEs in Thailand are defined by the Ministry of Industry (2019) as an enterprise that has either less than 200 employees or total assets of up to 200 million baht. There are two types of SMEs in Thailand which are small and medium-sized enterprises. On the one hand, a small enterprise is an enterprise with less than 50 people employed or with total assets of up to 50 million baht. On the other hand, a medium-sized enterprise is an enterprise that has from 50 to 200 employees or total assets of no less than 50 million baht and up to 200 million baht. However, definitions and types of SMEs differ between Thailand and other countries. While Thailand has the above types of SMEs, European countries divided their SMEs into three types, which consist of micro, small, and medium-sized enterprises (European Commission, 2019). SMEs in European countries are identified as enterprises that have less 250 employees. Moreover, SMEs should also have a turnover of up to 50 million EUR or total assets of no more than 43 million EUR (Williams *et al*., 2018). We used two steps in selecting the sample for this study: quota and simple random sampling. In the first step, the study set a quota of 600 SMEs in Thailand within four regions of Thailand (northern, north-eastern, central, and southern Thailand) with 150 SMEs from each region. In the second step, simple random sampling was used to select 150 SMEs in each of the four regions mentioned above. Therefore, the sample used in this study consisted of 600 SMEs.

A mailed questionnaire modified from prior related studies was used to collect data from the sample of SMEs, relating to the extent and level of SEP practice and corporate performance, as measured by the BSC (Suriyankietkaew & Avery, 2016; Williams *et al.*, 2018). The SEP practice within three elements and two conditions was operationalised and adopted from prior related studies from Suttipun (2018 and 2019) who investigated the extent and level of SEP reporting of listed companies (large firms) in Thailand. The questionnaire was divided into three parts: (1) general information regarding the respondent SME, (2) the SME's SEP practice, and (3) the SME's performance as measured by the BSC (Appendix). The independent variables used in this study were the five elements and conditions of SEP consisting of the moderation, reasonableness, and self-immunity elements and the knowledge and morality conditions (Suriyankietkaew & Avery, 2016; Suttipun, 2018), with performance as measured by the BSC as the dependent variable, which was further sub-divided into the five BSC perspectives, such as financial, customer, internal process, learning, and environmental (Hetthong, 2017; Plaisuan, 2015; Williams *et al.,* 2018). In terms of control variables, SMEs' characteristics consisting of firm size, firm type, and firm age were used in this study by adopting from prior related studies (Suriyankietkaew & Avery, 2016; Suttipun & Saefu, 2017). In firm size, there were two types of SMEs in Thailand – small and medium-sized enterprises – while firm type was divided by the personal type of SMEs: ordinary person and juristic person. On the one hand, an ordinary person includes sole proprietorship, group of persons, and ordinary partnership. On the

other hand, a juristic person includes limited partnership, a limited company, and a listed company (The Ministry of Industry, 2019). Finally, firm age was distinguished into two periods of less than 10 years and equal or more than 10 years. All the variables were measured by items in the questionnaire to which the participating SMEs responded on a five-point Likert scale (5 = the highest level, 4 = high level, 3 = moderate level, 2 = low level, and 1 = the lowest level), as summarised in Table 1.

Table 1. Variable measurement of Thai SMEs in 2019

Independent Variables	Notation	Measurement
Moderation element	MODER	Five-point Likert scale
Reasonableness element	REASO	Five-point Likert scale
Self-immunity element	SELF	Five-point Likert scale
Knowledge condition	KNOW	Five-point Likert scale
Morality condition	MORAL	Five-point Likert scale
Dependent Variable	Notation	Measurement
SMEs' performance	BSC	Five-point Likert scale
Control Variables	Notation	Measurement
Firm size	SIZE	Dummy variable that 1 = medium firm, and 0 = small firm
Firm type	TYPE	Dummy variable that 1 = ordinary person, and 0 = juristic person
Firm age	AGE	Dummy variable that 1 = less than 10 years, and 0 = more than 10 years

Note: 5 = the highest level, 4 = high level, 3 = moderate level, 2 = low level, and 1 = the lowest level.
Source: adapted from Suttipun, 2018; 2019; Williams *et al.*, 2018; Suriyankietkaew and Avery, 2016.

The interpretation of the responses to the second and third parts of the mailed questionnaire was based on the mean score of responses to the Likert-scale items interpreted on the rating scale shown below (Srisa-ard, 2010).

The average score of 1.00-1.50 defined as at the lowest level.

The average score of 1.51-2.50 defined as at a low level.

The average score of 2.51-3.50 defined as at a moderate level.

The average score of 3.51-4.50 defined as at a high level.

The average score of 4.51-5.00 defined as at the highest level.

The draft questionnaire was sent to five experts to review its reliability and to ensure that it fully covers all aspects of this study. The questionnaire was then revised based on the experts' suggestions and was then once again reviewed by the experts before being finalised and sent to the sample of SMEs. The questionnaire was tested to establish the Cronbach (1951) coefficient alpha that resulted in 0.880, which means that – as it is higher than 0.60 – it indicates the satisfactory reliability of the questionnaire. Moreover, we show the validity and reliability test results in Table 2 below.

The data derived from the questionnaire was firstly analysed by averaging the responses to each item across the 600 SMEs constituting the sample in order to assess the extent of their SEP practice and the level of performance as measured by the BSC. Next, correlation matrix was used to test for multicollinearity between the variables and, finally, multiple regression to test for the influence of SEP practice on performance as measured by the BSC. We used the following regression equation:

$$\text{BSC} = \beta 0 + \beta 1 \cdot \text{MODER} + \beta 2 \cdot \text{REASO} + \beta 3 \cdot \text{SELF} + \beta 4 \cdot \text{KNOW} + \\ + \beta 5 \cdot \text{MORAL} + \varepsilon \quad (1)$$

$$\text{BSC} = \beta 0 + \beta 1 \cdot \text{MODER} + \beta 2 \cdot \text{REASO} + \beta 3 \cdot \text{SELF} + \beta 4 \cdot \text{KNOW} + \\ + \beta 5 \cdot \text{MORAL} + \beta 6 \cdot \text{SIZE} + \beta 7 \cdot \text{TYPE} + \beta 8 \cdot \text{AGE} + \varepsilon \quad (2)$$

Table 2. Validity and reliability test of variables' used

No.	Variables	Item	Pearson Correlation-validity		Reliability
			Pearson (sig.)	Validity	
1.	Moderation element	MODER-A	0.927**	Valid	0.887
		MODER-B	0.880**	Valid	
		MODER-C	0.909**	Valid	
		MODER-D	0.895**	Valid	
2.	Reasonableness element	REASO-A	0.921**	Valid	0.883
		REASO-B	0.923**	Valid	
		REASO-C	0.866**	Valid	
		REASO-D	0.880**	Valid	
3.	Self-immunity element	SELF-A	0.835**	Valid	0.820
		SELF-B	0.868**	Valid	
		SELF-C	0.823**	Valid	
		SELF-D	0.856**	Valid	
4.	Knowledge condition	KNOW-A	0.827**	Valid	0.849
		KNOW-B	0.898**	Valid	
		KNOW-C	0.854**	Valid	
		KNOW-D	0.882**	Valid	
5.	Morality condition	MORAL-A	0.881**	Valid	0.830
		MORAL-B	0.912**	Valid	
		MORAL-C	0.896**	Valid	
		MORAL-D	0.818**	Valid	
6.	SMEs' performance	BSC-A	0.892**	Valid	0.886
		BSC-B	0.915**	Valid	
		BSC-C	0.868**	Valid	
		BSC-D	0.909*	Valid	
		BSC-E	0.854**	Valid	

**Significant at 0.01 level, and * significant at 0.05 level.
Source: own study.

Besides the main model, we conducted a sensitivity analysis using each of the perspectives of the BSC (financial, customer, internal process, learning, and environmental), which effected in the adoption of the following five additional regression equations:

$$\text{Finance} = \beta 0 + \beta 1 \cdot \text{MODER} + \beta 2 \cdot \text{REASO} + \beta 3 \cdot \text{SELF} + \beta 4 \cdot \text{KNOW} + \\ + \beta 5 \cdot \text{MORAL} + \varepsilon \quad (3)$$

$$\text{Customer} = \beta 0 + \beta 1 \cdot \text{MODER} + \beta 2 \cdot \text{REASO} + \beta 3 \cdot \text{SELF} + \beta 4 \cdot \text{KNOW} + \\ + \beta 5 \cdot \text{MORAL} + \varepsilon \quad (4)$$

$$\text{Internal process} = \beta 0 + \beta 1 \cdot \text{MODER} + \beta 2 \cdot \text{REASO} + \beta 3 \cdot \text{SELF} + \beta 4 \cdot \text{KNOW} \\ + \beta 5 \cdot \text{MORAL} + \varepsilon \quad (5)$$

$$\text{Learning} = \beta 0 + \beta 1 \cdot \text{MODER} + \beta 2 \cdot \text{REASO} + \beta 3 \cdot \text{SELF} + \beta 4 \cdot \text{KNOW} + \\ + \beta 5 \cdot \text{MORAL} + \varepsilon \quad (6)$$

$$\text{Environmental} = \beta 0 + \beta 1 \cdot \text{MODER} + \beta 2 \cdot \text{REASO} + \beta 3 \cdot \text{SELF} + \beta 4 \cdot \text{KNOW} + \\ + \beta 5 \cdot \text{MORAL} + \varepsilon \quad (7)$$

RESULTS AND DISCUSSION

Among the 600 SMEs that responded to the questionnaire, respondents were 527 males (87.83%), and 73 females (12.17%). Samples were collected from 150 firms (25.00%) from each of the four regions of Thailand (northern, north-eastern, central, and southern). In terms of firm size, there were 547 small firms (91.16%), while 53 were medium firms (8.84%). In terms of firm type, most common respondents were ordinary person – such as sole proprietorship, group of persons, or ordinary partnership – in the case of 553 firms (92.17%), while 47 firms (7.83%) were a juristic person, such as limited partnership, company limited, or company listed. Finally, the most common SMEs' age was below 10 years among 585 firms (97.50%), while 15 SMEs (2.50%) saw 10 or more years of operation.

When investigating the extent of the SEP practice and the level of performance measured by the BSC – based on the responses to the questionnaire – the study found that all elements and conditions of SEP were implemented at a high level, as shown in Table 3. As we can see in Table 3, the moderation element was the most common aspect of SEP practiced by the sample of SMEs, followed by the morality condition, the reasonableness element, the self-immunity element, and the knowledge condition. In terms of performance as measured by the BSC, the study found that the averages for each of the BSC perspective were also high.

Table 3. The level of SEP practice and performance measured by the BSC of SMEs in Thailand in 2019

SEP Practice	Min.	Max.	Mean	S.D.	Rank	Level
Moderation element	2.25	5.00	3.99	0.61	1	High
Reasonableness element	1.50	5.00	3.77	0.71	3	High
Self-immunity element	1.75	5.00	3.63	0.75	4	High
Knowledge condition	1.50	5.00	3.51	0.69	5	High
Morality condition	1.00	5.00	3.89	0.69	2	High
SMEs' Performance by BSC	Min.	Max.	Mean	S.D.	Rank	Level
Financial perspective	1.50	5.00	3.85	0.57	2	High
Customer perspective	1.00	5.00	3.84	0.62	3	High
Internal Process perspective	1.00	5.00	3.71	0.59	5	High
Learning perspective	1.00	5.00	3.78	0.66	4	High
Environmental perspective	2.00	5.00	3.93	0.62	1	High
Average BSC	2.20	5.00	3.82	0.51	–	High

Source: own elaboration of the study (n = 600).

Before conducting the multiple regression analysis, assumptions that the data was normally distributed and that there was no multicollinearity among the variables included in the analysis were first tested. Table 4 shows the correlation matrix used to test for multicollinearity among the six variables used in this study, consisting of one dependent variable and five independent variables. Based on a fixed effects model for panel testing, the variance inflation factor)VIF(of the correlation matrix among the var-

iables was 2.468, which indicates that there appeared no multicollinearity, which would be indicated by the VIF exceeding 10 (Gunno & Penawuthikul, 2018, Vanstraelen *et al.*, 2012). Moreover, the low coefficients in the correlation matrix between the variables used in the study indicated that multicollinearity was unlikely to be a problem in multiple regression (Suttipun, 2018). Based on the correlation coefficients among the six variables used in this study, there appeared significant positive correlations among BSC, MODER, REASO, SELF, KNOW, and MORAL at the 0.01 level.

Table 4. The correlation matrix of variables

Variables	BSC	MODER	REASO	SELF	KNOW	MORAL
BSC	1.000	–	–	–	–	–
MODER	0.595**	1.000	–	–	–	–
REASO	0.613**	0.671**	1.000	–	–	–
SELF	0.578**	0.566**	0.661**	1.000	–	–
KNOW	0.520**	0.435**	0.483**	0.494**	1.000	–
MORAL	0.644**	0.506**	0.503**	0.367**	0.431**	1.000
Mean	3.820	3.990	3.770	3.630	3.510	3.890
Standard Deviation	0.510	0.610	0.710	0.750	0.690	0.690
Variance Inflation Factor	–	2.055	2.468	1.985	1.495	1.512

**Significant at 0.01 level, and * significant at 0.05 level.
Source: owe study base on the research (n = 600).

Table 5 indicates the outcome of the multiple regression analysis testing the influence of the five elements and conditions of SEP (denoted as MODER, REASO, SELF, KNOW, and MORAL) on performance measured by the BSC for the sample of SMEs. The study result of model 1 showed that all the elements and conditions of SEP influenced performance as measured by the BSC at the 0.01 level. Therefore, all the hypothesis tested in this study were accepted. On the other model, the study also found the positive influence of each elements and conditions of SEP practice on SMEs' performance. However, by using control variables, even though there was a significant relationship between SIZE, TYPE, and the BSC at 0.05 level, while AGE had no influenced on the BSC at 0.05 level.

This result is consistent with prior studies of Nuttavuthisit (2005), Pruetipibultham (2010), Ekwueme *et al.* (2013), and Suriyankietkaew and Avery (2016), which all find a positive influence of SEP practice and disclosure on the performance of businesses, while the positive relationship between SEP practice and performance can be explained by stakeholder theory, since by satisfying stakeholder demands, businesses can derive benefits such as improved reputation, higher firm value, competitive advantage, and better performance (Donaldson & Preston, 1995; Cheng & Fan, 2010; Parmar *et al.*, 2010). For example, Ekwueme *et al.* (2013) show that customers tend to purchase products from businesses that care about the welfare of their customers while also contributing to the well-being of society, environment, sustainable development (Jitsuchon, 2019). Moreover, in terms of discussion by using empirical data from the previous related studies, Suriyankietkaew and Avery (2016) reveal that the SEP practice can influence the (sound) decision to increase firm profitability, competitive advantage, and sustainability. Therefore, many businesses in Thailand put SEP into practice to maximise customer loyalty and satisfying customers' demands. This study demonstrates that SEP is not only implemented in Thailand by large firms – as

discovered by Suttipun and Saefu (2017) and Suttipun (2018), who find positive relationships between SEP practice and disclosure – or corporate performance among companies listed on the Stock Exchange of Thailand, but that many SMEs also implement SEP as their management strategy. This is because the SEP practice can assist company management in making sound decisions, and it can increase corporate performance and lead to sustainable development (Pruetipibultham, 2010; Jitsuchon, 2019).

In model 2 of Table 5, by using a control variable, this study found that there is a positively significant relationship between firm size and SMEs performance. The result provides that medium-sized enterprises had higher performance measuring by balanced scorecard than small enterprises. The result of negative relationship between firm age and SMEs performance appears to stem from SMEs that operate longer than 10 years and have higher performance than younger firms. However, there was no relationship between firm type and SMEs performance measured by the BSC. This may be because there were only 47 firms that were either limited partnership, company limited, or company listed, while 553 SMEs firms were ordinary persons.

Table 5. Multiple regression models of Thai SMEs in 2019

Variables	Model 1		Model 2	
	B	t (sig.)	B	t (sig.)
-Constant-	1.049	10.787 (0.000**)	1.160	8.424 (0.000**)
MODER	0.123	3.997 (0.000**)	0.118	3.814 (0.000**)
REASO	0.089	3.037 (0.002**)	0.093	3.189 (0.002**)
SELF	0.145	5.829 (0.000**)	0.145	5.801 (0.000**)
KNOW	0.098	4.202 (0.000**)	0.105	4.445 (0.000**)
MORAL	0.276	11.802 (0.000**)	0.273	11.485 (0.000**)
SIZE	–	–	0.084	2.337 (0.028*)
TYPE	–	–	0.003	0.050 (0.960)
AGE	–	–	-0.182	-2.063 (0.040*)
R Square	0.594		0.597	
Adjust R Square	0.590		0.592	
F value (sig.)	179.720**		113.524**	

** Significant at 0.01 level, and * significant at 0.05 level.
Source: own study.

Table 6 shows the results of the sensitivity analysis that refers to the influence of SEP practice on performance, as measured by the BSC for each perspective of performance. The financial and internal process models indicate that MODER, SELF, KNOW, and MORAL had a positive and significant influence on the financial and internal process perspectives

of performance at the 0.01 level, while there was no relationship between REASO and the financial and internal process perspectives at the 0.05 level. On the other hand, in the customer and learning models, this study found that MODER, REASO, SELF, and MORAL had a positive influence on the customer and learning perspectives of performance at the 0.01 level, while no relationship appeared between KNOW and the customer and learning perspectives at the 0.05 level. Finally, for the learning model, the study found that all elements and conditions of SEP had a positive influence on the learning perspective of performance at either the 0.01 or 0.05 levels.

