

Formal sources of finance boost innovation: Do immigrants benefit as much as natives?

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ABSTRACT

Objective: The article investigates the relative benefit of formality/informality of finance sources for innovation and compares this benefit amongst immigrant and native entrepreneurs. The authors investigate whether formal finance (here, bank loan) benefit innovation more than informal sources (personal savings and friend/family loan). Then, they explore whether an entrepreneur's status strengthens or weakens the benefit finance sources for innovation.

Research Design & Methods: This study applies a quantitative approach to conduct the research. The data of 15,850 entrepreneurs surveyed by Global Entrepreneurship Monitor in 2015 were analysed using the hierarchical linear modelling (HLM) technique.

Findings: Results indicated that formal finance benefits innovation more than informal sources, and this advantage is the same for both immigrant and native entrepreneurs.

Implications & Recommendations: Despite the prevalence of some stereotypes regarding the simplistic and repetitive nature of immigrants' businesses, the study recommends that financial institutions and policymakers plan to enhance entrepreneurs' access to formal financial resources irrespective of their migrant status. Policymakers also can plan to increase the immigrant entrepreneurs' access to the formal sources of finance by tailored educations to boost innovation.

Contribution & Value Added: The results highlight that immigrant entrepreneurs benefit from formal finance towards innovation similarly to their native counterparts. Such a clarification informs the studies on the liability of foreignness and innovation finance that immigration status cannot be a barrier to innovation as portrayed and conceptualized by some studies.

Article type: research article

Keywords: immigrant entrepreneurs; native entrepreneurs; entrepreneurial financing; innovation; liability of foreignness

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INTRODUCTION

Research evidence has revealed that innovation positively impacts SMEs' performance (Rosenbusch, Brinckmann & Bausch, 2011). However, relying on resource-based theory, successful innovation requires organizational resources and capabilities (Goedhuys, Janz & Mohnen, 2014), especially financial resources (Nylund *et al.*, 2019; O'Brien, 2003; Bartzokas & Mani, 2004). Accordingly, entrepreneurs try different formal and informal sources of financing to cover their innovation expenses. Some firms tend to use formal sources of finance such as bank loans, venture capitals, and equity financing to fund their innovation activities. Other firms use informal sources of finance such as family/friend loans or their personal saving. Studies have shown that the firms that use the formal sources of finance are more innovative and are more likely to be capitalized based on innovation than those that use informal sources (Wu,

Si, & Wu, 2016; Wellalage & Fernandez, 2019). However, the access and the decision to use formal sources of finance depends on many factors and considerations such as firms' credit records (Beck & Demirguc-Kunt, 2016; Buyinza, Tibaingana, & Mutenyoo, 2018), ability to provide collaterals (Osano & Languitone, 2016), the intended degree of control over the firm (Atiyet, 2012; De Jong, Verbeek, & Verwijmeren, 2011), access to alternative sources of finance and financial market structure (Osano & Languitone, 2016), the firm size, reputation and its assets (Arif *et al.*, 2020; Brixiová, Kangoye & Yogo, 2020), entrepreneurs' demographics (Dzadze, Aidoo, & Nurah, 2012), their human and social capital, the urgency of the need, loaning bureaucracy and paperwork, interest rate (Oyebamiji, 2020), *etc.* Beyond such firm-level and entrepreneur-level considerations, the relative access to the formal/informal sources of finance may vary based on the origin of the entrepreneur. Some research evidence suggests that immigrant entrepreneurs may face additional barriers (such as discrimination, language, or insufficient assets) to access such formal sources (Smallbone *et al.*, 2003). For instance, Cavalluzzo *et al.* (2002) find that African-American owners have a higher rejection rate in applying for a loan from banks. Another study by Aldén and Hammarstedt (2016) has demonstrated that the difficult access to the credit market and bank loans constrain immigrants' businesses in the USA, specifically non-Europeans. Therefore, such difficulties in access to loans from banks and the credit market may cause immigrant entrepreneurs to use a different approach for financing their business, including using their savings (Basu & Goswami, 1999) or funds from family and friends (Altinay & Altinay, 2008; Volery, 2007; Ostrovsky *et al.*, 2019).

Such research evidence shows that individuals with migrant backgrounds have worse access to formal finance than their native counterparts. Worse access may be due to the existence of liabilities of foreignness reflected by the socio-economic, normative, and regulative limitations faced by immigrants in the context of their host countries (Dabic *et al.*, 2020; Tengeh & Nkem, 2017; Zhou & Guillén, 2015; Gurău, Dana & Light, 2020). However, benefitting from formal/informal sources towards innovation is another critical aspect not fully captured and explained by the literature. Two conflicting yet inconclusive arguments can be drawn from the existing studies. On the one hand, as supported by the liability of foreignness perspective, one can assume that immigrant entrepreneurs may have lower access to the formal sources of finance due to regulative, normative and cultural limitations (Dabic *et al.*, 2020; Tengeh & Nkem, 2017; Zhou & Guillén, 2015). Moreover, the size of formal finance, such as bank loans they access, may be smaller than the non-minority groups (Bates, 1997). Such constraints can affect their tolerance and tendency towards doing risky or radical innovative activities.