Table 6. Sensitivity analysis models of SMEs in Thailand in 2019

Variables	Financial		Customer		Internal		Learning		Environmental	
	B	t (sig.)	B	t (sig.)	B	t (sig.)	B	t (sig.)	B	t (sig.)
-Cons-	1.336	10.043**	0.853	6.311**	1.295	9.104**	0.657	4.481**	1.106	7.982**
MODER	0.132	3.142**	0.128	2.978**	0.101	2.240**	0.159	3.414**	0.097	2.199*
REASO	0.009	0.235	0.143	3.522**	0.027	0.629	0.138	3.143**	0.126	3.030**
SELF	0.154	4.544**	0.172	4.974**	0.119	3.277**	0.130	3.487**	0.148	4.193**
KNOW	0.090	2.803**	0.038	1.168	0.247	7.230**	0.079	2.227*	0.038	1.142
MORAL	0.276	8.632**	0.308	9.339**	0.158	4.608**	0.313	8.882**	0.330	9.903**
R square		0.390		0.476		0.349		0.450		0.438
Adj. R		0.385		0.472		0.344		0.445		0.433
F value		78.763**		111.666**		66.004**		100.437**		95.854**

**Significant at 0.01 level, and * significant at 0.05 level.
Source: own study.

CONCLUSIONS

Based on SMEs responses to the questionnaire, the study answers the research questions that both SMEs SEP practice and performance appeared at a high level, as measured by the BSC. Moreover, in regard to the elements and conditions of SEP, the moderation element was the most commonly practiced by the sample of SMEs, followed by the morality condition, the reasonableness condition, self-immunity elements, and the knowledge condition. Furthermore, based on the multiple regression analysis, the study found that all elements and conditions of SEP positively and significantly influence the performance of SMEs, as measured by the BSC. Finally, using control variables, the study found the significant relationship between firm size, firm age, and SMEs' performance.

In terms of its theoretical contribution, the finding of a positive influence of SEP practice on performance, as measured by the BSC, demonstrates that the stakeholder theory can be used to explain the fact that SMEs in Thailand implement SEP to satisfy stakeholder demands. The result also sheds light on how SMEs in an emerging economy use Eastern management strategies and what are their benefits, as measured by the BSC, which primarily is a Western method of performance measurement. Finally, the result of this study should encourage businesses in Thailand and elsewhere to adopt SEP as a practical corporate strategy, in the form created by His Majesty the King of Thailand, Bhumibhol Adulyadej.

In terms of practical contribution and implications, the finding of the positive influence of SEP practice on both financial and non-financial performance, as measured by the BSC,

should encourage businesses to adopt SEP as a means of contributing to sustainable development. Moreover, business owners and top management can use SEP as a practical management tool on which to operate businesses, instead of adopting Western management models. The finding of the positive influence of SEP practice on performance should also encourage multinational companies and firms in other countries to learn more about Eastern management practices – in this case, the SEP practice – to improve their overall performance by balancing the economic, social, and environmental perspectives.

There are some limitations to this study's findings. Firstly, the use of a mailed questionnaire must be mentioned as a limitation because it included only closed-ended and no open-ended questions. Therefore, the study could not provide an in-depth investigation of the reasons for the SMEs implementation of SEP practice in businesses. Secondly, the sample used was only 600 SMEs in Thailand, which can be viewed as a limitation of this study, because there were only 0.1% of all SMEs in Thailand that has around 600 000 firms. Next, data collection adopted from listed companies (large firms) in Thailand was limited because the context of SMEs may differ with large enterprises. Finally, even though the SEP concept and its practical application has already spread to other countries, the study focused only on Thailand. Therefore, based on the results of positive relationship of all elements and conditions of SEP practice and SMEs' performance measured by the BSC, in-depth interview to SMEs will be investigate how and why the SMEs would like to have the SEP concept into their operation. In addition, there will be comparative research into the other countries such as Bhutan, Nepal, Laos, and Timor-Leste where SEP concept has been used as business management practice. In order to small number of samples and mismatch questionnaire, the future study will develop an appropriate questionnaire to survey more number of Thai SMEs.

REFERENCES

Avery, G.C. (2005). *Leadership for sustainable futures: achieving success in a competitive world*. Cheltenham, UK: Edward Elgar.

Carrol, A., & Bucholtz, A.K. (2006). *Business and society: ethics and stakeholder management*. New York, USA: Thompson.

Cheng, L.H., & Fan, H.K. (2010). Drivers of environmental disclosure and stakeholder expectation: evidence from Taiwan. *Journal of Business Ethics*, *96*(3), 435-451.

Collier, P.M. (2008). Stakeholder accountability: a field study of the implementation of a governance improvement plan. *Accounting, Auditing & Accountability Journal*, *21*(7), 933-953.

Cronbach, L.J. (1951). Coefficient alpha and the internal structure of tests. *Psychometric*, *16*(2), 297-334.

Decharin, P. (2004). *Implementing balance scorecard (Edition 4).* Bangkok: Chulalongkorn University.

Deegan, C. (2002). Introduction: The legitimizing effect of social and environmental disclosures-a theoretical foundation. *Accounting, Auditing and Accountability Journal*, *15*(3), 282-311.

Donaldson, T., & Preston, L. (1995). The stakeholder theory of the corporation: concept, evidence, and implications. *Academic of Management Review*, *20*(1), 65-91.

Dutta, S., & Evrard, P. (1999). Information technology and organization within European small enterprises*. European Management Journal*, *17*(3), 239-251.

Ekwueme, C.M., Egbunike, C.F., & Onyali, C.I. (2013). Benefits of triple bottom line disclosures on corporate performance: an exploratory study of corporate stakeholders. *Journal of Management and Sustainability*, *3*(2), 201-230.

Elkington, J. (1997). *Cannibals with fork: the Triple Bottom Line of 21st Century business*. Capstone, Oxford.

European Commission. (2019*). Small and medium-sized enterprises (SMEs)*. Retrieved from ec.europa.eu on March 15, 2020.

Freeman, R.E. (1984). *Strategic management: a stakeholder approach*. Boston: Pitman.

Gray, R., Collison, D., & Bebbington, J. (1998). *Environmental and social accounting and reporting*. Dundee, UK: University of Dundee.

Garrison, R.H., Noreen, E.W., Brewer, P.C., Cheng, N.S., & Yuen, K.C. (2015). *Managerial Accounting Asia Global*. United State: McGraw-Hill Education.

Gunno, P., & Penawuthikul. P. (2018). Factors affecting disclosure quality on key audit matters in auditor's report in Thailand. *Journal of MCU Nakhondhat*, *5*(3), 926-942.

Hatetong, P. (2016). *The relationship between ownership structure, environment, and performance measurement of finance and non-finance* (Research Paper in National Conference of Walailak Research No. 4). Retrieved from www.research.wu.ac.th on May 25, 2019.

Jitsuchon, S. (2019). Thailand's sufficiency economy philosophy as an alternative path to sustainable development. *European Journal of Sustainable Development*, *8*(2), 191-200.

Joshi, P.L., & Gao, S.S. (2009). Multinational corporate social and environmental disclosures (CSED) on web sites. *International Journal of Commerce & Management*, *19*(1), 27-44.

Kantabutra, S. (2006). Relating vision-based leadership to sustainable business performance: a Thai perspective. *Kravis Leadership Institute Leadership Review*, *6*(1), 37-53.

Kantabutra, S. (2010). Philosophy of suffiency economy in business and sustainable development. *Human Resource Management by Sufficiency Economy Philosophy*, *17*(1), 143-185.

Kaplan, R.S., & Norton, D.P. (1992). The balanced socrecard-measures that drive performance. *Havard Business Review*, *70*(1), 72-82.

Kaplan, R.S., & Norton, D.P. (1996). *The balanced socrecard: translating strategy into action*. MA: Harvard Business Scholl Press.

Kulkalyuenyong, P. (2018). Strategies in building corporate enterpreneurship. *Journal of Humanities and Social Sciences Rajapruk University*, *4*(1), 1-11.

Mongsawad, P. (2010). The philosophy of the sufficiency economy: a contribution to the theory of development. *Asia-Pacific Development Journal*, *17*(1), 123-143.

Mongsawad, P., & Thongpakde, N. (2016). Sufficiency economy philosophy: a holistic approach to economic development and mainstream economic thought. *Asian Social Science*, *12*(7), 136-142.

Nuttavuthisit, K. (2005). *Applying sufficiency economy philosophy in business organizations: a case of Panda Jewelry* (unpublished paper). Sufficiency Economy Unit, Office of National Economic and Social Development Board, Thailand.

Noim Uddin, S., Taplin, R., & Yu, X. (2006). Energy, environment and development in Bhutan. *Renewable and Sustainable Energy Reviews*, *11*(3), 2083-2103.

Norreklit, K. (2000). The balance on the balanced scorecard: a critical analysis of some of its assumptions. *Management Accounting Research*, *11*(1), 65-88.

Office of SMEs Promotion (OSMEP). (2018). *SMEs Promotion Scheme Number 4* (2560-2564 B.C.) Retrieved from www.sme.go.th/th/download.php?modulekey=12 on March 10, 2019.

Organization for Economic Co-operation and Development (OECD). (2017). *Enhancing the Contributions of SMEs in a Global and Digitalized Economy*. Retrieved from www.oecd.org/mcm/documentsC-MIN-2018-EN.pdf on October 25, 2018.

Parmar, B.L., Freeman, R.E., Harrison, J.S., Wicks, A.C., Purnell, L., & De Colle, S. (2010). Stakeholder theory: the state of the art. *Academy of Management Annals*, *4*(1), 403-445.

Pruetipibultham, O. (2010). The sufficiency economy philosophy and strategic HRD: a sustainable development for Thailand. *Human Resource Development International*, *13*(1), 99-110.

Revenue Department. (2018). *SMEs Characteristics*. Retrieved from www.re.go.th on April 16, 2019.

Silpcharu, T. (2010). *Research and statistical analysis by SPSS (Edition 11)*. Bangkok: S.R. Printing Mass Product.

Shone, J.J. (2014, September). The sufficiency economy philosophy and its international role in sustainable development as seem in application in the SEP model villages of Laos and Timor-Leste. Paper presented at the *3rd MSSRC International Conference on Mekong Region and ASEAN in Transition: People and Tranborder*. Ubon Ratchathani, Thailand.

Skouloudis, K. (2009). Development of an evaluation methodology for triple bottom line reports using international standards on reporting. *Environmental Management*, *44*(2), 298-311.

Srisa-ard, B. (2010). *Introductory Research*. Bangkok: Suweeriyasarn.

Suriyankietkaew, S., & Avery, G. (2016). Sustainable leadership practices driving financial performance: empirical evidence from Thai SMEs. *Sustainability*, *8*(1), 1-14.

Suttipun, M. (2018). The influence of corporate governance, sufficiency economy philosophy reporting on corporate financial performance: evidence from Thailand. *Asia-Pacific Journal of Business Administration*, *10*(1), 79-99.

Suttipun, M. (2019). The longitudinal study of sufficiency economy philosophy reporting of listed companies in the Stock Exchange of Thailand. *Asia-Pacific Journal of Business Administration*, *11*(2), 187-206.

Suttipun, M., & Saefu, S. (2017). Investigation of sufficiency economy philosophy reporting in Thailand. *DLSU Business & Economics Review*, *26*(2), 53-65.

Suttipun, M., & Sittidate, N. (2016). Corporate social responsibility reporting and operation performance of listed companies in the Stock Exchange of Thailand. *Songklanakarin Journal of Social Sciences and Humanities*, *22*(1), 269-295.

Teeratanachaikul, K. (2010). Performance measurement by balance scorecards in software industry. *Srinakharinwirot Business Journal*, *2*(1), 135-147.

ThaiPat Institute. (2017). *The KPI's of Sustainable Development Reporting of Listed Company in the Stock Exchange of Thailand*. Retrieved from www.thaipat.org on October 3, 2017.

The Ministry of Industry. (2019). *Definition of SMEs in Thailand*. Retrieved from www.industry.go.th on September 10, 2019.

UNESCO. (2013). *Towards a Sufficiency Economy & New Ethical Paradigm for Development*. UNESCO, France.

Vanstraelen, A., Schelleman, C., Meuwissen, R., & Hofmann, I. (2012). The audit reporting debated seemingly intractable problems and solutions. *European Accounting Review*, *21*(2), 193-215.

Williams, R.I., Manley, S.C., Aaron, J.R., & Daniel, F. (2018). The relationship between a comprehensive strategic approach and small business performance. *Journal of Small Business Strategy*, *28*(2), 33.

Appendix: Questionnaire

The Influence of Sufficiency Economy Philosophy Practice on SMEs' Performance in Thailand

Section 1. **General information**

1. Gender ( ) Male ( ) Female
2. Work Position ( ) General Manager ( ) Specific Manager
   ( ) Owner ( ) other.....
3. Firm Location ( ) Northern Thailand ( ) Central Thailand
   ( ) North-Eastern Thailand ( ) Southern Thailand
4. Firm Size ( ) Small Enterprise (Total assets less than 50 million baht)
   ( ) Medium-Sized Enterprise (Total assets equal or more than 50 million baht)
5. Firm Type ( ) Ordinary Person (i.e. sole proprietorship, group of persons, ordinary partnership)
   ( ) Juristic Person (i.e. limited partnership, company limited, company listed)
6. Firm Age ( ) Less than 10 years ( ) 10 years or more

Section 2.

Table 1. SMEs' Sufficiency Economy Philosophy practice

The Sufficiency Economy Philosophy practice	Level				
	5	4	3	2	1
Moderation Element					
1. SME produces its product or service to serve the main target					
2. SME sets an appropriate price of product or service					
3. SME focus on long-term outcome rather than short-term outcome					
4. SME has business alliance with its stakeholders					
Reasonableness Element					
5. SME understands its business and competitive market					
6. SME sets its business plan including vision, mission, and goal					
7. SME assesses and compare its competitor's performance					
8. SME builds innovation or differentiate					
Self-immunity Element					
9. SME expands international and national markets					
10. SME assesses the future business risks					
11. SME has budgeting plan					
12. SME has the policy for customer retention and development					
Knowledge Condition					
13. SME has research and development for its product or service					
14. SME develops management information system					

The Sufficiency Economy Philosophy practice	Level				
	5	4	3	2	1
15. SME trains and develop its staff					
16. SME has an appropriate accounting system					
Morality Condition					
17. SME's operation is followed by good corporate governance					
18. SME keeps quality and customer secret well					
19. SME has social and environmental activity and spending					
20. SME promotes moral as its organisational culture					

Note: 5 = the highest level, 4 = high level, 3 = moderate level, 2 = low level, and 1 = the lowest level.
Source: own study.

Table 2. The SME's performance measured by the balanced scorecard

The SME's Performance	Level				
	5	4	3	2	1
Financial Perspective					
1. SME increases total revenue and operational profit continually					
2. SME can reduce an appropriate production costs					
3. SME has reasonable return of investment					
4. SME has financial performance following by its goal/budget					
Customer Perspective					
5. SME increases its market share continually					
6. SME can keep its customer retention well					
7. SME takes customers' feedback to improve its operation well					
8. SME surveys its customers' satisfaction continually					
Internal Process Perspective					
9. SME has product development and new service to serve its target					
10. SME can reduce operational time including error reduction					
11. SME has an efficiency internal management information development by using information technology					
12. SME can evaluate information for decision making on time					
Learning Perspective					
13. SME has program to develop and increase its human resources					
14. SME takes its staff feedback to develop its operation					
15. SME surveys its staff's satisfaction continually					
16. SME collects problems of human resource management well					
Environmental Perspective					
17. SME has an activity on environmental development					
18. SME is a good refuge of community and environment					
19. SME is a part of better society and environment					
20. SME can reduce any environmental pollution in community					

Note: 5 = the highest level, 4 = high level, 3 = moderate level, 2 = low level, and 1 = the lowest level.
Source: own study.

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The contribution share of authors is equal and amounted to 50% each of them.

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Intention to De-Internationalise: Foreign-Based Competition at Home and the Effect of Decision-Makers' Role

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ABSTRACT

Objective: The objective of the article is to investigate how decision-makers' perception of the level of foreign-based competition in the home market affects their intention to de-internationalise and how decision-makers' role moderates this relationship.

Research Design & Methods: A set of hypotheses is tested using regression analysis on a sample of 96 participants (entrepreneurs and managers) originating from Poland.

Findings: The results show that the perceived level of foreign-based competition in the home market is positively and significantly associated with the intention to de-internationalise. We find a statistically significant moderating effect of decision-makers' role. In the case of managers, the intention to de-internationalise increases with the level of perceived foreign-based competition in the home industry, while in the case of entrepreneurs the relationship is negative. Firm international exposure and international experience are negatively associated with the intention to de-internationalise.

Implications & Recommendations: The results indicate the role of individual cognition and home market context in the non-linear internationalisation process.

Contribution & Value Added: We demonstrate that the perception of the increased level of foreign-based competition in the home market and decision-makers' role should be considered with the Uppsala internationalisation process. The study findings draw attention to the nature of the manager-owner relationship, resonating with the agency theory in that the manager's self-interest is bounded by the reciprocal behaviour of the owner.

Article type: research article

Keywords: de-internationalisation; Uppsala model; decision-making

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INTRODUCTION

The internationalisation process is a complex and multidimensional phenomenon that continuously undergoes conceptual development (Kuivalainen, Saarenketo, Sundqvist, & McNaughton, 2012). It is explained through three main theoretical approaches: economic-rational, sequential/stage-based, and international entrepreneurial (Javalgi, Deligonul, Dixit, & Cavusgil, 2011). However, while extant theoretical explanations focus on understanding different patterns of international commitment and growth, none of them explicitly considers or theoretically incorporates the reverse phenomenon of de-internationalisation. This shortcoming sharply contrasts with the developing literature on nonlinear internationalisation (Vissak & Francioni, 2013). Therefore, the exploration of peculiarities of de-internationalisation is important, as it is considered to be a part of the complex process of internationalisation in general (e.g., Dominguez & Mayrhofer, 2017; Trąpczyński, 2016; Vissak & Francioni, 2013). However, despite the relative frequency of de-internationalisation, it remains underrepresented as a research topic in international business (Santangelo & Meyer, 2017; Vissak, 2010).

Defined as a reduction of a company's engagement in cross-border activities (Benito & Welch, 1997), de-internationalisation is characterised in terms of its sources, forms, and outcomes (Trąpczyński, 2016). Notwithstanding the theoretical advancement made by the prior studies, they examine de-internationalisation by employing a predominantly rational lens (e.g., Pedersen, Petersen, & Benito, 2002), while largely omitting the cognitive factors involved in this phenomenon, despite their theoretical and practical relevance (see Buckley, Devinney, & Louviere, 2007). This overemphasis on rationality in international business (IB) studies is criticised and considered a significant limitation to the development of the field (e.g., Buckley & Casson, 2019; Contractor, Foss, Kundu, & Lahiri, 2019). However, although individual-level cognition and cognitive biases were conceived and empirically tested in strategy, entrepreneurship, and psychology research, scholarship in the IB field remain relatively scant in this regard, which calls for more research. Moreover, existing approaches of internationalisation explain changes in international operations from the perspective of foreign markets, leaving the home market unexplored (for exceptions, see Bowen & Wiersema, 2005; Hutzschenreuter, Kleindienst, Groene, & Verbeke, 2014; Wiersema & Bowen, 2008). Therefore, although scholars provide a broad picture of de-internationalisation's antecedents, their primary focus remains on macro- and organisational-level factors in foreign markets, ignoring the potential individual-level drivers at home.

In this article, we propose that a suitable theoretical perspective for analysing de-internationalisation and its individual-level antecedents lies in the Uppsala model. There are several arguments behind this statement. First, the Uppsala model accounts for behavioural foundations of firm-level actions (Cyert & March, 1963). The model allows for the consideration of different responses by decision-makers to similar situation of uncertainty and their risk perception, which may result in de-internationalisation (Clarke & Liesch, 2017; Figueira-de-Lemos & Hadjikhani, 2014). In the original model, the incremental nature of foreign expansion is associated with the individual perception of uncertainty and risk-avoidance related to the lack of knowledge about foreign markets (Johanson & Vahlne, 1977). We argue that an analogous mechanism applies to uncertainty related to home-market competitive situations. Secondly, the Uppsala model is applicable to firms of different sizes

(SMEs, large firms, and multinationals; see Dow, Liesch, & Welch, 2018) and firms that originate from or operate in different institutional contexts, including emerging economies (e.g., Meyer, 2014). Finally, Vahlne and Johanson (2017) explicitly recognise the possibility of reduced commitment in the internationalisation trajectory.

The recognition of individual risk attitudes and home market perspective is important because it may contribute to a better understanding of the dynamics and complexity of the internationalisation process. Accordingly, in this article, we are interested in exploring two research questions:

1. How does decision-makers' perception of the level of foreign-based competition in the home market affect their intention to de-internationalise?
2. How does decision-makers' role (manager vs entrepreneur) affect this relationship?

For the purpose of this paper, we draw on the strategic decision-making and IB literature. We aim to contribute to the literature by empirically testing a conceptual model that explores individual cognitive framing of foreign-based competition in the home market, environmental hostility, and related intentions to de-internationalise, while simultaneously considering the decision-maker's role; a set of relationships never previously examined.

The remainder of this paper is structured as follows. The next section defines and reviews the de-internationalisation phenomenon – together with its antecedents – explores the role of decision-makers' cognition in the Uppsala model, and briefly reviews the existing research on the role of home market perspective in internationalisation. This review leads to the hypotheses formulation. The following section presents the methods employed to test the hypotheses and results from the analysis. The final section discusses the results and concludes.

LITERATURE REVIEW

De-Internationalisation and Its Antecedents

Existing approaches to internationalisation implicitly assume irreversible international growth (e.g., Luostarninen, 1988). Consequently, any firm beginning its foreign expansion is supposed to infinitely increase engagement in international operations, expanding to an increasing number of foreign markets and generating increasing revenues from foreign operations. However, more recently, researchers indicate that this process actually involves more irregularities than initially assumed (Benito & Welch, 1997; Fletcher, 2001; Kuivalainen *et al*., 2012), including both progressive and reversal activities (e.g., Dominguez & Mayrhofer 2017) and foreign market re-entry after previous exit (Vissak & Francioni, 2013).

Benito and Welch (1997) define de-internationalisation (DI) as "a voluntary or forced actions that reduce a company's engagement in or exposure to current cross-border activities" (p. 9). Several scholars underline the adaptive nature of de-internationalisation. According to Mellahi (2003), it is "a voluntary process of decreasing involvement in international operations in response to organisational decline at home or abroad, or as a means of enhancing corporate profitability under non-crisis conditions" (p. 151). Turner (2012) treats DI as a process of strategic change in terms of configuration employing coevolutionary theory. Vissak (2010) adds to the body of knowledge by conceptualising de-internationalisation as a complete or partial withdrawal from foreign markets and a reduction of the depth and

breadth of operations (Vissak, 2010, p. 565). More recently, Trąpczyński (2016) argues that de-internationalisation should be considered a "reduction of international operations along specific dimensions of a firm's internationalisation strategy, which may or may not lead to an overall lower international commitment" (p. 366). Consequently, de-internationalisation refers to the reduction of operating modes, the number of foreign markets (geographic diversification), product portfolio, the diversity of value chain activities, and the integration of international operations (Trąpczyński, 2016). However, reversal activities should not be analysed along these dimensions like progressive activities (Trąpczyński, 2016). The reason for this is that, from the international portfolio perspective (Swoboda *et al*., 2011), de-internationalisation decisions are considered in the context of an overall diversification strategy. Therefore, a complete or partial withdrawal from a foreign market may be a part of resource reallocation among company locations and is contingent upon the subsidiary's role, its integration level with the rest of the company, and the actual profitability and economic potential of particular markets. Moreover, Vissak and Francioni (2013) show that market withdrawal can be followed by re-internationalisation and, thus, it is not necessarily a sign of a failure but a frequent phenomenon in the case of project-based service firms motivated by low exit/re-entry costs. Indeed, due to the lower associated risk, de-internationalisation is more common for exporting firms than for those investing abroad (Pauwels & Matthyssens, 1999). Moreover, the likelihood of de-internationalisation differs across internationalisation stages and depends on international experience (Welch & Luostarinen, 1988). Consequently, de-internationalisation can be treated as an umbrella concept for other notions. The first is foreign divestment, as opposed to foreign direct investment (Iurkov & Benito, 2018). It is strictly related to partial or total withdrawal from a foreign market in terms of a reduced number of operations or the amount of resources committed. A related notion is mode downgrade (Benito & Welch, 1997; Swoboda *et al*., 2011), as it relates to a decreased commitment in foreign markets. Other empirical studies focus on export withdrawal/discontinuation (e.g., Matthyssens & Pauwels, 2000; Pauwels & Matthyssens, 1999), market exit (Sousa & Tan, 2015), and product exit (Rahu, 2015). Whereas divestment is applicable to multinational corporations – in terms of their subsidiaries' operations – export withdrawal may strictly refer to exporters.

Trąpczyński (2018) identifies that determinants of de-internationalisation decisions are reactive rather than proactive in nature and are generally attributed to poor performance in foreign markets. More broadly, Benito and Welch (1997) distinguish three broad groups of antecedents of de-internationalisation: (1) economic antecedents, which are rational responses to changes in the external environment (economic conditions, institutional context); (2) strategic management, which is associated with product lifecycle (DI as a strategic option in declining industries) and corporate portfolio perspective (resource reallocation between business units as part of overall international strategy); and (3) the internationalisation-management perspective, which underlines that DI can result from learning from experiences gained in foreign markets (e.g. failures) resulting in behavioural adjustment. These multiple antecedents of DI can be grouped at three levels: (1) the organisational level, (2) the industry or environmental level, and (3) the managerial level. The first, internal/organisational level, includes prior divestment or host country experience, the level of subsidiary's autonomy, the role of subsidiary, subsidiary and parent firm

size, ownership level, cultural distance between parent and foreign unit, the scope of markets served, firm productivity, product diversification level, corporate international strategy, performance decline, failed adaptation or positioning on the local market, and decreased foreign demand. The second group of factors includes economic crises, the level of environmental dynamism, market changes, and the level of foreign competition (import penetration in the local market). Moreover, scholars indicate the role of firm's experience in foreign markets (Tan & Sousa, 2019) and strategic misfit (Sousa & Tan, 2015) as possible DI determinants. Several studies also foreground institutional voids and uncertainty in foreign markets (Santangelo & Meyer 2011) – along with the lack of adaptability to norms in local markets (Bianchi & Ostale, 2006) – as factors that increase the likelihood of de-internationalisation. In the third group, among managerial-level antecedents, Trąpczyński (2016) identifies the threat of prospective losses and performance dissatisfaction. Taken together, the major shortcoming of prior studies on DI – as noted by Trąpczyński (2016) – is that they have not differentiated between active and reactive determinants. Moreover, the above analysis of antecedents indicates that there is a dearth of empirical studies that explore individual decision-making processes, which especially consider the perceived unfavourable situation in the domestic market.

The Uppsala Model and Decision-Makers' Cognition

The original Uppsala model (Johanson & Vahlne, 1977) builds on the behavioural theory of firm (Cyert & March, 1963). Its basic premise is that firms' internationalisation involves a series of incremental "adjustments to changing conditions of the firm and its environment" (Johanson & Vahlne, 1977, p. 26), which translate into a gradual increase of resource commitment in foreign markets. Further extensions of the Uppsala model began to more explicitly acknowledge the role of cognitive aspects of individual decision-makers in the internationalisation process. Among the first such studies was that of Calof and Beamish (1995), who explicitly recognise that the choice of less resource-intensive entry modes is driven by the change in individual managers' beliefs and attitudes in response to different stimuli in the external environment. In a later study, Figueira-de-Lemos and Hadjikhani (2014) explicitly recognise the relationship between decision-makers' risk perception and the contingency of de-internationalisation in the Uppsala model: "When coping with environmental dynamics commitment decisions entail choices and risk whose contingent nature may explain types of firm behaviour other than just the increase of commitment" (p. 332). Clarke and Liesch (2017) propose that firms change their international commitment by "changing the level of risk that they are willing to tolerate and/or their perceptions of the existing risk in the situation" (p. 924). On the individual level, the existing risk is assessed by the decision-maker according to his/her risk preferences – after comparison with the tolerable risk level – ultimately influencing commitment decisions. Other studies argue that foreign expansion is an evolutionary process with progression and reversal activities stemming from a sequence of decisions (Benito & Welch, 1997; Fletcher, 2001). Therefore, the Uppsala model "accommodates internationalisation, de-internationalisation, and even withdrawal from international operations" (Clarke & Liesch, 2017, p. 924).

In this vein, Vahlne and Johanson (2017) note that "a new resource position may be a reflection of reduced commitment, or of de-commitment, such as reducing diversification, leaving a market, and discontinuing a relationship."

Given the above, we seek the boundary conditions of the market-oriented model (Johanson & Vahlne, 1977, 1990, 2006) by incorporating the possibility that reversed foreign commitment stems from decision-makers' perception of external conditions. Our central proposition is that both the perceived level of foreign-based competition in the home market and the related hostility are subject to cognitive framing by individual decision-makers, leading to the organisation's adaptive behaviour. Thus, we consider two possible alternatives: defending the home market at the cost of foreign markets (i.e., decreased foreign commitment) or, conversely, reducing home market commitment to seek opportunities abroad (i.e., increased foreign commitment).

The Perceived Level of Foreign-Based Competition in the Home Market and Environmental Hostility as Drivers of the Intention to De-Internationalise

We recognise individual-level and industry-level factors as drivers of de-internationalisation decisions. In doing so, we consider individual intentions about foreign commitment as a response to the perceived level of foreign-based competition in the home market.

The question of how and why foreign-based competition in the home market affects foreign commitment requires one to refer to the predictions of the Uppsala model. That is, the model emphasises the relative importance of the home market as a benchmark for foreign activities.

In this vein, Hutzschenreuter *et al*. (2007) argue that internationalisation is a process of discretionary managerial decisions that allow a firm to allocate resources between home and foreign markets. Salomon and Shaver (2005) find that firm-level factors (e.g. investments in R&D and advertising) and macro-level factors (i.e. economic growth and exchange rates) simultaneously affect both export and domestic sales, but that they do so differently for foreign-owned and domestic firms. In the case of incumbents, they are complementary, so that strengths in the home market are leveraged abroad (by R&D expenditures) to increase foreign sales. In contrast, the Spanish market is considered in terms of market portfolio for foreign-owned firms, and therefore sales in this market and other international markets were found to be substitutes (i.e. sales in the Spanish market negatively affect export sales).

Therefore, we expect that decision-makers of exporting incumbent firms will prefer to defend their home market as the main source of revenues to prevent overall performance decline. Few studies empirically explore the incumbents' strategic choices as driven by the increased level of foreign-based competition in the home market. Scholars find that the incumbents respond by strengthening the focus on the domestic market while simultaneously lowering the focus on the foreign market (e.g., Driffield & Munday, 2000). Bowen and Wiersema (2005) show that increased foreign competition in the domestic market leads to the reduced diversification of business portfolio. The underlying mechanism is that the inflow of foreign competitors increases competitive intensity, resulting in price reductions, tighter margins, reduced organisational slack (Porter, 1980), and incumbents' reduced market share (Dunning, 2001). In this sense, the nature of competition as exerted by foreign-based companies "raises the cost of keeping scarce managerial attention directed at non-core activities" (Bowen & Wiersema, 2005, p. 1168). These "non-core activities" could reasonably be activities performed in foreign markets.

Three other studies have shown that different modes of market servicing (i.e. exports vs foreign direct investments) used by foreign entrants determine different responses of

incumbents, respectively reducing and increasing geographic scope (Wiersema & Bowen, 2008) and geographic diversification (Hutzschenreuter *et al*., 2014). Hutzschenreuter *et al*. (2014) apply a cognitive framing lens to find that firms' responses are consistent with prospect theory predictions.

The inflow of foreign competitors increases uncertainty, complexity, and efficiency pressures (Wiersema & Bowen, 2008), which could lead to the perception of environment as adverse. This requires a reference to the postulates of the Uppsala model, whereby firms' actions in foreign markets are explained within the tradition of the behavioural theory of the firm (BTF; Cyert & March, 1963). Among other things, the BTF predicts that goals are formed as expectations and "take the form of aspiration level rather than an imperative to 'maximize' or 'minimize'" (Cyert & March, 1963, p. 28). Ultimately, decision-makers compare actual organisational outcomes with aspiration levels (desired goals). Based on the perception of the difference between these two states, they make decisions that drive organisational actions. Realised goals reflect firms' actual performance in terms of profitability, sales, production level (Cyert & March, 1963), or market share (Baum, Rowley, Shipilov, & Chuang, 2005). Experienced actual performance below the aspiration level will motivate decision-makers to seek solutions. The rationale underlying this process is one of avoiding uncertainty by maintaining the existing procedures, which promote resistance to change. Therefore, a perception of the current market situation as adverse is likely to initiate risk-averse behaviour, which involves the application of known solutions.

This central assumption of the BTF about risk-averse responses to variation from expected outcomes is further developed by works on individual decision-making, which explore the role of decision-makers' interpretation of the issue/stimulating factor (issue framing or framing effect; Tversky & Kahneman, 1982) in organisational adaptation to external environment (Miles, Snow, Meyer, & Coleman, 1978; Thomas, Clark, & Gioia, 1993). In the context of de-internationalisation, Turcan (2003) and Turner (2012) formulate propositions with regard to the interaction between a stimulus in the external environment and discretionary actions via its managerial perception. Dutton and Jackson (1987) argue that any stimulus in the external environment is categorised by decision-makers in terms of threats or opportunities. The question that remains is how they actually categorise and react to increased domestic market penetration by foreign firms.