On the other hand, immigrants have access to different ideas originating from dual-embeddedness (Ashourizadeh & Saeedikiya, *in press*; Dang & Harima, 2020) and their position as the connector of structural holes (Gurău, Dana, & Light, 2020) enables them to innovate more than their native counterparts. Further, immigrant entrepreneurs have better access to cheap labour and ethnic resources (Abd Hamid, Ayob, Sidek, & Senik, 2021) to cover the risk of innovations. Such a paradoxical understanding presented by the literature on immigrant entrepreneurship does not provide us with a comparative insight into the benefits of immigrant and native entrepreneurs from their financial sources for innovation. This study aimed to fill this gap and compare the benefit finance sources for innovation between immigrant and native entrepreneurs. We first compared the benefit of bank loans (as a formal source of finance) for innovation with that of two informal sources, namely, personal savings and family/friend loans. Then, we investigated if the effect of formality/informality of finance on innovation differs amongst immigrants and natives. In other words, the research aimed to answer two main questions:

1. Do bank loans benefit innovation more than informal sources (personal savings, family/friends' loans)?
2. Does the superiority of bank loans for innovation differ between immigrant and native entrepreneurs?

We drew upon finance, innovation, and immigrant entrepreneurship literature to answer these questions to hypothesize the effects and strengths. We tested the hypotheses using a comprehensive dataset from Global Entrepreneurship Monitor (GEM) in 2012-2013, yielding information on entrepreneurs' innovativeness and financing sources for 15,850 immigrants and natives in 33 countries worldwide. The authors showed that innovation is a function of the formality/informality of

finance. Moreover, we showed that the superiority of bank loans for innovation is not dependent on the entrepreneur's status (immigrant vs. native).

This study makes three contributions to entrepreneurship and finance literature; firstly, it scrutinized how finance sources, both formal and informal, may/may not be coupled with an entrepreneur's status, i.e. being immigrant or native, affect innovativeness. Secondly, this study is a reply for further comparative research on immigrant entrepreneurs' finance sources and their performance compared to their native counterparts (Fairlie, 2013). We answered such the call by providing a comparative insight into the role of finance formality/informality in conjunction with the immigration status of entrepreneurs on their innovation. Thirdly, while most research focuses on the supply of entrepreneurial finance and how entrepreneurs access the sources of finance (Robb & Robinson 2014; Moghaddam *et al.*, 2017), this study emphasized comparing the benefit of financing choices towards the innovative performance of immigrant and native entrepreneurs.

The remainder of this article is structured as follows: in the next section, we will review the immigrant entrepreneur financing studies and then formulate our hypotheses. Next, we will describe the research methodology for testing the hypotheses. Later, the results will be analysed, followed by a discussion, concluding remarks, and implications for policymakers and scholars.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Innovation

According to Schumpeter's theory of innovation, a man of action introduces new combinations, intuitively selects desirable and feasible ones in the face of risk and uncertainty and transforms the imagined selected new combination into reality (Schumpeter, 2010). Innovation has different aspects and characteristics. It can be characterized as *destructive, dynamic, planned, and purposeful*. As a destructive process, innovation involves creating new means and ends or establishing new relationships between the existing ones (Schumpeter, 1942). As a purposeful activity, innovation has been defined as a new wealth-creating resource or an existing resource with the enhanced potential to create wealth (in the case of commercial innovations) (Drucker, 2014) or as an intentional implementation of novelty towards benefiting the society (Phills, Deiglmeier, & Miller, 2008). As a dynamic activity, innovation inherently carries a dynamism meaning such that Meeus and Oerlemans (2000) define it as a trade-off between change and routinization. As a planned activity, innovation is systematic, rational and organized (Drucker, 2014). It begins with intention, insight, creativity, inventing and sensing something novel and desirable but not entirely actual yet, like a poet. Still, it needs meaningful actions within their contexts (Dimov *et al.*, 2021). It requires different resources, capabilities and actors whose interrelations and interactions determine innovation outcomes.

Among these factors and actors, the firm financial capital is key to the nature and the extent of the innovations. This factor has been discussed in detail below.

The formality of finance affecting innovation

Entrepreneurial financing is one of the fundamental topics in entrepreneurship research (Cassar, 2004; Chrysostome, 2010; Smallbone *et al.*, 2003). Limited access to financial capital is a significant factor that hinders entrepreneurs from running and developing their businesses (Tengeh & Nkem, 2017). Entrepreneurs try to get financed by formal sources (e.g., bank loans and equity financing) and informal ones such as family/friend loans and personal savings (Smallbone *et al.*, 2003). However, access to formal or informal sources of finance and the choice of the options available in each category depends on different conditions and considerations. For example, on some occasions, entrepreneurs need to maintain their control over the firm entirely. In such a circumstance, equity financing is not suitable since it necessitates the firm owners to lose some of their control (Zhang, 2015).

Moreover, on some occasions, some factors constrain entrepreneurs' access to bank loans. They may not have enough credit and assets to secure the loan. Moreover, their business plan may not comprehensively disclose their financial and market plan, which leaves suspicions for bankers and financial managers about financing the project. Additionally, the banks and financial institutions may

use the Credit Scoring System or Secured Lending to control the enterprise 's potential risk (Smallbone *et al.*, 2003). Under such conditions, the small and young firms cannot benefit from formal sources of finance. Therefore, informal financing such as debt from friends and family or personal savings becomes the dominant means of accumulating capital (Conning, 1999). Because of its speed, freedom from collateral requirements, and significantly lower transaction costs, debt financing can be more interactive to entrepreneurs (Armendáriz & Morduch, 2007).

While accessing the different sources of finance depends on many conditions and considerations, such access has contrasting implications for innovation. Formal financing is hard to acquire and raises the risk of disclosing the innovation to other companies and losing entrepreneurs ' control over their own companies. However, the large amount of financial capital gained through this method gives the entrepreneur the ability to do more innovations (Kortum & Lerner, 2000). In contrast, applying for an arranged loan from family and friends or utilizing personal savings may maintain their business control. Still, the amount of loans is smaller than the bank loan, which may force entrepreneurs to quit the innovative ideas and restrict their action (Hottenrott & Peters, 2012). Besides, the innovation process 's risky, idiosyncratic, and unpredictable nature needs continuous and substantial investment for R&D, invention, and innovation-related activities and practices (Ullah, 2019). Financial institutions usually provide medium-term or long-term options on their loans. The more extended payment periods allow entrepreneurs to implement innovation projects as a long-term process, including planning, designing, testing, and development stages (Wellalag & Fernandez, 2019).