Following March and Shapira (1987), we argue that although decision-makers operate under conditions of uncertainty, their choices can be considered close to situations of risk management, because they estimate that one of the alternative solutions they consider will be more likely than others to lead to a 'success' (achievement of desired goal). Growing risk increases variation from desired goals (performance outcomes). Increasing resource commitment abroad will increase the likelihood of domestic firms' exposure to risk associated with not surviving the competition at home (i.e. the perceived hostility of the home market; see Santangelo & Meyer, 2017). In line with the predictions of the BTF, we expect that when decision-makers are faced with an increased level of foreign-based competition in the home market, they will perceive it as a threat to the performance of their exporting firms and will be motivated to seek solutions that could help to improve the situation by applying existing well-known organisational rules. In other words, given that internationalisation is a risky activity (Shrader,

Oviatt, & McDougall, 2000), they will likely avoid uncertainty and make risk-averse decisions. Accordingly, as we associate risk-averse choices with reduced foreign commitment, we expect that the most likely reaction to increased foreign-based competition at home will be a high intention to de-internationalise. Therefore:

H1: Decision-makers' intention to de-internationalise is positively associated with:

(a) the perceived level of foreign-based competition in the home market;

(b) the perceived level of environmental hostility in the domestic market.

The Moderating Effect of Decision-Makers' Role

We expect that the decision-maker's role (entrepreneur vs manager) moderates the above relationships. Supporting arguments come from several streams of literature. Studies in entrepreneurship usually attribute a higher risk-taking propensity to entrepreneurs than to non-entrepreneurs (e.g. managers; see the meta-analytic study by Stewart & Roth, 2001). For instance, entrepreneurs were found to reveal more positive attitudes towards uncertainty compared to non-entrepreneurs (Palich & Bagby, 1995). Other studies attribute the source to entrepreneurial overconfidence and greater proneness to (positive) cognitive biases (Simon & Shrader, 2012).

A related plausible explanation of the nature of the relationship between the investigated constructs is the mechanism of performance-reducing threat as proposed by Kahneman and Tversky (1979) in their prospect theory. Its main argument is that individuals are risk-averse in the domain of gains and risk-seeking in the domain of losses due to the framing effect (i.e. anticipated losses). The prospect theory predicts the "loss aversion" of decision-makers and assumes that when a situation is framed by an individual as a likely loss, it will evoke a risk-seeking attitude. Consequently, decision-makers are motivated to "escape" from the space of losses and seek likely gains. It is most likely that decision-makers will generally perceive any action associated with deepening foreign expansion as a risky activity, because of its uncertain effects (Johanson & Vahlne, 1977) as compared to the *status quo*. However, because Kahneman and Tversky (1979) overtly note that entrepreneurs, are "likely to accept gambles that would be unacceptable otherwise" (pp. 286-287), we posit that, compared to managers, entrepreneurs will respond with a more risk-seeking attitude to increased foreign-based competition and home market hostility through a lower intention to de-internationalise. In this vein, Kiss, Williams, and Houghton (2013) show that entrepreneurs perceive less risk in international activities about opportunities abroad.

Moreover, many believe that decisions related to the internationalisation process differ depending on the role played in the company by the focal person, meaning that entrepreneurs respond differently to the external environment than managers. This is because managers, when making a decision like whether to retract resources from foreign markets, consider the 'psychological contract' between themselves and the owners by whom they were hired and refer to the reward systems in their organisations (Cameron & Quinn, 1988). A complementary view is provided by empirical studies in strategy, which tend to show that managers have a systematic aversion to risk due to uncertainty (e.g. Zahra, 1996). In contrast, Chittoor, Aulakh, and Ray (2019) find that the owner-CEO facilitates the firm's exploratory (risky) international activities. Hence:

H2: The positive relationship between the intention to de-internationalise and:

(a) the perceived level of foreign-based competition in the home market;

(b) the perceived level of environmental hostility is moderated by the decision maker's role, such that the relationship is stronger in the case of managers than in the case of entrepreneurs.

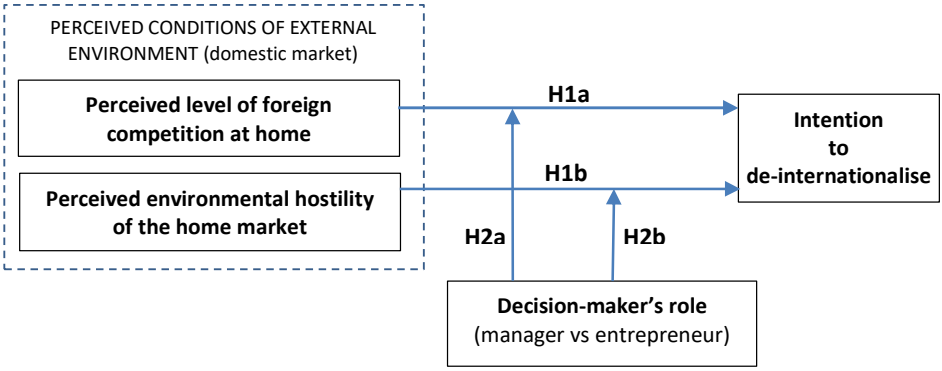

Figure 1. Conceptual framework
Source: own elaboration.

MATERIAL AND METHODS

Data and sample

The data for this study come from a 2018 survey of Polish firms (CATI method; usable sample: 96 respondents) and form a part of a larger project funded by a grant from the Polish National Science Centre (grant no. DEC-2017/01/X/HS4/01015). We applied purposive sampling, as we were solely interested in exporting companies with the majority of Polish capital (at least 51%; subsidiaries of MNCs were excluded). Our focus was on internationalised companies; thus, as another criterion we adopted companies that obtain at least 10% of their total revenues from sales in international markets (i.e. >= 10% FSTS). Similarly to other countries (e.g. Miocevic & Morgan, 2018), for companies registered in Poland with the majority of Polish capital, exporting remained the most popular form of international engagement in 2016, and 99.1% of all firms conducting outward international activities were exporters (Cieślik, 2019). The firms in our sample operated in all type of industries according to NACE classification. The data were collected using the Bisnode database (including a database of Dun & Bradstreet) of randomly selected firms registered in Poland, from decision-makers responsible for internationalisation, including 50 entrepreneurs/managing owners of their companies and 46 managers. The characteristics of the sample and characteristics of the subgroups based on the respondents' role (managers and entrepreneurs) who represent the companies in the study are presented in Table 1.

Firms represented by managers and entrepreneurs differ in terms of size, age, international exposure, and industry. Considering the characteristics of individual respondents, there is a higher representation of women among managers (41%) than among entrepreneurs (18%). The amount of prior individual international experience – resulting from work

and study abroad – is about half a year in both groups (i.e. managers and entrepreneurs). In our analyses, we decided to control for these effects, which we further elaborate in the "Measures" section, in the paragraph that discusses control variables.

Table 1. Characteristics of the sample

Variable	Descriptive statistics	N=96	N=46 (Managers)	N=50 (Entrepreneurs)
% of female respondents	n/a	29%	41%	18%
Respondent's international experience (cumulative years of study and work abroad)	Mean	0.52	0.48	0.56
	Std. dev.	1.34	1.26	1.43
Firm size (no. of employees)	Mean	233.54	473.11	13.14
	Std. dev.	324.33	330.57	11.91
Firm age	Mean	18.30	31.24	6.40
	Std. dev.	16.43	15.35	2.28
Firm international exposure (Foreign sales to total sales, as %)	Mean	22.52	29.56	16.04
	Std. dev.	17.85	22.47	8.03
% of firms operating in manufacturing industries	n/a	71%	87%	56%

Source: own study.

To ensure that the data came from our target decision-makers, we applied an ex-post check for respondent competency (Morgan, Katsikeas, & Vorhies, 2012).

Measures

Dependent variable. Considering that the construct of de-internationalisation is multidimensional and has no clear definition (Trąpczyński, 2016), we decided to design the scale drawing from the literature. Similarly to Calof and Beamish (1995), we defined de-internationalisation (DI) as broadly as possible and followed the logic of the extent of a firm's actual outward activities. DI involves three dimensions: overall involvement abroad vs in the home market, the scope of market offer, and resource commitment in foreign markets vs domestic market. Relying on Liu, Li, and Xue's (2011) scale of the internationalisation of companies from emerging markets, we developed opposite meanings compared to the original scale and adapted it respectively. The respondents were asked to indicate on a seven-point scale the extent to which they agreed with three statements (see Table 1). The exploratory factor analysis indicated that the items' loadings were between 0.813 and 0.937 (see Table 1). The construct reliability does not raise concerns, as indicated by Cronbach's alpha (0.821).

Independent variables. The domination of foreign-based competitors in the home industry was operationalised as one self-reported statement ("our home industry is dominated by foreign competitors") measured on a seven-point Likert scale. The environmental hostility of the home industry was adapted from Martin and Rialp (2013; Cronbach's α=0.60). The respondents were asked to indicate on a seven-point scale the extent to which they agreed with three statements (see Table 1). The construct has a Cronbach's alpha of 0.60, which is satisfactory in exploratory studies (Nunnally, 1978). The decision-

maker's role was operationalised as a binary variable, differentiating between managers (value "0") and entrepreneurs (value "1").

Control variables. We controlled for the possible effect of four variables for the dependent variable. The first of the variables was firm international experience, i.e. years a focal firm has served foreign markets; we extracted the year when the company began exporting from the year of data collection, i.e. in 2018. Taking into account that for the intention to de-internationalise, firm international experience is more relevant than firm age alone, not to mention the fact that these two variables were significantly and highly correlated ($p<0.001$; Pearson's correlation equal to 0.82), we decided to keep only the firm's international experience so as to avoid multicollinearity issues. The second control variable was firm international exposure (foreign sales to total sales ratio, FSTS) because we expected that incumbents whose performance depends largely on foreign buyers would be less likely to be concerned with their peer foreign rivals in the home market. Thirdly, we controlled for industry type. Since firms in the sample derive from different industries, we wanted to target those that operate in industries with different levels of foreign-based competition. Eventually, we used dummy variables to discriminate between service and manufacturing industries. The fourth control variable was firm size (the number of employees). The reason for that was that the incumbent's organisational size in terms of employees, which correlates with the amount of organisational slack and equity, will likely weaken the significance and perceived threat stemming from foreign competition. Table 2 summarises the operationalisation of variables, while correlations and descriptive statistics for all variables are shown in Table 3.

Table 2. Measurement and validity assessment

Variables	Loadings
Intention to de-internationalise (DI) (Cronbach's α=0.82)	
Concentrate on domestic market, while simultaneously decreasing involvement in currently served foreign markets	0.824
Widen domestic market offer (introduce new products/services), while simultaneously limiting market offer on foreign markets	0.813
Limit resource commitment on foreign markets and allocate freed-up resources domestically	0.937
Environmental hostility (EH) (Cronbach's α=0.60)	
The external environment in which we operate generates numerous threats	0.556
There are very few marketing opportunities and investment in the external environment in which we operate	0.838
Our firm's initiatives count for very little against intensive competition	0.810
Domination of foreign-based competitors in the home industry (FC)	n/a
Firm international experience (current year – first year of exporting)	n/a
Firm international exposure (FSTS in %)	n/a
Decision-maker's role (DMR) (managers vs entrepreneurs)	n/a
Firm size (number of employees)	n/a
Industry type (service vs manufacturing)	n/a
Decision-maker's gender (male vs female)	n/a

Source: own study.

Table 3. Correlations and descriptive statistics

Variables	1	2	3	4	5	6	7
De-internationalisation	1						
Foreign competition (FC; Home industry dominated by foreign competitors)	0.252*	1					
Environmental hostility (EH)	0.229*	0.222*	1				
Firm int. exposure (FSTS)	-0.448**	-0.133	-0.150	1			
Firm int. experience	-0.366**	-0.172	-0.315**	0.386**	1		
Firm size	-0.208*	-0.251*	-0.281**	0.193	0.592**	1	
Industry	-0.116	-0.098	-0.235*	0.286**	0.368**	0.186	1
Mean	2.71	3.77	3.62	22.52	12.92	233.54	0.71
Median	3.00	4.00	3.67	16.50	7.50	40.00	1.00
SD	0.94	1.51	0.92	17.85	10.88	324.33	0.46
Range (min-max)	(1-7)	(1-7)	(1.33-6.33)	10.00-85.00	1-48	2-2000	0-1

Note: Correlation is significant: ** at the 0.01 level (2-tailed); * at the 0.05 level (2-tailed).
Source: own study.

RESULTS AND DISCUSSION

To test the proposed set of hypotheses (Figure 1), we performed a linear regression analysis using SPSS 25.0. We considered the main effects model (Model 1, Table 4) and the full model, including the interaction effects (Model 2, Table 4).

Model 1 is statistically significant (F=4.426, p<0.001). The perceived level of foreign-based competition in the home market is positively and significantly associated with the intention to de-internationalise (p=0.088), thus supporting H1a. The relationship between the perceived level of environmental hostility and the intention to de-internationalise was positive but not significant (p=0.298), which does not support H1b. Model 2, which includes the moderation effects, is statistically significant (F=4.337, p<0.001). The moderating effect of the decision-maker's role in the relationship between intention to de-internationalise and the perceived level of environmental hostility was not supported, which rejects H2b. However, there is a statistically significant (p=0.016) moderating effect of the decision-maker's role and perceived foreign-based competition in the home industry on the intention to de-internationalise, which supports H2a. In the case of managers, the intention to de-internationalise increases with the level of perceived foreign-based competition in the home industry, while in the case of entrepreneurs the relationship is negative. The moderating effect is illustrated in Figure 2. The inclusion of moderating effects in Model 2 statistically significantly increased the explanatory power of the model captured by the change in R-squared (Change in R-Squared is 4.9%; p<0.05; Cohen & Cohen, 1983). Our full model explains 33.8% of the variance of the dependent variable. This value in the management field is usually viewed as acceptable. The explanatory power of the statistical model – as captured by *adjusted R-squared* – is medium. Among the control variables, firm international exposure (p=0.001) and firm international experience (p=0.098) appeared to be significant predictors of the dependent variable, negatively associated with the intention to de-internationalise.

Table 4. OLS regression results (intention to de-internationalisation as a dependent variable)

Variable	Model 1	Model 2	VIF
Foreign competition (FC)	**0.164 †** *(0.059)*	0.095 (0.061)	1.228
Environmental hostility (EH)	0.108 (0.106)	0.174 (0.108)	1.430
Decision-maker's role (DMR)	-0.025 (0.333)	0.008 (0.327)	3.898
EH x DMR		0.092 (0.101)	1.158
FC x DMR		**-0.236*** (0.094)	1.185
Firm int. experience (years)	**-0.245†** *(0.013)*	**-0.241†** (0.012)	2.669
Firm int. exposure (FSTS)	**-0.362**** (0.005)	**-0.344**** (0.005)	1.278
Firm size	0.043 (0.000)	0.087 (0.000)	2.214
Industry	0.104 (0.207)	0.144 (0.206)	1.280
Decision-maker's gender	0.007 (0.197)	0.044 (0.195)	1.145
R-Squared	0.289	0.338	
Adj. R-Squared	0.224	0.260	
F	4.426***	4.337***	
Change in R-Squared		0.049	
F-change		3.119*	

Notes: Cell entries are standardised regression coefficients. Standard errors shown in parentheses.
†p<0.10; *p<0.05; **p<0.01; ***p<0.001
Source: own study.

While the majority of the literature on internationalisation implicitly assumed irreversible international commitment and growth, the reverse process remained an underexplored area. To address this gap, the present study explored the drivers of de-internationalisation. In doing so, we focused on the effects of perceived foreign competition at home and the decision-maker's role. Specifically, against the backdrop of the predominant conceptualisation of de-internationalisation based on rational/economic premises and explained at either the macro/industry or organisational level, this article sought to explore the relationship between decision-makers' cognition and intentions to de-internationalise.

Overall, the results highlight that the perceived high level of foreign-based competition in the home market can be considered a driver for de-internationalisation. Our findings support what other scholars conceptualised: that the individual perception of the external environment is crucial to understand decisions to decrease resource commitment abroad (e.g. Calof & Beamish, 1995; Clarke & Liesch, 2017). We postulate that the level of foreign-based competition in the home market constitutes an external stimulus of the organisation's adaptive behaviour.