In contrast, excessive reliance on informal finance sources can expose entrepreneurs to severe challenges, especially conflicts and entanglements. Because of devoting more time to deal with personal or community interactions and the resulting difficulties, there would be less time for innovation-related staff (Wu, Si, & Wu, 2016). Therefore, formal financial institutions reduce the financial burden for innovative firms, promoting innovation (Wellalag & Fernandez, 2019).

Moreover, financial institutions heavily rely on their expertise in the decision-making process. The impersonal and impartial nature of their decision-making process leads to accepting the right project 's application most of the time (Anthony, 2005). In contrast, informal debt providers offer finance through relationships (Degryse, Lu, & Ongena, 2016), leading to adverse selection of innovation projects.

To conclude, due to the abovementioned limitations mentioned by informal financing towards innovation activities, one can expect that getting finance through formal sources has a higher benefit for innovation than informal sources. Notably, two hypotheses can be derived:

- H1:** Formal sources of finance benefit innovation more than informal sources, making the impact of bank loans on innovation greater than that of family/friends' loans.
- H2:** Formal sources of finance benefit innovation more than informal sources, making the impact of bank loans on innovation greater than that of personal savings.

The Benefit of formal finance for innovation: Is it the same for immigrants and natives?

In the above sections, we argued that formal sources of finance (for example, bank loans) might have an advantage over informal sources (personal savings and bank loans) for innovation. In this section, we argue that the existing literature is inconclusive, and it is necessary to uncover whether this advantage is higher amongst immigrant or native entrepreneurs. Being an immigrant may act like a double-sided sword when benefiting from formal finance towards innovation.

Immigrant entrepreneurship and finance are almost inconclusive regarding the relative benefit of immigrants versus natives from financial sources towards innovation. Different research streams have their implication about the possible direction of this effect. On the one hand, we know from the literature that accessing formal sources of finance is more difficult for immigrant entrepreneurs than their native counterparts due to barriers and limitations in the host country (Abbasian & Yazdanfar, 2013; Yazdanfar & Abbasian, 2014; Aldén & Hammarstedt, 2016; Ram *et al.*, 2003; Smallbone *et al.*, 2003; Volery, 2007). By implication, such an argument may lead us to conclude that if it is harder for the immigrant entrepreneurs to get formal finance, they probably are less risk-willing to do risky entrepreneurial activities such as radical innovations. Such a type of innovation, due to its uncertain nature, may bring the firm adverse effects.

Further, the size of formal finance that immigrant entrepreneurs can get may be smaller than their native counterparts. For example, Bates (1997) finds that the mean size of the bank loan and debt to equity ratio for Korean/Chinese entrepreneurs was lower than that of non-minority entrepreneurs. Therefore, the small size of formal finance (for example, bank loans) may make this group of innovators less innovative. Further, the smaller bank loan size can imply that they probably have a lower risk threshold for radical innovations or expensive innovations. Therefore, their innovation capability may decrease (Giudici & Paleari, 2000).

On the other hand, despite the above assumptions on the possibility of the lower benefit of formal finance for innovation amongst immigrant entrepreneurs (when compared to natives), there are other lines of reasoning to justify us that this group of entrepreneurs may benefit more from formal sources of finance towards innovation. For example, since immigrants are dual embedded in the home and host country context, we may argue that they are the source of innovative ideas (Kloosterman *et al.* 1999; Kloosterman & Rath 2001). Such an advantage provides immigrant entrepreneurs with the opportunity of filling the structural holes that exist in their network structure and transform a liability into a benefit (Gurău *et al.*, 2020). In such a situation, the innovation scope of the immigrants can increase due to the diversity of products and services, and they may be able to benefit from the formal sources of finance to take advantage of heterogeneous ideas towards more innovations (Reagans & Zuckerman 2001; Vasudeva *et al.*, 2013; Storti, 2014). Apart from information and ideas, entrepreneurs can achieve critical resources by being positioned in the middle of these structural holes (Zang, 2018). The heterogeneous composition of immigrant entrepreneurs' social networks privileges them with lesser difficulties in the host country than their counterparts positioning in homogenous ethnic networks (Kloosterman & Rath, 2006). So that, 'resource-sharing' benefit of heterogeneous networks (Zang, 2018) facilitates integrating immigrant entrepreneurs in the host market, access to critical resources, and realize innovation outcomes (Turkina & Thai, 2013; Anwar & Daniel, 2017). Even when it comes to the risk of innovations, we may argue that they can cover the risk of innovations by economies of scale and transaction cost reductions due to their access to their ethnic resources and cheap labour. Such benefits may be used by them to cover the risk of innovations or to overcome the dark sides of the liability of foreignness. Therefore, such lines of arguments may lead us to conclude that they may benefit from sources of finance towards innovation more than their native counterparts.

As discussed above, the literature is inconclusive on the relative benefit of formal sources of finance towards innovation among immigrant and native entrepreneurs. In line with such a paradoxical yet inconclusive understanding about the direction of the effect that, we can get from entrepreneurship and finance literature, we hypothesized this possible effect without direction. Accordingly, we tried to uncover whether the superiority of formal sources of finance over informal sources for innovation is higher amongst the immigrant entrepreneurs than their native counterparts or vice versa. Therefore, we hypothesized that:

- H3:** The superiority of bank loans over personal savings for innovation is not different between immigrant entrepreneurs and their native counterparts.
- H4:** The superiority of bank loans over the friend/family loans for innovation is not different between immigrant entrepreneurs and their native counterparts.