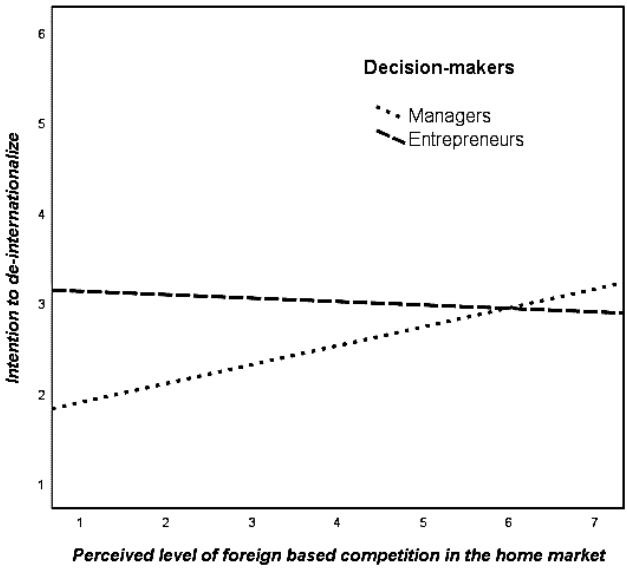

Figure 2. The moderating effect of decision-makers' role
Source: own elaboration.

However, the results do not consistently support the claim that this effect is explained by the framing of this issue as a threat by individual decision-makers, as environmental hostility proved to be an insignificant predictor of the dependent variable (see H1b and H2b), thus calling for further research. In line with prior studies (Trąpczyński, 2016), our results also suggest that the intention to de-internationalise – as affected by the increased foreign-based competition – can be reduced by international experience and exposure.

In a sense, our results echo Bowen and Wiersema's (2005) and Hutzschenreuter *et al*.'s (2014) studies. The former authors indicate the home market perspective's effect on the company's diversification extent. The latter study found that when domestic incumbents (multinationals) face increased import-based foreign competition in their home market, they apply a sure-gains approach by reducing their FDI. This suggests that, as in our study, managers perceive increased foreign competition as a critical threat. However, the limitation of their study is that it considers only multinationals.

In line with our expectations, the moderation effect tested in Model 2 revealed that managers are more risk-averse than entrepreneurs. We can speculate that our results may be biased, since entrepreneurs in our sample are unique, as we considered only strongly internationalised SMEs (FSTS >= 10%). This may suggest that entrepreneurs in our sample are more risk-prone than their non-internationalised peers.

CONCLUSIONS

Our study seeks to contribute to the internationalisation literature in general and the Uppsala model in particular. The results indicate the role of individual cognition in de-internationalisation phenomenon. In response to calls to extend research on individual-level

factors in IB (e.g. Hutzenschreuter *et al*., 2007), we show that decision-makers' cognition and cognitive biases – along with their role in the organisation – are basic elements when in the de-internationalisation phenomenon. Consistent with behavioural theory, our results indicate the greater risk-aversion of managers in their response to external stimuli as compared to entrepreneurs. Moreover, our study indicates the decision-maker's role and draws attention to the nature of the manager-owner relationship, resonating with the agency theory in that the manager's self-interest is bounded by the reciprocal behaviour of the owner (Bosse & Phillips, 2014). In this sense, we believe that our study contributes to the emerging literature on microfoundations and behavioural strategy in IB (Buckley & Casson, 2019; Contractor *et al*., 2019). We also highlight the role of the home market perspective in the internationalisation process. In this respect, our results are consistent with literature on the effect of the home market on internationalisation strategy (Bowen & Wiersema, 2005; Hutzschenreuter *et al*., 2014; Wiersema & Bowen, 2008).

This study has several limitations. First, it focused on a single emerging home country, which may come at the expense of external validity. Second, while we concentrated on the home market perspective only, future studies could also take into account the foreign market(s) perspective. Because internationalisation decisions are made in a concrete context, we note that decisions about increasing and decreasing foreign commitment should be explored in conjunction. In other words, it is reasonable to expect that the contexts of both home and host markets interplay, being subject to individual perception and affecting ultimate decisions. The third limitation relates to the construct of de-internationalisation used in this study. As our sample involved only exporting companies, we considered a narrow view of de-internationalisation (i.e. resource decommitment). Therefore, we suggest that future studies should incorporate more DI dimensions, as proposed by Trąpczyński (2016). Fourthly, the operationalisation of foreign-based competition is not perfect. The domination of foreign players in an industry may not necessarily reflect the intensity of competition that the studied companies experience. Therefore, we suggest that more robust measures of foreign-based competition should be used in future studies. We also believe that distinguishing between environmental hostility in domestic and foreign markets would enrich the value of the future research. Finally, it is worth noting that results of this study should be considered in terms of an interesting IB-related theoretical phenomenon rather than ultimate findings; i.e. the explanatory power of the statistical model as captured by adjusted R-squared is medium.

We believe that additional research is needed in order to better understand the nature of de-internationalisation. Specifically, we suggest that future studies could also incorporate the effect of resource slack apart from firm size. Another issue for further research concerns foreign competition entry mode, which may affect the response of incumbent firms. Lastly, we believe that to improve external validity, future studies could examine DI decisions by controlling for the type of industry, which relates to different requirements with regard to investment levels (i.e. less vs more capital-intensive industries) and, thus, affects incumbents' foreign market entry mode choices. It is our hope that our exploratory study, despite its limitations, will lay the groundwork for future avenues of deepened research.

REFERENCES

Baum, J.A.C., Rowley, T.J., Shipilov, A.V., & Chuang, Y.-T. (2005). Dancing with Strangers: Aspiration Performance and the Search for Underwriting Syndicate Partners. *Administrative Science Quarterly*, *50*(4), 536-575.

Benito, G., & Welch, L. (1997). De-Internationalisation. *Management International Review*, *37*, 7-25.

Bianchi, C.C., & Ostale, E. (2006). Lessons learned from unsuccessful internationalisation attempts: Examples of multinational retailers in Chile. *Journal of Business Research*, *59*(1), 140-147.

Bosse, D.A., & Phillips, R.A. (2014). Agency Theory and Bounded Self-Interest. *Academy of Management Review*, *41*(2), 276-297.

Bowen, H.P., & Wiersema, M.F. (2005). Foreign-based competition and corporate diversification strategy. *Strategic Management Journal*, *26*(12), 1153-1171.

Buckley, P., & Casson, M. (2019). Decision-making in international business. *Journal of International Business Studies*.

Buckley, P.J., Devinney, T.M., & Louviere, J.J. (2007). Do managers behave the way theory suggests? A choice-theoretic examination of foreign direct investment location decision-making. *Journal of International Business Studies*, *38*(7), 1069-1094.

Busenitz, L.W., & Barney, J.B. (1997). Differences between entrepreneurs and managers in large organizations: Biases and heuristics in strategic decision-making. *Journal of Business Venturing*, *12*(1), 9-30.

Calof, J.L., & Beamish, P.W. (1995). Adapting to foreign markets: Explaining internationalisation. *International Business Review*, *4*(2), 115-131.

Cameron, K.S., & Quinn, R.E. (1988). Organizational paradox and transformation. In *Paradox and transformation: Toward a theory of change in organization and management* (pp. 1-18). New York, US: Ballinger Publishing Co/Harper & Row Publishers.

Cerrato, D., Crosato, L., & Depperu, D. (2016). Archetypes of SME internationalisation: A configurational approach. *International Business Review*, *25*(1, Part B), 286-295.

Chittoor, R., Aulakh, P.S., & Ray, S. (2019). Microfoundations of firm internationalisation: The owner CEO effect. *Global Strategy Journal*, *9*(1), 42-65.

Cieślik, J. (2019). *Zaangażowanie międzynarodowe polskich przedsiębiorstw*. Warszawa: Wydawnictwo Akademii Leona Koźmińskiego.

Clarke, J.E., & Liesch, P.W. (2017). Wait-and-see strategy: Risk management in the internationalisation process model. *Journal of International Business Studies*, *48*(8), 923-940.

Cohen, J., & Cohen, P. (1983). *Applied Multiple Regression/Correlation Analysis for the Behavioural Sciences*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Contractor, F., Foss, N.J., Kundu, S., & Lahiri, S. (2019). Viewing global strategy through a microfoundations lens. *Global Strategy Journal*, *9*(1), 3-18.

Cyert, R., & March, J. (1963). *A Behavioural Theory of the Firm*. Englewood Cliffs: Prentice Hall.

Dew, N., Read, S., Sarasvathy, S.D., & Wiltbank, R. (2008). Outlines of a behavioural theory of the entrepreneurial firm. *A Retrospective Look at a Behavioural Theory of the Firm*, *66*(1), 37-59.

Dominguez, N., & Mayrhofer, U. (2017). Internationalisation stages of traditional SMEs: Increasing, decreasing and re-increasing commitment to foreign markets. *International Business Review*, *26*(6), 1051-1063.

Dow, D., Liesch, P., & Welch, L. (2018). Inertia and Managerial Intentionality: Extending the Uppsala Model. *Management International Review*, *58*(3), 465-493.

Driffield, N., & Munday, M. (2000). Industrial Performance, Agglomeration, and Foreign Manufacturing Investment in the UK. *Journal of International Business Studies*, *31*(1), 21-37.

Dunning, J.H. (2001). The Eclectic (OLI) Paradigm of International Production: Past, Present and Future. *International Journal of the Economics of Business*, *8*(2), 173-190.

Dutton, J.E., & Jackson, S.E. (1987). Categorizing Strategic Issues: Links to Organizational Action. *Academy of Management Review*, *12*(1), 76-90.

Figueira-de-Lemos, F., & Hadjikhani, A. (2014). Internationalisation processes in stable and unstable market conditions: Towards a model of commitment decisions in dynamic environments. *Journal of World Business*, *49*(3), 332-349.

Fletcher, R. (2001). A holistic approach to internationalisation. *International Business Review*, *10*(1), 25-49.

Hutzschenreuter, T., Kleindienst, I., Groene, F., & Verbeke, A. (2014). Corporate strategic responses to foreign entry: insights from prospect theory. *Multinational Business Review*, *22*(3), 294-323.

Hutzschenreuter, T., Pedersen, T., & Volberda, H. W. (2007). The role of path dependency and managerial intentionality: a perspective on international business research. *Journal of International Business Studies*, *38*(7), 1055-1068.

Iurkov, V., & Benito, G. (2018). Change in domestic network centrality, uncertainty, and the foreign divestment decisions of firms. *Journal of International Business Studies* https://doi.org/10.1057/s41267-018-0194-0

Javalgi, R., Deligonul, S., Dixit, A., & Cavusgil, S.T. (2011). International Market Reentry: A Review and Research Framework. *International Business Review*, *20*(4), 377-393.

Johanson, J., & Vahlne, J. (2013). The Uppsala model on evolution of the multinational business enterprise – from internalization to coordination of networks. *International Marketing Review*, *30*(3), 189-210.

Johanson, J., & Vahlne, J.-E. (1977). The Internationalisation Process of the Firm – A Model of Knowledge Development and Increasing Foreign Market Commitments. *Journal of International Business Studies*, *8*(1), 23-32.

Johanson, J., & Vahlne, J.-E. (2003). Business Relationship Learning and Commitment in the Internationalisation Process. *Journal of International Entrepreneurship*, *1*(1), 83-101.

Johanson, J., & Vahlne, J.-E. (2006). Commitment and opportunity development in the internationalisation process: A note on the Uppsala internationalisation process model. *Management International Review*, *46*(2), 165-178.

Johanson, J., & Wiedersheim-Paul, F. (1975). The Internationalisation of the Firm – Four Swedish Cases 1. *Journal of Management Studies*, *12*(3), 305-323.

Kahneman, D., & Tversky, A. (1979). Prospect Theory: An Analysis of Decision under Risk. *Econometrica*, *47*(2), 263-91.

Kiss, A. N., Williams, D. W., & Houghton, S. M. (2013). Risk bias and the link between motivation and new venture post-entry international growth. *International Business Review*, *22*(6), 1068-1078.

Kuivalainen, O., Saarenketo, S., Sundqvist, S., & McNaughton, R. (2012). Internationalisation patterns of small and medium-sized enterprises. *International Marketing Review*, *29*(5), 448-465.

Liu, Y., Li, Y., & Xue, J. (2011). Ownership, strategic orientation and internationalisation in emerging markets. *Journal of World Business*, *46*(3), 381-393.

Malhotra, N., & Hinings, C. (2010). An organizational model for understanding internationalisation processes. *Journal of International Business Studies*, *41*(2), 330-349. https://doi.org/10.1057/jibs.2009.75

March, J.G. (1991). Exploration and Exploitation in Organizational Learning. *Organization Science*, *2*(1), 71-87.

March, J.G., & Shapira, Z. (1987). Managerial Perspectives on Risk and Risk Taking. *Management Science*, *33*(11), 1404-1418.

Matthyssens, P., & Pauwels, P. (2000). Uncovering international market-exit processes: A comparative case study. *Psychology & Marketing*, *17*(8), 697-719.

Mellahi, K. (2003). The De-Internationalisation Process: A Case Study of Marks and Spencer. In C. Wheeler, F. McDonald, & I. Greaves (Eds.), *Internationalisation: Firm Strategies and Management* (pp. 150-162). London, UK: Palgrave Macmillan.

Meyer, K.E. (2014). Process Perspectives on the Growth of Emerging Economy Multinationals. In R. Ramamurti & A. Cuervo-Cazurra (Eds.), *Understanding Multinationals from Emerging Markets*. Cambridge: Cambridge University Press.

Miles, R.E., Snow, C.C., Meyer, A.D., & Coleman, H.J. (1978). Organizational Strategy, Structure, and Process. *Academy of Management Review*, *3*(3), 546-562.

Miocevic, D., & Morgan, R.E. (2018). Operational capabilities and entrepreneurial opportunities in emerging market firms. *International Marketing Review*, *35*(2), 320-341. https://doi.org/10.1108/IMR-12-2015-0270

Morgan, N.A., Katsikeas, C.S., & Vorhies, D.W. (2012). Export marketing strategy implementation, export marketing capabilities, and export venture performance. *Journal of the Academy of Marketing Science*, *40*(2), 271-289. https://doi.org/10.1007/s11747-011-0275-0

Nunnally, J. (1978). *Psychometric Theory*. New York: McGraw-Hill.

Ocasio, W. (1997). Towards an attention-based view of the firm. *Strategic Management Journal*, *18*(S1), 187-206.

Palich, L.E., & Bagby, R.D. (1995). Using cognitive theory to explain entrepreneurial risk-taking: Challenging conventional wisdom. *Journal of Business Venturing*, *10*(6), 425-438.

Pauwels, P., & Matthyssens, P. (1999). A Strategy Process Perspective on Export Withdrawal. *Journal of International Marketing*, *7*(3), 10-37.

Pedersen, T., Petersen, B., & Benito, G. (2002). Change of foreign operation method: impetus and switching costs. *The Internationalisation Process of the Firm*, *11*(3), 325-345.

Porter, M.E. (1980). Industry Structure and Competitive Strategy: Keys to Profitability. *Financial Analysts Journal*, *36*(4), 30-41.

Rahu, S. (2015). *The Role of Uncertainty for Export Survival: Evidence from Estonia* (Working Paper No. 97-2015). The University of Tartu, Faculty of Economics and Business Administration.

Salomon, R., & Shaver, J.M. (2005). Export and domestic sales: their interrelationship and determinants. *Strategic Management Journal*, *26*(9), 855-871.

Santangelo, G.D., & Meyer, K.E. (2011). Extending the internationalisation process model: Increases and decreases of MNE commitment in emerging economies. *Journal of International Business Studies*, *42*(7), 894-909.

Shrader, R.C., Oviatt, B.M., & McDougall, P.P. (2000). How New Ventures Exploit Trade-Offs Among International Risk Factors: Lessons for The Accelerated Internationization of the 21St Century. *Academy of Management Journal*, *43*(6), 1227-1247.

Simon, M., & Shrader, R.C. (2012). Entrepreneurial actions and optimistic overconfidence: The role of motivated reasoning in new product introductions. *Journal of Business Venturing*, *27*(3), 291-309.

Sousa, C.M. P., & Tan, Q. (2015). Exit from a Foreign Market: Do Poor Performance, Strategic Fit, Cultural Distance, and International Experience Matter?. *Journal of International Marketing*, *23*(4), 84-104.

Stewart Jr., W.H., & Roth, P.L. (2001). Risk propensity differences between entrepreneurs and managers: A meta-analytic review. *Journal of Applied Psychology*, *86*(1), 145-153.

Swoboda, B., Olejnik, E., & Morschett, D. (2011). Changes in foreign operation modes: Stimuli for increases versus reductions. *International Business Review*, *20*(5), 578-590.

Tan, Q., & Sousa, C.M.P. (2019). Why Poor Performance is Not Enough for a Foreign Exit: The Importance of Innovation Capability and International Experience. *Management International Review*, *59*(3), 465-498.

Thomas, J.B., Clark, S.M., & Gioia, D.A. (1993). Strategic Sensemaking and Organizational Performance: Linkages Among Scanning, Interpretation, Action, and Outcomes. *Academy of Management Journal*, *36*(2), 239-270.

Trąpczyński, P. (2016). De-internationalisation: A review of empirical studies and implications for international business research. *Baltic Journal of Management*, *11*(4), 350-379.

Turcan, R.V. (2003). Small Firm De-Internationalisation: An Entrepreneurship Perspective. In C. Wheeler, F. McDonald, & I. Greaves (Eds.), *Internationalisation: Firms strategies and management* (pp. 208-222). New York: Palgrave.

Turner, C. (2012). Deinternationalisation: towards a coevolutionary framework. *European Business Review*, *24*(2), 92-105.