RESEARCH METHODOLOGY

The study investigated the impact of finance sources on entrepreneurs' innovativeness and its differences among immigrants and native entrepreneurs. The population was entrepreneurs who have established a business for at least 42 months (Bosma *et al.*, 2012). Global Entrepreneurship Monitor (GEM) has measured innovation, entrepreneur's status, and sources of finance.

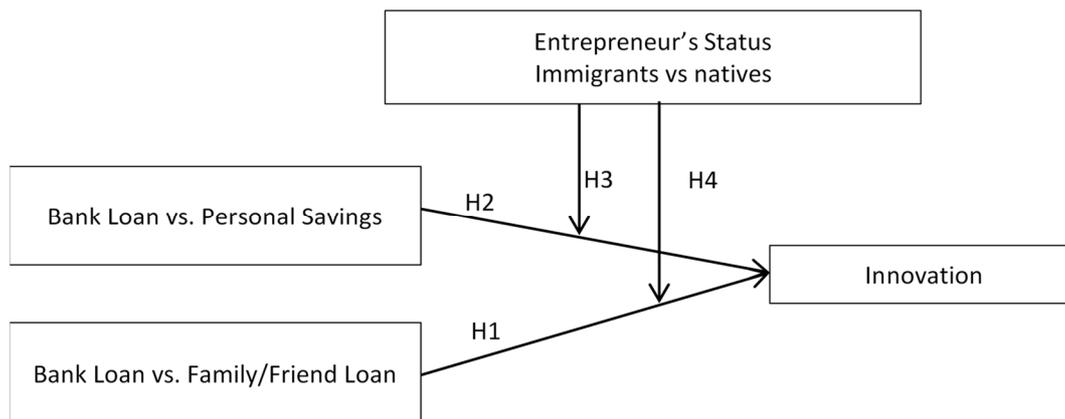


Figure 1. The hypothesized effects in this research

Source: own elaboration.

The GEM is an international consortium launched in 1999 and currently has more than 100 national country teams. The GEM carries out survey-based research on entrepreneurship activities and entrepreneurship ecosystems around the world. It is a global project that annually measures individuals' attributes and activities and supplies unique datasets called Adult Population Survey (APS). At the individual-level (APS), GEM country teams randomly collect data through a standardized survey among adult populations between 18 to 64.

To run the descriptive and inferential analysis, we applied the cross-tabulation test and Linear Mixed Modeling, respectively. To robust our analyses, we applied bootstrapping and PROCESS models from Hayes.

Sample

In 2012, the GEM consortium's national teams collected data on immigrant entrepreneurs in 33 countries, namely Egypt, South Africa, Argentina, Colombia, Malaysia, Philippines, China, India, Iran, Algeria, Tunisia, Nigeria, Angola, Barbados, Ethiopia, Uganda, Zambia, Namibia, Malawi, Botswana, Bosnia, Costa Rica, Trinidad and Tobago, Palestine, Qatar, Chile, Germany, Ireland, South Korea, Luxemburg, Spain, Slovakia, United States, yielding a sample of 15,850 entrepreneurs which consists of 15,096 native entrepreneurs and 754 immigrant entrepreneurs around the world. Having a representative and random sample of entrepreneurs enables us to generalize our findings to similar contexts.

Measurements

Dependent variable: Innovation

Entrepreneurs' innovation is an indicator of an entrepreneur's output. Previous studies found that immigrants are more innovative entrepreneurs than natives (Hunt & Gauthier-Loiselle, 2010; Saxenian, 2002). Thus, innovation was measured by asking the GEM survey participants about the newness of the technology, newness of products for customers, competitiveness, and the number of rivals in the market. These three dimensions covered different types of innovation (Varis & Littunen, 2010) based on the level of innovation; they were scaled low=1, medium=2, and high=3. The respondents answered these questions:

1. Have the technologies or procedures required for this product or service been available for less than a year, or between one to five years, or longer than five years?
2. Will all, some, or none of your potential competitors consider this product or service new and unfamiliar?
3. Will all, some, or none of your potential customers consider this product or service new and unfamiliar?

To measure the innovation, we made an index by using the average of the three indices.

Independent variable: Entrepreneur 's status

Entrepreneurs ' being migrant or native was questioned by 'Were you born in this country?' The responses coded as 0 for 'Yes I was born in this country,' which means s/he is regarded as native, and 1 for 'No I was not born in this country,' which means s/he is considered an immigrant. The operationalization of an entrepreneur 's status (immigrant vs. native) aligns with the UN 's definition of immigrant (UN DESA, 1998).

Independent variable: Sources of financing

In the GEM survey, entrepreneurs were asked about the sources of funding. 'Where did the majority of this money come from to start this business?' and answers are categorized as follows: Personal savings coded as 1, family savings coded as 2, bank or other financial institution coded as 3, friends as 4, and other sources as 5.

To make a more robust measurement, we have combined family and friends ' categories and omitted other sources because the respondents who selected other sources were few. Additionally, entrepreneurs who do not use any financial sources were excluded from the analysis. Hence, the final measurement is coded 1 for personal savings, 2 for family and friends ' loans, and 3 for bank loans. Since it is a categorical variable, and we test it in hierarchical linear modelling, we have to transform it into two dummy variables for statistical analyses: one dummy for the bank loan vs. personal saving and another for bank vs. friend/family loan.