Tversky, A., & Kahneman, D. (1981). The framing of decisions and the psychology of choice. *Science*, *211*(4481), 453.

Vahlne, J., & Johanson, J. (1990). The Mechanism of Internationalisation. *International Marketing Review*, *7*(4).

Vahlne, J.-E., & Johanson, J. (2017). From internationalisation to evolution: The Uppsala model at 40 years. *Journal of International Business Studies*, *48*(9), 1087-1102.

Vissak, T. (2010). Nonlinear internationalisation: a neglected topic in international business research. In T. Devinney, T. Pedersen, & T. Laszlo (Eds.), *The Past, Present and Future of International Business & Management* (Vol. 23, pp. 559-580). Emerald Group Publish.

Vissak, T., & Francioni, B. (2013). Serial nonlinear internationalisation in practice: A case study. *International Business Review*, *22*(6), 951-962.

Welch, L.S., & Luostarinen, R. (1988). Internationalisation: Evolution of a Concept. *Journal of General Management*, *14*(2), 34-55.

Wiersema, M.F., & Bowen, H.P. (2008). Corporate diversification: the impact of foreign competition, industry globalization, and product diversification. *Strategic Management Journal*, *29*(2), 115-132.

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An Everlasting Battle between Theoretical Knowledge and Practical Skills? The Joint Impact of Education and Professional Experience on Entrepreneurial Success

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ABSTRACT

Objective: The objective of the article is to examine the complementarity between education and professional experience and the complementarity's impact on the probability of entrepreneurial success.

Research Design & Methods: To test the complementarity, we utilise a sample of both successful entrepreneurs and salary workers with previous entrepreneurial experience and a logit model with a dependent variable indicating the respondent's membership in one of these two groups. Secondly, we use net income as a proxy of entrepreneurial success and run ordered logit regressions on a sample of successful entrepreneurs.

Findings: Our study confirms the existence of complementarity between education and breadth of professional experience and its impact on the probability of an entrepreneur's success.

Implications & Recommendations: Our findings are informative for those planning or pursuing an entrepreneurial career, but they are also relevant for entrepreneurship education and entrepreneurship research.

Contribution & Value Added: We add to the knowledge of entrepreneurial success factors and the relationships among them. We particularise Lazear's theory of entrepreneurship by addressing the complementarity effect between education and professional experience.

Article type: research article

Keywords: entrepreneurial success; complementarity; Lazear's theory of entrepreneurship; Mincer's wage model

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INTRODUCTION

The question on the essence of entrepreneurial success (Osborne, 1995) is not a new one. Nevertheless, the dilemma regarding what supports professional success in entrepreneurship still provokes numerous research discussions. Scholarship answers usually relate to human capital (Unger, Rauch, Frese, & Rosenbusch, 2011). However, is the matter not more linked to theoretical knowledge delivered through formal education or practical skills developed by professional experience? As scholars, we often advocate for theory as the vehicle of knowledge that – by being abstracted – gains academic legitimacy. At the same time, we observe a dynamically changing world in which practice often precedes research, and in which students demand a more action-oriented approach and hands-on experience, which usually requires practice outside of schools. The question on the merits of theoretical preparation versus practical training for a professional career is particularly relevant if we position it in the domain of entrepreneurship, which by its nature is connected with learning by doing (Rasmussen & Sørheim, 2006; Pittaway & Cope, 2007) or experiential learning (Cope & Watts, 2000; Rae & Carswell, 2001; Cope, 2005; Corbett, 2005; Politis, 2005), just as it aspires to provide a scientifically proven explanation of the entrepreneurship phenomenon (Scott, 2001; Lamont, 2012). As a society, we aim to "produce" future successful entrepreneurs, but we challenge the problem of what dictates entrepreneurial success. In this everlasting battle between theoretical knowledge and practical skills, there are also voices arguing for a third way – a combination of the two (Iversen, Malchow-Møller, & Sørensen, 2016) – which we should address in the context of designing training programmes and curricula (Nieuwenhuizen & Kroon, 2002).

We identify the research gap in the insufficiently recognized complementarity effect between education and professional experience, as empirical confirmation of this effect is scarce in the context of entrepreneurial success (Iversen *et al.*, 2016). Moreover, many studies relate to the diverse sources of entrepreneurial intentions as preconditions for entrepreneurial behaviour (e.g. Krueger, Reilly, & Carsrud, 2000; Sánchez, 2011) but do not focus on the complementarity effect between them and do not relate to more longstanding achievements beyond a business start-up success.

The aim of this article is to fill this research gap and test the complementarity between education and professional experience and the complementarity's impact on the probability of entrepreneurial success. We assume that neither only formal education nor only professional experience constitutes a sufficient condition to make a successful entrepreneur. Therefore, we hypothesise that in order to succeed, an entrepreneur requires a combination of the two, which is related to their complementarity. However, we not only aim to confirm the coexistence of both education and professional experience in building an entrepreneurial career, but we also suppose that there is a threshold that triggers the positive impact of education/professional experience on entrepreneurial success.

In this paper, we follow a similar line of reasoning to Iversen *et al.* (2016), studying the joint impact of education and professional experience on entrepreneurial success. In contrast to Iversen *et al.* (2016), we refer to business survival as the measure of entrepreneurial success. Our study mostly builds on Lazear's theory of entrepreneurship

(2005) and develops this well-established theory even further. Lazear presumes that entrepreneurs must be competent in many diverse skills and have at least basic knowledge in numerous areas (Lazear, 2005); therefore, his theory connects entrepreneurial success with the breadth and diversification of education and experience. We extend Lazear's "jack-of-all-trades" hypothesis by additionally asking about the complementarity between education and professional experience. In our study, we also refer to Mincer's wage model (1974), which is an econometric specification for the relationship between wages and accumulated human capital: schooling and professional training. Hence, we relate to entrepreneurial success not only in terms of survival but also in terms of entrepreneurs' earnings.

In order to test the complementarity between education and professional experience and its impact on the probability of an entrepreneur's success, we use a sample of both 'successful' entrepreneurs and salary workers with previous entrepreneurial experience. The study was conducted in Poland. By successful entrepreneurs, we mean those who have run their company continuously, which we operationalise as a minimum of three consecutive years. This composition of the sample creates a unique opportunity to investigate what characteristics related to human capital have an effect on sustainably running a company among individuals who follow an entrepreneurial path. The sample in other studies that examine entrepreneurial success factors usually consists of entrepreneurs and non-entrepreneurs. We also used net income as a proxy of entrepreneurial success. In this case, we run ordered logit regressions and test our hypotheses on a sample of current entrepreneurs who have run their businesses for at least 36 months.

The paper contributes to the human capital stream of the literature on entrepreneurial success but also to the entrepreneurship education field. By investigating the joint impact of the diversification of experience and education, we add to the knowledge of entrepreneurial success factors and the relationships among them. Therefore, we particularise Lazear's theory of entrepreneurship by addressing the complementarity effect between education and professional experience. Our results are informative for the individuals who plan or follow an entrepreneurial career, but they are also applicable for the purposes of entrepreneurship education.

The paper is structured as follows. The next section describes the theoretical foundations of the paper. The discussion on Lazear's (2005) theory of entrepreneurship and Mincer's (1974) wage model leads to implications for our hypotheses. Next, we explain our methodological choices and sample composition. In the next section, we present the results of hypotheses testing, together with an interpretation of the results. The article ends with conclusion and thoughts on the relevance of theory and practice of entrepreneurship education.

LITERATURE REVIEW

From the perspective of human capital theory, both education and professional training are regarded as fundamental determinants of an individual's economic performance (Becker, 1993; Schultz, 1961). They increase human productivity through the development of knowledge and practical skills. Hence, the research endeavours focus on investigating the specifics of their impact on success in professional life. The classic model of this impact

is illustrated by Mincer's wage model (Mincer, 1974), which is an econometric specification for the relationship between wages and accumulated human capital. References to human capital also gain in popularity in entrepreneurship research (Marvel, Davis, & Sproul, 2016). One of the most seminal theories pertaining to human capital and entrepreneurial success is Lazear's theory of entrepreneurship (Orazem, Jolly, & Yu, 2015; Kurczewska, Mackiewicz, Doryń, & Wawrzyniak, 2020).

Lazear's Theory of Entrepreneurship

The theoretical framework of the paper is built around Lazear's theory of entrepreneurship, which is one of the most powerful explanations of individual selection into entrepreneurship (Hsieh, Parker, & van Praag, 2017; Saiz-Alvarez, 2019). This theory, well-established in the field, assumes that the maximization of lifetime income is the fundamental motive motive for career choice. The theory states that to become an entrepreneur, an individual needs to be competent in various skills and have even an elementary knowledge, but in multiple areas (Lazear, 2005). Lazear calls this the "jack-of-all-trades" hypothesis. He links career choice both to education and professional experience. However, Lazear differentiates between two types of actors on the labour market: entrepreneurs and paid employees. For the first group, Lazear advocates a breadth of knowledge and skills, whereas for the second – depth. He assumes that to achieve success, entrepreneurs need general skills and knowledge in a variety of areas, while paid employees profit from being specialists in a narrow field required by the labour market (Sorgner & Fritsch, 2018). In this sense, an entrepreneur's wider number of theoretical and practical skills – as a result of diverse backgrounds, a variety of formal and informal training, rich work experience, and different roles during their career and life – are replenished by the expertise of their employees who follow a single predefined path.

Lazear's theory was verified on 500 Stanford alumni who entered the labour market. His study proved that individuals who follow more diversified careers are more likely to become entrepreneurs. One of the explanations for this dependency provided by Lazear stems from the perception of career as the result of conscious investment: aspiring entrepreneurs are to test multiple and different roles in order to gain the knowledge and skills necessary to launch their ventures. Lazear's theory was challenged in many further studies – and most often confirmed. For example, the theory was positively validated by Åstebro and Thompson (2011), Aldén, Hammarstedt, and Neumann (2017), Backes-Gellner and Moog (2013), Hartog, van Praag, and van der Sluis (2010), Stuetzer, Obschonka, Davidsson, and Schmitt-Rodermund (2013), and Wagner (2003, 2006). However, there are also studies, like the one by Silva (2007), which did not uphold the "jack-of-all-trades" hypothesis. On top of that, there also appeared multiple attempts to broaden the theory (e.g. Tegtmeier & Kurczewska, 2017; Strohmeyer, Tonoyan, & Jennings, 2017).

One of the extensions of Lazear's theory is to include entrepreneurial self-efficacy as a factor that influences having an entrepreneurial career (Tegtmeier & Kurczewska, 2017). Self-efficacy is commonly defined as "the belief in one's capabilities to organise and execute the courses of action required to manage prospective situations" (Bandura, 1995). In the entrepreneurship context, the concept relates to an individual's belief in and judgment of their own skills and abilities to achieve entrepreneurial goals (Baron, Mueller, & Wolfe, 2016). Scholars proved self-efficacy to have a significant meaning in entrepreneurial processes (Zhao, Seibert, & Hills, 2005). Therefore, besides the objectively verified diversity

and breadth of education and professional experience, we also add in our study their perceptions as a factor that influences the probability of entrepreneurial success. In this sense, we also presume that the probability of a successful entrepreneurial career increases with the higher level of entrepreneurial self-efficacy.

However, the many follow-up studies – among which none questioned education and professional experience as key determinants of entrepreneurial success – never checked Lazear's theory for the mutual effects between the two. The question of whether education and professional experience complement each other, and in what circumstances, remains unanswered.

Mincer's Wage Model

The basic assumption around which human capital theories are built is the existence of some skills that individuals on the labour market have as a form of capital and in which they invest. Most human capital theories relate to Mincer and his concept of investment in human capital. Mincer's wage model (1974) is a widely used equation to estimate the earnings effects of two types of human investments: schooling and work experience. The model explains wage income as a function of formal education, typically measured as the sum of years and experience modelled as a quadratic function of the years of potential experience. The model assumes the existence of both education and experience as substitutes in generating skills, and thus ignoring their possible complementary effect. Following Mincer's idea that education and professional experience are fundamental human capital factors related to a successful professional career expressed by earnings, we claim that the two may happen at the same time – and that they complement each other.

We limit our considerations to entrepreneurship and entrepreneurial success, which reinforces our claim for the potential complementarity between education and professional experience, because in light of Lazear's theory the broader and more diversified the skills – both theoretical and practical – the higher the probability of success as an entrepreneur. Accordingly, the issue of the complementarity of different skills becomes critical. Therefore, although in Mincer's equation log earnings are additively separable in schooling and experience, we follow the line of thought of Iversen *et al.* (2016) by arguing in our study that education and professional experience result in skills that are complements to entrepreneurial success. However, in addition to Iversen *et al.* (2016), we also emphasise the breadth of professional experience. Moreover, again with Lazear's theory in mind, we speculate that the complementarity effect between the two might not always work, as in the case of extremely low levels of education/professional experience.

Critically drawing both from Lazear's theory of entrepreneurship and Mincer's wage model, the above discussion leads us to two hypotheses:

H1: There is a complementarity between education and professional experience in determining entrepreneurial success.

H2: As professional experience/education increases, there is a threshold that triggers the positive impact of education/professional experience on entrepreneurial success.

MATERIAL AND METHODS

To test the complementary effect of education and professional experience, we estimate the following base model:

$$suc = \alpha_0 + \alpha_1 edu + \alpha_2 exp + \alpha_3 edu \times exp + \alpha_4 age + \alpha_5 sex + \alpha_6 kids + \varepsilon \quad (1)$$

Suc stands for entrepreneurial success operationalised with two measures. Firstly, we proxied it as a survival of the business for at least three years. The three-year survival rate of Polish enterprises reaches above 40%, and the four-year rate equals approximately 35% (CSO, 2014), which indicates that this period is vital for the further existence of an enterprise. Therefore, the first dependent variable is a dummy equal to 1 for entrepreneurs who managed to sustain their businesses for at least 36 months and 0 for wage workers who were previously entrepreneurs.

Our second success proxy is the level of net entrepreneurial income expressed by an ordinal variable with six categories (see Table 1 for details). *Edu* and *exp* mean general expressions that reflect education and professional experience, respectively. Education is measured by the highest completed level of education (*ledu*) and – alternatively – by the number of studies undertaken but not necessarily completed (*stud*). The breadth of experience is expressed in two ways, namely by the number of areas (*exp*) and industries (*bexp*) in which the individual possesses professional experience. We also introduce a set of control variables that express the individuals' age (*age*), sex (*sex*), and the number of children (*kids*). We then augment the baseline specification of the model with two additional explanatory variables. The first one (*necess*) refers to the literature that analyses the necessity of entrepreneurship, as it indicates whether initiating a business activity was determined by the failure to get another job or for other reasons. The second variable (*askills*) reflects the self-assessment of skills in different business-related areas. We expect that being a necessity-driven entrepreneur correlates negatively with entrepreneurial success, while the higher assessment of one's entrepreneurial skills translates into both higher earnings and the probability of sustaining a business throughout the given threshold period.

The data was obtained through telephone interviews conducted by an established Polish research institute with the CATI method. The questionnaire was developed by the research team and revised after a pilot study; the pilot study confirmed the logic of surveys and appropriateness of questions, which effected in minor changes to the wording of some questions to ensure clarity. The data collection (interviews proceeded by screening calls) took place in Poland in December 2017 and January 2018. The sample was randomly selected from the pool of individuals and companies with a Polish telephone number by using random digit dialling; they were then interviewed. In the process of initial filtering, surveys were administered only to adults who fell into one of the following categories: a self-employed individual or a non-self-employed individual who was previously an entrepreneur.

We test the complementarity between education and professional experience using two different schemas. Firstly, we utilise the full sample (N=1470) of both 'successful' entrepreneurs (N=693) and salaried workers with previous entrepreneurial experience (N=777) and a logit model with a dependent variable that indicates the respondent's membership in one of these two groups. Secondly, we use net income as a proxy of entrepreneurial success. In this case, we run ordered logit regressions and test our hypotheses on the sample of current entrepreneurs who have run their businesses for at least 36 months (N=693).