Control variables

We control for variables, namely age, gender (Marlow & Patton, 2005), education (Berge *et al.*, 2014), entrepreneurial competencies such as self-efficacy (Ahlin, Drnovšekand, & Hisrich, 2014), opportunity-alertness (Zhuang *et al.*, 2012), risk-willingness (Nanda & Rhodes-Kropf, 2016) and role model. It is to prevent the accumulation of knowledge and exact test of the interaction effects. Prior research has confirmed that demographic characteristics and entrepreneurial competencies affect immigrant and native entrepreneurs ' outcomes (Baptista *et al.*, 2014). Moreover, we controlled the money entrepreneurs receive from these sources (Cooper *et al.*, 1994). Since we operated the analysis amongst 33 countries, we controlled each country 's institutional effect in this study (Autio *et al.*, 2014). The country was a proxy for expertise level and cultural impact in this study (Ozgen *et al.*, 2014).

Method of analysis

The authors utilized Linear Mixed Modeling to test the hypotheses (McCulloch & Neuhaus, 2001). We used this modelling since the impact of finance sources and the entrepreneur 's status was associated with sampling procedures in countries, and this combination imposed correlations among the sample. Therefore, we introduced countries as random effects in Linear-Mixed Modeling.

To do the above procedure, in the first model, we examined the effect of control variables on our dependent variable, *i.e.* innovation, while inserting countries as a random effect into the model. Then, we tested the direct impact of the entrepreneur 's status and finance ' sources. At the final stage, the authors analysed the moderating effect of an entrepreneur 's status on the relationship between finance sources and innovation, controlling for other variables related to the entrepreneur 's characteristics and competencies.

To ensure the results, we ran two robust checks. Firstly, we checked our results through bootstrap at 95% confidence intervals and 5000 subsampling. Next, we ran model one from PROCESS to check the results ' match.

RESULTS AND DISCUSSION

Table 1 presents the descriptive analyses of our sample. It shows that the average years of education and age were higher for immigrants than native entrepreneurs from a demographic point of view. Moreover, as expected, the proportion of men who participated was relatively higher than women in both groups (immigrants vs. natives).

Table 1 indicates that immigrant entrepreneurs had a relatively higher innovation degree (in terms of market, customers, and technology) on average than native entrepreneurs. The average amount of money that immigrant entrepreneurs received from different sources (like bank loans or family and friends) was more petite than native entrepreneurs. Regarding the sources of finances, contrary to Bates (1997) findings, immigrant entrepreneurs received a higher percentage of money for their business from bank loans than native entrepreneurs. In contrast, native entrepreneurs received a higher percentage of money from family and friends than immigrant entrepreneurs.

Table 1. Descriptive characteristics of the sample

Characteristics		Native entrepreneurs	Immigrant entrepreneurs
Sample Size (N)		15 096	754
Education (years)		10.6	12.97
Age		34.9	37.3
Gender	Male	57.1%	70.6%
	Female	42.9%	29.4%
Sources of financing	Personal savings	54.2%	54.1%
	Family and friends ' loan	24.3%	19.8%
	Banks	21.5%	26.1%
The total amount of money (per 1000\$)		11.31	10.60
Innovation		1.60	1.67

Source: own study.

Table 2 shows the correlation of variables; innovation was positively associated with entrepreneur status. It means that immigrant entrepreneurs had higher innovation than native entrepreneurs. Moreover, innovation was negatively correlated with informal finance sources, namely personal savings and family and friends ' loans. In contrast, innovation had a positive relation with bank and formal institutions loans.

The impact of finance sources of entrepreneurs upon innovation

Table 3 presents the step-wise modelling of hypotheses in this study. In model 1, the control variables were inserted, and it shows which of the control variables may have had a significant effect on our dependent variable, *i.e.* innovation. In model 2, the independent variables, namely entrepreneurs ' status and finance sources, were introduced. Here, it shows that entrepreneurs ' innovativeness did not depend on entrepreneurs ' status.

Hypothesis 1 expected about the impact of family and friends ' loans on innovation compared to bank loans. Results in Table 3, model 2, showed that the more loan from family and friends had a detrimental effect on entrepreneur ' s innovativeness ($\beta = -0.02$, $p\text{-value} < 0.05$). It means that bank loans had an essential role in entrepreneurs ' innovation compared to family and friends ' loans. Therefore, the result supports hypothesis H1.

Hypothesis H2 predicted the impact of personal savings on innovation compared to bank loans. The results revealed that personal saving is less effective for entrepreneurs ' innovation than a bank loan ($\beta = -0.02$, $p\text{-value} < 0.05$). Therefore, hypothesis H2 is supported.

According to hypotheses H1 and H2, we may argue that bank loan has a significant role in entrepreneurs ' innovation.

The Moderating effect of entrepreneurs ' status on finance sources and innovation

Table 3, model 3, presents the results from interaction analyses. Hypotheses 3 and 4 are about the moderating impact of entrepreneurs ' status on formal finance ' s benefit upon innovation. Analysis showed no significant moderating impact of entrepreneurs ' status. It means that the advantage of bank loans over personal saving for innovation did not differ amongst immigrant and native entrepreneurs. Thus, hypothesis H3 is supported.

Table 2. Mean, standard deviation and correlations of variables

Variables	Mean	St. Dev.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) Innovation	1.6	0.51	1												
(2) Ent. status	0.05	0.21	0.032**	1											
(3) Personal saving	0.54	0.49	-0.028**	0.000	1										
(4) Family and friend's money	0.24	0.42	-0.008	-0.020*	-0.613**	1									
(5)Bank	0.22	0.41	0.042**	0.022*	-0.573**	-0.297**	1								
(6) Age	35.03	11.1	-0.008	0.047**	0.031**	-0.066**	0.031**	1							
(7) Gender	0.42	0.49	-0.008	-0.058**	-0.014	0.098**	-0.085**	0.008	1						
(8) Education	10.7	4.6	0.042**	0.108**	-0.073**	-0.013	0.102**	-0.013	-0.072**	1					
(9) Self-efficacy	0.87	0.33	-0.001	0.026**	0.037**	-0.017	-0.027**	0.034**	-0.008	-0.001	1				
(10) Opportunity-alertness	0.72	0.44	0.030**	-0.001	0.037**	-0.008	-0.037**	-0.065**	0.022**	-0.074**	0.142**	1			
(11) Risk-willing	0.76	0.42	-0.015	0.006	0.040**	-0.011	-0.038**	-0.023**	-0.002	-0.031**	0.166**	0.096**	1		
(12) Role-model	0.71	0.456	0.015	-0.037**	-0.005	0.004	0.002	-0.044**	-0.029**	0.022**	0.133**	0.161**	0.011	1	
(13) Amount of money	-0.002	1.01	0.034**	0.014	-0.192**	-0.023*	0.256**	0.016	-0.142**	0.174**	0.050**	0.007	0.009	0.059**	1

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Source: own study.

Hypothesis H4 expected that the advantage of bank loans over family/friends for innovation was not different amongst immigrant and native entrepreneurs. Statistical analyses in Table 3, model 3, did not show such a significant moderation effect. It means that for innovation, the advantage of bank loans over family/friend loans did not differ amongst immigrant and native entrepreneurs. Thus, hypothesis H4 is supported.

Table 3. Direct and moderating effects of entrepreneur status and finance sources

Variables	Model 1	Model 2	Model 3
Constant	1.62***	1.63***	1.64***
Age	-0.0009*	-0.001*	-0.001*
Gender	0.002	0.003	0.003
Education	0.001	0.001*	0.001*
Self-efficacy	-0.006	-0.006	-0.006
Opportunity-alertness	0.002	0.002	0.002
Risk-willingness	-0.02*	-0.02*	-0.02*
Role-model	0.02**	0.02*	0.02*
Total amount of money	0.02**	0.01**	0.01**
Entrepreneurs ' status	–	-0.01	-0.08*
Bank Loan vs. Personal Savings (Dummy variable)	–	-0.02*	-0.02*
Bank Loan vs. Family/Friend Loan (Dummy variable)	–	-0.02*	-0.03*
Entrepreneur status x personal savings	–	–	0.101
Entrepreneur status x family & friends ' loan	–	–	0.08

Significant codes: 0.0001 '***' 0.005 '**' 0.05 '*'

Number of cases = 15 850.

Source: own study.

Robustness checks

We applied linear regression analysis and bootstrap at 95% confidence interval and 5000 subsampling to prevent the accumulation of knowledge and exact test of the interaction effects. Results from the bootstrapping methods confirmed our previous results. Table 4 presents the linear regression and bootstrapping of our data.

Table 4. Linear regression analysis and bootstrapping

Variables	Model 4	Model 5
Constant	1.621**	1.624**
Age	-0.001	-0.001
Gender	0.015	0.016
Education	0.002*	0.002*
Self-efficacy	-0.014	-0.014
Opportunity-alertness	0.035**	0.036**
Risk-willingness	-0.034**	-0.034**
Role-model	0.011	0.011
Total amount of money	0.023**	0.023**
Entrepreneurs ' status	.079**	-0.005
Bank Loan vs. Personal Savings (Dummy variable)	-0.047**	-0.052**
Bank Loan vs. Family/Friend Loan (Dummy variable)	-0.04**	-0.045*
Entrepreneur status x personal savings	–	0.119
Entrepreneur status x family & friends ' loan	–	0.096

Significant codes: *** 0.0001, ** 0.005, * 0.05.

Number of cases = 15,850

Source: own study.

Table 4 confirms our previous analyses; the family and friends ' loan and personal savings deteriorated entrepreneurs ' innovation compared to bank loans. Thus, hypotheses H1 and H2 are supported.

In these analyses, we did not find a significant effect of entrepreneurs' status upon the relationship between finance sources and entrepreneurs' innovation.

Process

To make our results more robust in comparison to the previous ones, specifically in the interaction section, we applied the Process model number 1 is to observe our results from another angle view (Process Macro from Andrew F. Hayes, Version 3.5). Table 5 presents results from the Process analyses. The results confirmed our initial analyses that the entrepreneurs' status did not significantly impact the relationship between family and friends' loans and entrepreneurs' innovation.

Table 5. The interaction effect of family and friends' loan and entrepreneurs' status upon innovation

Variables	Coefficient	T- Value	LLCI	ULCI
Family and friends' loan	-0.008	-0.78	-0.0255	0.0090
Entrepreneur's status	0.076**	3.06	0.0354	0.1171
Family and friends' loan × entrepreneurs' status	-0.012	-0.21	-0.1036	0.0792
Constant	1.5878***	307.54	1.5793	1.5963

Significant codes: *** 0.0001, ** 0.005, * 0.05.

DV= Innovation

Source: own study.

Table 6 shows the analyses for the effect of the interaction between personal savings and entrepreneurs on innovation. The results confirmed the analyses presented in table 3, model 3. It indicated that the entrepreneurs' status did not modify the impact of finance sources on entrepreneurs' innovation.

Table 6. The interaction effect of personal savings and entrepreneurs' status upon innovation

Variables	Coefficient	T- Value	LLCI	ULCI
Personal savings	-0.03***	-3.32	-0.0448	-0.0151
Entrepreneur's status	0.051	1.56	-0.0026	0.1053
Personal savings × entrepreneurs' status	0.042	0.94	-0.0312	0.1155
Constant	1.602***	241.306	1.5911	1.6129

Significant codes: 0.0001 '***' 0.005 '**' 0.05 '*'

DV= Innovation

Source: own study.