Table 1. List of variables and operationalization

Variable	Operationalization
Dependent variable (*suc*)	Dummy variable: 1 – entrepreneurs who sustained their businesses for at least 36 months 0 – wage workers who were previously entrepreneurs Alternative measure – level of net income: 1 – up to 2 000 PLN 2 – 2 001 - 4 000 PLN 3 – 4 001 - 6 000 PLN 4 – 6 001 - 8 000 PLN 5 – 8 001 - 10 000 PLN 6 – more than 10 000 PLN
Number of different fields of studies (*stud*)	Sum of declared different fields of studies undertaken (but not necessarily completed)
Highest earned level of education (*ledu*)	The highest completed level of education: 0 – primary education or no education 1 – basic vocational education 2 – secondary vocational /secondary general education 3 – post-secondary education 4 – tertiary education
Professional experience (*exp*)	The number of different areas in which the respondents declared professional experience, including the areas of production and services, shopping and maintaining contacts with suppliers, logistics, marketing, sales, customer relations, financial management and accounting, human resource management, others (to be indicated by the respondent).
Professional experience (*bexp*)	The number of different industries in which the respondents declared professional experience, including the following industries: industry/production, construction, trade, agriculture, transportation, other branches of production, hospitality and catering, science and technology development, education and upbringing, culture and art, health protection and social welfare, physical culture, tourism and leisure, other branches of services, state administration and justice, finance and insurance, others (to be indicated by the respondent).
Reason for launching a business (*necess*)	Dummy variable: 1 – respondents who declared initiating a business activity because they “could not find another job” (necessity entrepreneurs) 0 – respondents who declared other reasons of starting a business (i.e., desire for self-realisation, an idea for a product or service unavailable on the market, unwillingness to work as a full-time employee, chance to combine family responsibilities with earning, a promising partner, taking over a family business).
Self-efficacy (*askills*)	The level of entrepreneurial self-efficacy calculated as the sum of the respondents’ self-assessment of skills in the areas of financial management and accounting, sales, marketing and advertising, human resource management, customer relations, logistics and shopping, product design, and IT systems on a 5-point Likert scale (1=very poor, 5=very good).
Age (*age*)	Years
Sex (*sex*)	Dummy variable: 1 – male 0 – female
Number of children (*kids*)	Declared number of children

Source: own compilation.

The sample descriptive statistics are given in Table 2.

Table 2. Descriptive statistics

Variable	Mean	Std. Dev.	Min	Max
Entrepreneurs (N=693)				
Net income (dependent variable)	3.81	1.66	1	6
Number of different fields of studies (*stud*)	0.82	0.93	0	4
Highest earned level of education (*ledu*)	3.02	1.17	0	4
Professional experience (*exp*)	1.96	2.12	0	9
Professional experience (*bexp*)	1.34	1.37	0	9
Reason of launching a business (*necess*)	0.09	0.29	0	1
Self-efficacy (*askills*)	28.07	4.58	12	40
Age (*age*)	46.95	10.67	24	68
Sex (*sex*)	0.68	0.47	0	1
Number of children (*kids*)	1.56	1.10	0	6
Ex-entrepreneurs – wage workers (N=777)				
Number of different fields of studies (*stud*)	0.57	0.71	0	3
Highest earned level of education (*ledu*)	2.78	1.24	0	4
Professional experience (*exp*)	1.14	1.66	0	8
Professional experience (*bexp*)	1.21	1.36	0	7
Reason of launching a business (*necess*)	0.24	0.43	0	1
Self-efficacy (*askills*)	25.38	4.98	8	40
Age (*age*)	45.85	11.06	20	67
Sex (*sex*)	0.44	0.50	0	1
Number of children (*kids*)	1.49	1.11	0	7

Source: own elaboration in Stata 15.

RESULTS AND DISCUSSION

The estimation results for the model that employs entrepreneurial survival for at least 36 months as a measure of success are given in Table 3. The first four columns report the results for the augmented specification, while the next four columns are for the baseline specification. In all equations, the coefficients on the interaction term (*stud×exp*, *stud×bexp*, *ledu×exp*, and *ledu×bexp*) are positive and statistically significant at the 1% level, which indicates the existence of complementarity between education and professional experience. These results give strong support to our first hypothesis (H1) which postulates that – to succeed – an entrepreneur needs a combination of both practical and theoretical skills. Among the control variables representing age, sex, and the number of children, only sex determines entrepreneurial success in a statistically significant manner. The coefficient on the sex dummy suggests that businesses run by men are more likely to survive.

The impact of additionally incorporated variables that reflect the reason for starting a business and self-efficacy is statistically significant across all models. It indicates that the probability of an enterprise surviving increases with higher self-efficacy, while necessity entrepreneurs experience a decrease in the probability that their company will survive.

Table 3. Logit estimates for entrepreneurial success (entrepreneurial survival for at least 36 months)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
stud	-0.1809*	-0.1905			-0.1960*	-0.2178*		
exp	-0.0400		-0.1805*		-0.0264		-0.2220**	
stud×exp	0.2806***				0.3113***			
age	0.0076	0.0063	0.0075	0.0066	0.0052	0.0034	0.0050	0.0034
sex	0.9389***	0.9952***	0.9156***	0.9578***	0.9335***	0.9982***	0.9167***	0.9658***
kids	0.0239	0.0264	0.0097	0.0088	0.0382	0.0397	0.0230	0.0207
necess	-1.1052***	-1.1149***	-1.1218***	-1.1075***				
askills	0.0958***	0.1018***	0.0969***	0.1032***				
bexp		-0.2883***		-0.7105***		-0.3023***		-0.8269***
stud×bexp		0.4089***				0.4657***		
ledu			-0.0985	-0.1716**			-0.1132*	-0.2016***
ledu×exp			0.1162***				0.1412***	
ledu×bexp				0.2386***				0.2853***
Constant	-3.5949***	-3.4810***	-3.4048***	-3.1035***	-1.1621***	-0.8344***	-0.9079***	-0.3333
N	1470	1470	1470	1470	1470	1470	1470	1470
Pseudo-R^2	0.159	0.151	0.144	0.138	0.104	0.0911	0.0864	0.0768
χ^2	196.1	202.8	210.0	202.6	121.3	123.1	134.1	111.4

*** p<0.01, ** p<0.05, * p<0.1

Source: own elaboration in Stata 15.

To validate hypothesis 2, the analysis needs to be accompanied by the corresponding figures that present the marginal effects of education and professional experience on entrepreneurial success. In order to conserve space, we demonstrate figures only for the augmented model, which is our preferred specification. The analysed effect is considered statistically significant when its two-tailed 95% confidence interval lies above or below the zero line. Figure 1 depicts the average marginal effect of the number of fields of studies undertaken (*stud*) as professional experience changes – measured with the number of different areas (*exp*) – whereas Figure 2 shows the average marginal effect of professional experience dependent on the number of fields of studies undertaken. According to Figure 1, the probability of success increases with the number of fields of studies undertaken, when the number of areas of experience is large enough (and here it amounts to at least two). The effect is statistically insignificant in the case of a lack of experience or experience only in a single area. Figure 2 indicates that the probability of success increases with professional experience when undertaking at least one field of studies. The figures provide evidence for the presence of complementarity between education and professional experience (H1). They also support our second hypothesis (H2), that there is a threshold that triggers the positive impact of education/professional experience on entrepreneurial success, as the mutual effect between regressors became statistically significant and positive, starting from a threshold value.

Figures 3 and 4 depict the average marginal effect for the variables that measure education with the highest level of education earned, and professional experience with the sum of industries. The general finding regarding the complementarity of education and professional experience remains unchanged (H1 holds). Figure 3 indicates that the statistically significant positive marginal effect of the level of education is triggered by professional experience gained in at least two fields. The effect was negative and statistically significant in the

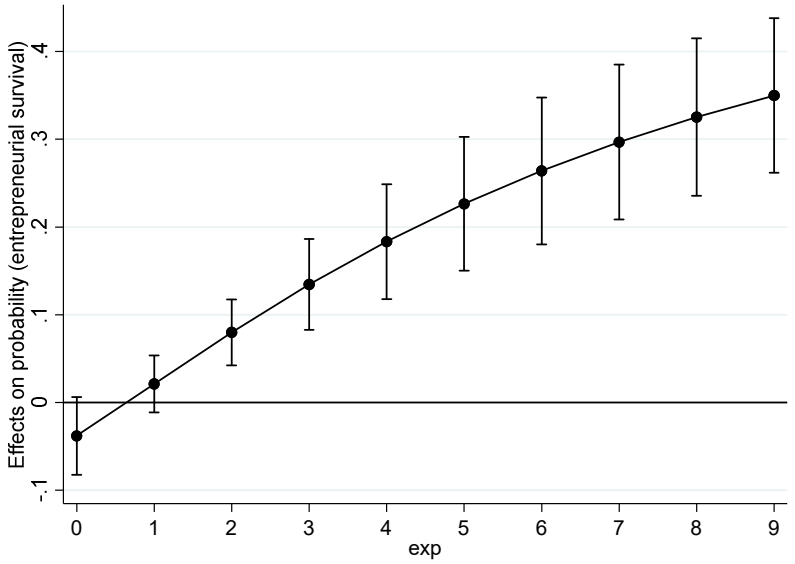

Figure 1. Average marginal effects of *stud* as *exp* changes, based on the estimation for entrepreneurial survival (95% confidence intervals)
Source: own elaboration in Stata 15.

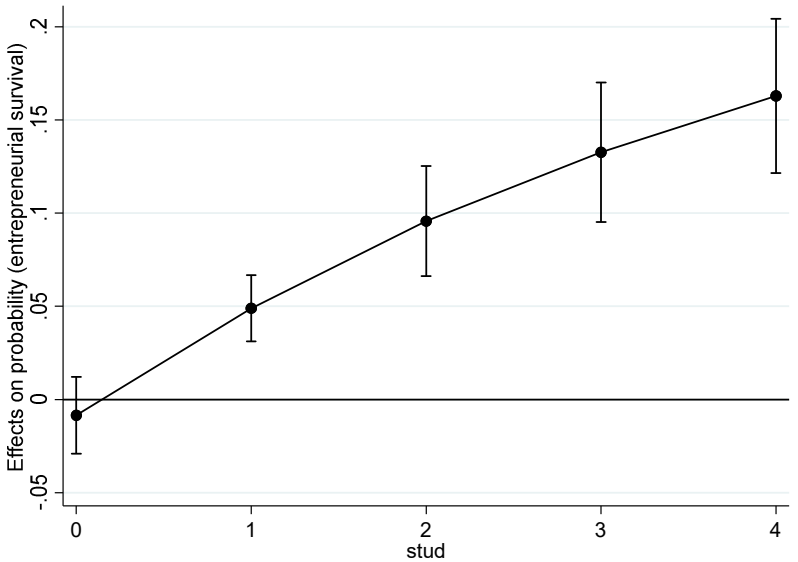

Figure 2. Average marginal effects of *exp* as *stud* changes, based on the estimation for entrepreneurial survival (95% confidence intervals)
Source: own elaboration in Stata 15.

case of the lack of any experience, while it is insignificant for experience in only one field. According to Figure 4, the marginal effect of the increase in professional experience on the probability of survival is positive and statistically significant for the level of tertiary education, while it is statistically insignificant in the case of post-secondary education and is statistically significant and negative for lower levels of education. These results agree with our second hypothesis (H2) on the threshold level triggering the positive impact of the combination of education and professional experience on entrepreneurial survival.

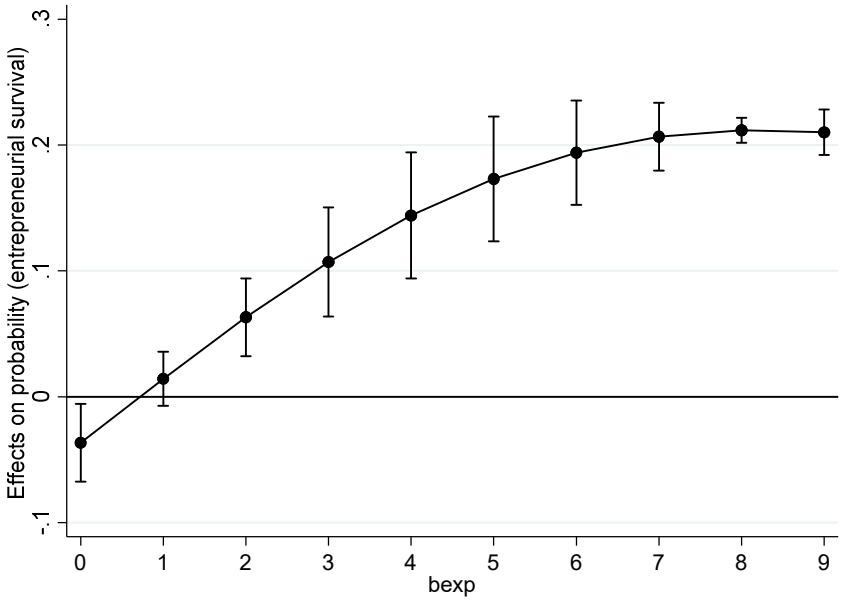

Figure 3. Average marginal effects of *ledu* as *bexp* changes, based on the estimation for entrepreneurial survival (95% confidence intervals)
Source: own elaboration in Stata 15.

The ordered logit estimations for the model with net income as the dependent variable are presented in Table 4. The impact of the interaction term is statistically significant for both models (augmented and base) only in the case of *stud×exp*, namely when the number of fields of studies undertaken is used as a proxy for education, along with professional experience measured by the number of areas. For the variables *ledu* and *exp,* the analysed effect is statistically significant at the 10% level in the extended model and 5% in the base one. In other cases, the impact of the interaction term is statistically insignificant. Hence, the presented results lend only partial support to our first hypothesis (H1), i.e. the existence of complementarity between education and professional experience on entrepreneurial income. We suspect that these ambiguous results might be related to the deficiency in income variable used as a proxy for entrepreneurial success. We consider business survival/failure as a superior proxy of entrepreneurial success as it is an objective and ultimate measure of business performance. Discussion regarding other variables are analogous to previous models.

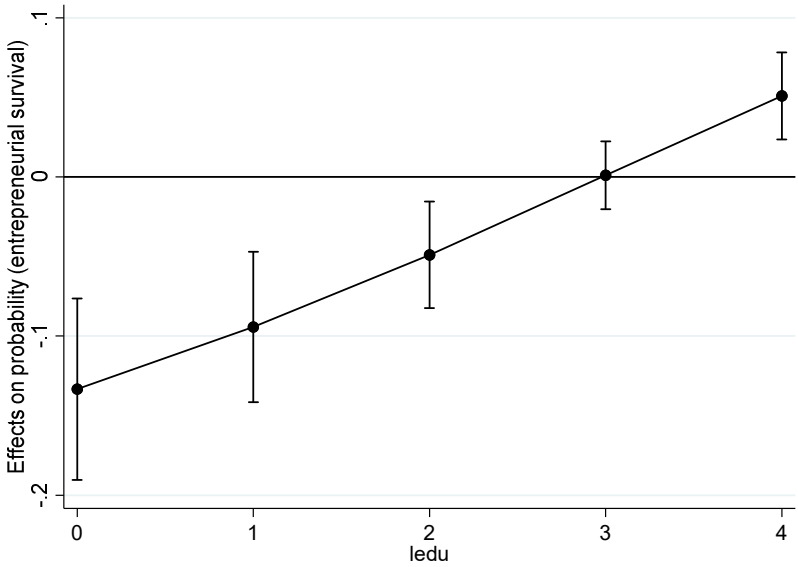

Figure 4. Average marginal effects of *bexp* as *ledu* changes, based on the estimation for entrepreneurial survival (95% confidence intervals)
Source: own elaboration in Stata 15.

Table 4. Ordered logit estimates for entrepreneurial success (income)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
stud	0.0173	0.1914			0.0016	0.1895		
exp	-0.0129		-0.0871		-0.0220		-0.1113	
stud×exp	0.0818**				0.0931***			
age	-0.0008	-0.0010	-0.0023	-0.0026	-0.0022	-0.0025	-0.0039	-0.0041
sex	0.3284**	0.3716**	0.3059**	0.3462**	0.2798*	0.3299**	0.2576*	0.3057**
kids	0.0864	0.0918	0.0743	0.0766	0.0850	0.0913	0.0724	0.0778
necess	-1.0873***	-1.0809***	-1.1039***	-1.0796***				
askills	0.0391**	0.0434***	0.0392**	0.0439***				
bexp		-0.0706		-0.0732		-0.0848		-0.1428
stud×bexp		0.0469				0.0566		
ledu			-0.0309	0.0791			-0.0345	0.0673
ledu×exp			0.0528*				0.0605**	
ledu×bexp				0.0276				0.0480
N	693	693	693	693	693	693	693	693
Pseudo-R^2	0.0243	0.0214	0.0214	0.0181	0.0119	0.00847	0.00868	0.00513
χ^2	61.10	52.77	51.57	43.00	30.64	21.15	21.68	11.25

*** p<0.01, ** p<0.05, * p<0.1
Source: own elaboration in Stata 15.

To test our second hypothesis (H2), we present Figures 5 and 6, which illustrate the marginal effects that professional experience (education) has on entrepreneurial income as the level of education (professional experience) changes. According to Figure 5, the probability of earning a very high income (category 6 – above 10 000 PLN) increases with the number of

areas of professional experience, which is conditional on having undertaken at least one field of studies. In turn, the probability of earning an income in the three lowest categories (1-3 – below 6 000 PLN) falls. For income categories 4 and 5 (6 000 - 8 000 PLN and 8 000 - 10 000 PLN, respectively), the relationship is statistically insignificant and not presented on the graph for the sake of clarity. For non-students (*stud* equal to 0), all the effects remain statistically insignificant. Figure 6 indicates that the probability of earning the highest income increases with the number of fields of studies undertaken if the person has experience of working in at least two different areas. At the same time, the probability of earning an income in three lowest categories decreases for entrepreneurs with experience in two or more areas, while it is insignificant for those with more modest experience. The average marginal effects in the case of the *ledu×bexp* interaction are statistically insignificant for all income categories and, thus, we do not present them. Our empirical findings agree with our hypotheses, albeit the assumed effects appear only in some specifications. In sum, the estimation results of the income model only partially support our claims.

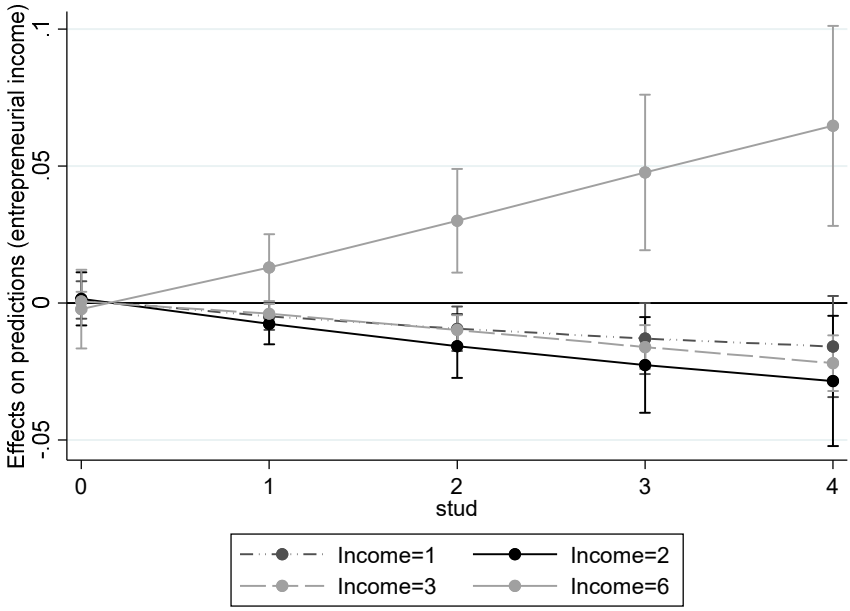

Figure 5. Average marginal effects of *exp* as *stud* changes, based on the estimation for entrepreneurial income (95% confidence intervals)
Source: own elaboration in Stata 15.

To summarise, our general finding regarding the complementarity of formal education (explicit knowledge) and professional experience (tacit knowledge) supports the results of Iversen et al. (2016), who empirically confirmed the significance of interaction effect between these two types of human capital in determining entrepreneurial success. However, our study not only provides an additional robustness check test, using a new dataset, but also provides new insight from the long-term success perspective, namely the survival of established enterprises.

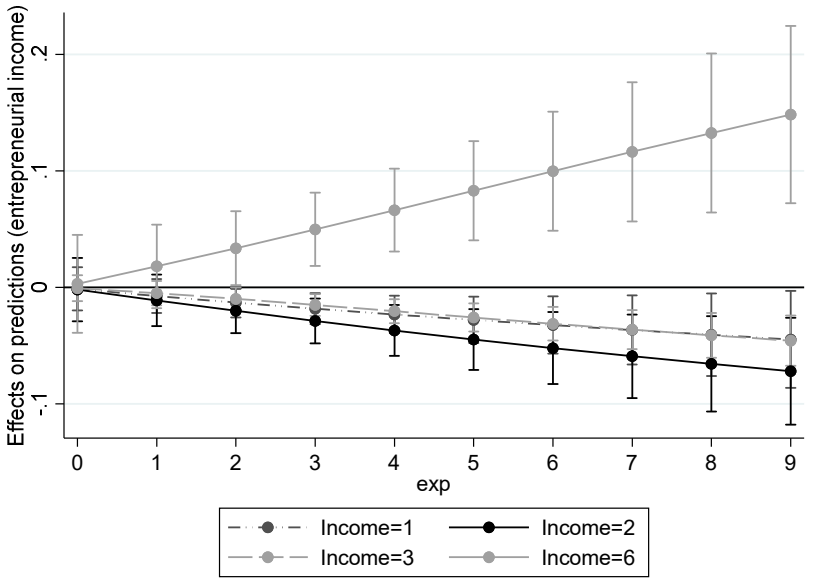

Figure 6. Average marginal effects of *stud* as *exp* changes, based on the estimation for entrepreneurial income (95% confidence intervals)
Source: own elaboration in Stata 15.

We also discovered some unintended results in our study that might require further comments. Firstly, in light of our research, businesses run by men are more likely to survive. This result may be interpreted in a way that female entrepreneurs are more constrained in terms of the amount and quality of human capital that they gained while employed (Boden & Nucci, 2000; Fairlie & Robb, 2009) or have less start-up capital and less prior work experience in a family business (Fairlie & Robb, 2009). Similar findings were obtained in a study by Watson (2003). Secondly, our study reveals the role of self-efficacy in determining entrepreneurial processes. This finding agrees with other studies, e.g. McGee, Peterson, Mueller, and Sequeira (2009) or Zhao *et al.* (2005), who confirm the positive relationship between entrepreneurial intentions (as the prediction of entrepreneurial behaviour) and entrepreneurial self-efficacy, but also of Pollack, Burnette, and Hoyt (2012), who highlight the role of mindset for entrepreneurial success.

CONCLUSIONS

In this paper, we aimed to examine the complementarity between two types of human capital, namely formal education and professional experience. Building upon two seminal human capital theories, i.e. Lazear's theory of entrepreneurship and Mincer's wage model, we formulated two hypotheses. The first hypothesis stated that education and professional experience are mutually indispensable to succeed as an entrepreneur, whereas the second one that there is a threshold level of both education and professional experience above which they have a positive joint impact. To verify these two hypotheses, we ran a set of logit regressions on the unique sample of data and presented findings.

Our study confirms the first hypothesis on the existence of complementarity between education and the breadth of professional experience, and the complementarity's impact on the probability of an entrepreneur's success, measured by sustaining a business for at least three consecutive years. Furthermore, we found that the mutual effect between education and professional experience is statistically significant and positive, starting from a threshold value of both human capital proxies. The probability of success increases with the number of fields of studies undertaken (the highest completed level of education), when the number of areas of experience amounts to at least two (when the experience measured with the sum of industries equals to at least two). Moreover, the positive effect of the number of areas of experience (the number of different industries in which the respondents declared professional experience) is triggered by undertaking at least one field of studies. Therefore, our study also confirms the second hypothesis for entrepreneurial success measured by sustaining a business for at least three consecutive years. Our results remain robust to the use of different measures of education and professional experience and toward augmented specifications, which includes proxies for entrepreneurial self-efficacy and being a necessity entrepreneur. Our main conclusion holds – albeit partly – for net income as the measure of entrepreneurial success, i.e. when the number of fields of studies undertaken is used as a proxy for education, along with professional experience measured by the number of areas. The results indicate that the probability of earning the highest income increases with the number of fields of studies undertaken (the number of areas of professional experience) for individuals who possess working experience in at least two different areas (undertaking at least one field of study). At the same time, we revealed the negative impact of education/professional experience on the probability of success measured by income level for entrepreneurs with earnings below 6 000 PLN. In light of the presented results, we conclude that there are many shades of entrepreneurial success, and it is important to distinguish between income success and the ultimate measure of entrepreneurial performance: business survival.

Our findings may have practical implications for entrepreneurship research, education, and entrepreneurship practice. The finding on the importance of the measure of entrepreneurial success has a strong value for entrepreneurship research. In any empirical investigations on entrepreneurial success, the choice of measure must be carefully discussed, and the results must be interpreted through the measure's advantages and limits. In order to obtain meaningful findings and a broader picture of a phenomenon, we recommend the application of more than one measure of entrepreneurial success. Our results can also be translated into recommendations for the educational system. Acknowledging the importance of both formal knowledge and professional experience for success as an entrepreneur, we call for curricula to be supplemented with a system of apprenticeships, which will enable future entrepreneurs to acquire sufficient skills before starting their own business. Our results are also advisory for individuals planning or following an entrepreneurial career. They demonstrate that pursuing education and having a breadth of professional experience is a key for business success due to the complementarity between the two. Completing education followed by being active in a business environment – e.g. attending business-related events and workshops, completing business training programs, working in different positions – should help develop stronger entrepreneurial skills and knowledge, which are indispensable for entrepreneurial success. The probability of success increases with professional experience when undertaking at least one field of studies.

There is no study without limitations; in this case, they are mainly related to the sample used. We tested our hypotheses on individuals from the single-country setting of Poland. When studying one particular context, the generalisation of the findings to other populations starts to be problematic and, therefore, requires additional validation. We know that the specific characteristics of the business framework in Poland might have determined respondents' answers. The measurement of successful entrepreneurship applied in the study may also raise questions. For example, what could shine new light on the problem in question is the employment of a different proxy of entrepreneurial success, namely by extending the survival period to more than three years. Moreover, it may be interesting to confront the self-satisfaction as a subjective measure of entrepreneurial success with the variables used in our study. Potentially, there could also be some shortages in questionnaire. The addition of a few questions to enable answering what particular skills are complementary to each other – and to what extent – could enhance our understanding of the complementarity effect between education and professional experience. Furthermore, it could be informative to track the entrepreneurial path of individuals under study to control for the potential impact of the experience gained while running a business. However, we leave these questions for a follow-up study.

Despite any potential limitations, we hope that the results of this paper have a chance to become a starting point for future investigations on entrepreneurial success, but also for studies aimed at extending Lazear's theory of entrepreneurship.

REFERENCES

Aldén, L., Hammarstedt, M., & Neumann, E. (2017). All about balance? A test of the Jack-of-all-Trades theory using military enlistment data. *Labour Economics*, *49*, 1-13.

Åstebro, T., & Thompson, P. (2011). Entrepreneurs, jacks of all trades or hobos? *Research Policy*, *40*(5), 637-649.

Backes-Gellner, U., & Moog, P. (2013). The disposition to become an entrepreneur and the jacks-of-all-trades in social and human capital. *The Journal of Socio-Economics*, *47*, 55-72.

Bandura, A. (1995). Self efficacy in changing societies. Cambridge University Press.

Baron, R.A., Mueller, B.A., & Wolfe, M.T. (2016). Self-efficacy and entrepreneurs' adoption of unattainable goals: The restraining effects of self-control. *Journal of Business Venturing*, *31*(1), 55-71.

Becker, G.S. (1993). *Human capital. A theoretical and empirical analysis with special references to education* (3rd edition). Chicago: The University of Chicago Press.

Boden Jr, R.J., & Nucci, A.R. (2000). On the survival prospects of men's and women's new business ventures. *Journal of Business Venturing*, *15*(4), 347-362.

Cope, J. (2005). Toward a dynamic learning perspective of entrepreneurship. *Entrepreneurship Theory and Practice*, *29*(4), 373-397.

Cope, J., & Watts, G. (2000). Learning by doing – an exploration of experience, critical incidents and reflection in entrepreneurial learning. *International Journal of Entrepreneurial Behaviour & Research*, *6*(3), 104-124.

Corbett, A.C. (2005). Experiential learning within the process of opportunity identification and exploitation. *Entrepreneurship Theory and Practice*, *29*(4), 473-491.

CSO. (2014). *Creation and operation conditions, development prospects of Polish enterprises established in the years 2008-2012*. Retrieved from https://stat.gov.pl/download/gfx/portalinformacyjny/en/defaultaktualnosci/3317/7/3/1/pgwf_creation_and_operation_conditiopns_of_polish_enterprises_2008-2012.pdf on September 15, 2019.

Fairlie, R.W., & Robb, A.M. (2009). Gender differences in business performance: Evidence from the Characteristics of Business Owners survey. *Small Business Economics, 33*, 375-395.

Hartog, J., van Praag, M., & van der Sluis, J. (2010). If you are so smart, why aren't you an entrepreneur? Returns to cognitive and social ability: Entrepreneurs versus employees. *Journal of Economics & Management Strategy*, *19*(4), 947-989.

Hsieh, C., Parker, S.C., & van Praag, C.M. (2017). Risk, balanced skills and entrepreneurship. *Small Business Economics*, *48*(2), 287-302.

Iversen, J., Malchow-Møller, N., & Sørensen, A. (2016). Success in entrepreneurship: a complementarity between schooling and wage-work experience*. Small Business Economics*, *47*, 437-460.

Krueger, N.F., Reilly, M.D., & Carsrud, A.L. (2000). Competing models of entrepreneurial intentions. *Journal of Business Venturing*, *15*(5-6), 411-432.

Kurczewska, A., Mackiewicz, M., Doryń, W., & Wawrzyniak, D. (2020). Peculiarity of hybrid entrepreneurs – revisiting Lazear's theory of entrepreneurship. *Journal of Business Economics and Management*, *21*(1), 277-300.

Lamont, M. (2012). Toward a comparative sociology of valuation and evaluation. *Annual Review of Sociology, 38*(1), 201-221.

Lazear, E.P. (2005). Entrepreneurship. *Journal of Labor Economics*, *23*, 649-680.

Marvel, M.R., Davis, J.L., & Sproul, C.R. (2016). Human capital and entrepreneurship research: A critical review and future directions. *Entrepreneurship Theory and Practice*, *40*(3), 599-626.

McGee, J.E., Peterson, M., Mueller, S.L., & Sequeira, J.M. (2009). Entrepreneurial self-efficacy: refining the measure. *Entrepreneurship Theory and Practice*, *33*(4), 965-988.

Mincer, J. (1974). Schooling, experience, and earnings. *Human Behavior & Social Institutions, 2.* New York: Columbia University Press.

Nieuwenhuizen, C., Kroon, J. (2002). Identification of entrepreneurial success factors to determine the content of entrepreneurship subjects*. South African Journal of Higher Education*, *16*(3), 157-166.

Orazem, P.F., Jolly, R., & Yu, L. (2015). Once an entrepreneur, always an entrepreneur? The impacts of skills developed before, during and after college on firm start-ups. *IZA Journal of Labor Economics, 4*(9), 1-27.

Osborne, R. (1995). The essence of entrepreneurial success. *Management Decision*, *33*(7), 4-9.

Pittaway, L., & Cope, J. (2007). Simulating entrepreneurial learning integrating experiential and collaborative approaches to learning. *Management Learning*, *38*(2), 211-233.

Politis, D. (2005), The process of entrepreneurial learning: a conceptual framework. *Entrepreneurship Theory and Practice*, *29*(4), 399-424.

Pollack, J.M., Burnette, J.L., & Hoyt, C.L. (2012). Self-Efficacy in the face of threats to entrepreneurial success: mind-sets matter. *Basic and Applied Social Psychology*, *34*(3), 287-294.

Rae, D., & Carswell, M. (2001). Towards a conceptual understanding of entrepreneurial learning. *Journal of Small Business and Enterprise Development*, *8*(2), 150-158.

Rasmussen, E.A., & Sørheim, R. (2006). Action-based entrepreneurship education. *Technovation*, *26*(2), 185-194.

Saiz-Alvarez, J. (2019). New approaches and theories of entrepreneurship. In M. Corrales-Estrada (Ed.), *Innovation and Entrepreneurship: A New Mindset for Emerging Markets* (pp. 13-30). Wagon Lane, UK: Emerald Publishing Limited.

Sánchez, J.C. (2011). University training for entrepreneurial competencies: Its impact on intention of venture creation. *International Entrepreneurship and Management Journal*, *7*, 239-254.

Schultz, T.W. (1961). Investment in human capital. American Economic Review, *51*(1), 1-17.

Scott, W.R. (2001). *Institutions and organizations*. London: Sage.

Silva, O. (2007). The jack-of-all-trades entrepreneur: Innate talent or acquired skill? *Economics Letters*, *97*(2), 118-123.

Sorgner, A., & Fritsch, M. (2018). Entrepreneurial career paths: occupational context and the propensity to become self-employed. *Small Business Economics*, *51*(1), 129-152.

Stuetzer, M., Obschonka, M., Davidsson, P., & Schmitt-Rodermund, E. (2013). Where do entrepreneurial skills come from?. *Applied Economics Letters*, *20*(12), 1183-1186.

Strohmeyer, R., Tonoyan, V., & Jennings, J.E. (2017). Jacks-(and Jills)-of-all-trades: On whether, how and why gender influences firm innovativeness. *Journal of Business Venturing*, *32*(5), 498-518.

Tegtmeier, S., & Kurczewska, A. (2017). Business entry and window of opportunity-empirical results for women entrepreneurs with graduate degree. *International Journal of Entrepreneurial Venturing*, *9*(1), 41-59.

Unger, J.M., Rauch, A., Frese, M., & Rosenbusch, N. (2011). Human capital and entrepreneurial success: A meta-analytical review. *Journal of Business Venturing*, *26*(3), 341-358.

Wagner, J. (2003). Testing Lazear's jack-of-all-trades view of entrepreneurship with German micro data. *Applied Economics Letters, 10*(11), 687-689.

Wagner, J. (2006). Are nascent entrepreneurs "Jacks-of-all-trades"? A test of Lazear's theory of entrepreneurship with German data. *Applied Economics*, *38*(20), 2415-2419.

Watson, J. (2003). Failure Rates for Female-Controlled Businesses: Are They Any Different?. *Journal of Small Business Management*, *41*(3), 262-277.

Zhao, H., Seibert, S.E., & Hills, G.E. (2005). The mediating role of self-efficacy in the development of entrepreneurial intentions. *Journal of Applied Psychology*, *90*, 1265-1272.

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