As Figure 2 also shows, the entrepreneurs' status (being immigrant or native) did not influence the effect of finance sources upon innovation.

Discussion

Immigrant entrepreneurs may suffer from discrimination in the financial system regarding access to formal sources of finance (Aldén & Hammarstedt, 2016; Smallbone *et al.*, 2003). However, it is unknown whether this deficiency can hinder their innovations or be balanced or neutralized by other privileges. The current research fills this gap consistent with the calls for investigating the effect of immigrant's financial sources and innovation (Aliaga-Isla & Rialp, 2013; Moghaddam *et al.*, 2017). Therefore, it compares the superiority of formal sources of finance for innovation amongst immigrants and native entrepreneurs.

The primary motivation was to answer the inconclusive arguments presented in the literature on the benefit of financial sources for innovation amongst immigrant and native entrepreneurs. The study found that while formal sources of finance can benefit innovation more than informal sources, this advantage is independent of the entrepreneur's status. In other words, while there is a gap in the innovation level of entrepreneurs depending on the formality/informality of finance sources, this gap is the same for the immigrant and native entrepreneurs.

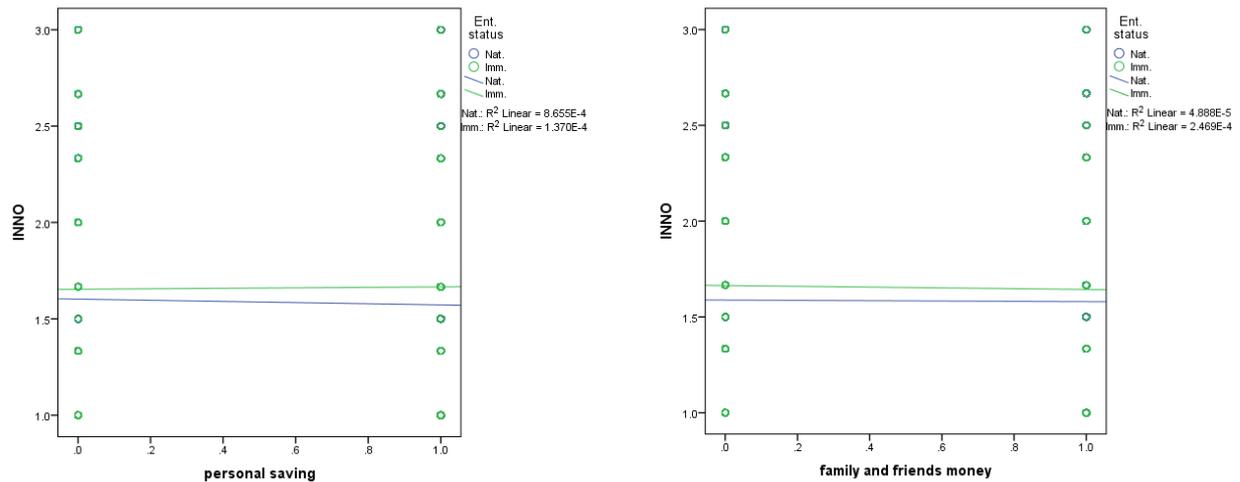


Figure 2. The interaction effect

Source: own elaboration.

Statistical analyses for hypotheses 1 and 2 showed that getting finance from informal sources (*i.e.*, personal savings or family/friends' loans) is less beneficial than formal sources for innovation. In other words, entrepreneurs (regardless of being immigrant or native) relying mainly on financing from formal sources are more likely to innovate than those who use informal finance. These findings are in line with those provided by Wu *et al.* (2016), according to which the informal sources of finance require time for conflict resolutions, and the entrepreneurs may have less time for innovation-related stuff. Further, we may adopt the standpoint of Wellalage and Fernandez (2019), arguing that the informal sources of finance are assigned on a personal basis. Financers may provide the funds to the business ideas with lower innovation potentials to the adverse selection effect. Moreover, financial institutions use their expertise to evaluate the projects' innovation potentials and estimate the return on the innovations. After such a scholarly investigation, funding the projects signals the project's innovative potential (Anthony, 2005).

Statistical analyses for hypotheses H3 and H4 showed that being an immigrant or a native did not affect the relative advantage of bank loans over personal savings and family/friend loans for innovation. The literature on immigrant entrepreneurship highlights that immigrant entrepreneurs face different liabilities and constraints in the host country to finance their entrepreneurial activity (Dabic *et al.*, 2020; Tengeh & Nkem, 2017; Zhou & Guillén, 2015; Lee & Black, 2017). Such constraints may increase the cost of innovation for them and lead the scholars to be suspicious about their ability to benefit from financial sources towards innovation. However, as our findings showed, the entrepreneur's status (immigrant vs. native) did not affect the superiority of formal finance for innovation. We argue that immigrant entrepreneurs have some privileges over native entrepreneurs, which may balance the adverse effects of foreignness liability. First, immigrant entrepreneurs can balance their liability of foreignness through other mechanisms. Mixed embeddedness (Kloosterman & Rath, 2006) in two societies can be a source of innovation (Dheer & Lenartowicz, 2018; Tavassoli & Trippl, 2019; Brieger & Gielnik, 2020). Immigrant entrepreneurs can apply the know-how they have learned and applied in their home country to innovate in their host society. Such a privilege is a source of innovation both directly and indirectly. They can directly repeat what is being done in their home country (and is unknown in the host country) and their local communities at home to address their needs. Further, they can complement the knowledge taken from their home country with their means in the host country.

Secondly, immigrant entrepreneurs can benefit from business and ethnic resources to lower the cost of innovation and the risks associated with their innovativeness in the host country. As research shows, immigrant entrepreneurs have more business collaborations (Ashourizadeh, 2017; Ashourizadeh & Saeedikiya, in press), which can affect the transaction costs for the innovation (Dheer & Lenartowicz, 2018). Therefore, while immigrants may face limitations when they try to access the formal

sources of finance, they can benefit from the economies of scale provided by their networks. Further, such business collaborations can help them in the process of value creation and delivery. Business networks can help them in addressing information asymmetry in terms of market research and future customer needs. Further, these networks can affect the information spillover about their product 's innovations and attracting demands for their innovations and affect their expected returns on innovation, leading them to innovate. The diversified network can also act as a source of innovation because the heterogeneity of information they receive can increase their awareness about desirable innovations in different sectors and regions (Wang, Chen, & Fang, 2018; Muller & Peres, 2019).

Thirdly, ethnic resources affect the innovation process. Unlike native entrepreneurs, immigrant entrepreneurs are embedded in their ethnic networks (Brzozowski, Cucculelli, & Surdej, 2017; Tong, 2019), a cheap labour and information source. Therefore, the availability of such resources can decrease the cost of innovation for the immigrant entrepreneurs and balance their innovation level compared to the native entrepreneurs.

CONCLUSIONS

This research 's contributes to the field in multiple folds. From a theoretical point of view, our results answer a paradoxical, yet inconclusive understanding portrayed by entrepreneurship and finance literature on the immigrant entrepreneurs ' benefit from formal finance towards innovation. It shows that although immigrant entrepreneurs face some limitations as the liability of foreignness in the host country, they have the advantage of insiders in ethnic and business networks (Ashourizadeh & Saedi-kiya, in press). Such a privilege can balance the unproductive effects of host country limitations on their innovation. Therefore, one needs to consider the liabilities and the privileges linked to the immigrant entrepreneurs in terms of innovation through formal and informal finance. More specifically, the current findings can be used by the researchers focusing on the liability of foreignness and finance by providing insight that the liability of foreignness (when measured by being immigrant vs. native) does not sufficiently explain the conversion of formal finance sources to innovation.

From an empirical point of view, previous studies (e.g., Aldén & Hammarstedt, 2016) showed that immigrants can have difficulties accessing formal sources of finance. However, they did not answer how this deficiency affects their innovativeness compared to their native counterparts. This study highlighted that being an immigrant is not associated with benefiting from formal sources of finance towards innovation.

Implications for policy and practice

Immigrant entrepreneurs may face limitations in accessing formal sources of finance and bank loans. However, based on our results, they benefit from sources of finance towards innovation, the same as native entrepreneurs. This finding implies that policymakers need to find ways to facilitate their access to such sources of finance. Planning tailored education for the immigrant entrepreneurs to teach them how to access bank loans and other formal means of finance would be beneficial in utilizing their innovation potential similar to native entrepreneurs. Training immigrant entrepreneurs on new alternative financing methods such as crowdfunding (Belleflamme *et al.*, 2014) and peer-to-peer lending can also be fruitful to obtain financial sources (Bruton *et al.*, 2015). When their project is assessed as highly innovative, they can be supported through a team of experts specializing in finance and market sectors to avoid denial and attract financial investors to exploit the opportunity for innovation.

Limitations

The current research provides a comparative perspective on the interplay of finance-innovation between immigrant and native entrepreneurs in a sample of entrepreneurs from 33 countries. While the comprehensiveness of the data gives us a unique insight to uncover the phenomenon, we still need comparative cross-contextual studies to explore the link between finance and innovation amongst immigrant and native entrepreneurs. For example, the structure of financial markets or financial institutions in different countries can influence the translation of finance to innovation. Our study did not

consider such differences. Further, the degree of liability of foreignness perceived by immigrant entrepreneurs might be different in different countries. For example, our study did not consider cultural or language similarities between the host and home country of the immigrants. Therefore, there is a need to customize the study 's finance-innovation link based on such criteria.

Moreover, our study focused on bank loans as a formal source of finance. The results should be treated with caution when applied to the other formal sources of finance, such as equity financing. In this case, different stakeholders ' engagement in the innovation process affects the control and decision to innovate.

Future research directions

As discussed earlier, immigrant entrepreneurs have more business collaborations and are embedded in their ethnic network (Ashourizadeh & Saeedikiya, in press). Still, we need to consider the nature and structure of immigrants ' networks and investigate how to trust mechanism shapes around financing entrepreneurial ventures and how the effect of these networks can be contingent on the role of the host society 's formal and informal institutions. Further, we need to understand how these networks balance the liabilities around the immigrant entrepreneurs.

Secondly, innovative financing ways (e.g., crowdfunding, microfinance, and peer to peer lending) (Bruton *et al.*, 2015) among immigrant entrepreneurs and how these sources of financing influence their performance have not been investigated yet, and it is recommended to be explored. It will give a more comprehensive picture at the micro-level about immigrants ' possibilities on financing sources, which can expand our knowledge on immigrant entrepreneurship and help policymakers for more effective policies regarding immigrant entrepreneurs.

Thirdly, our research is a comparative study of native and immigrant entrepreneurs. However, the impact of context has not been considered in this article. It would be fascinating if future studies consider the impact of context as a matrix, like the origin of immigrants from emerging or developed economies to emerging or developed economies, to scrutinize the impact of contextual embeddedness in a specific society.

Finally, literature confirms the effect of ethnic networks on providing the immigrants with their necessary resources. However, there is limited knowledge of the impact of their connections in other spheres (such as a business) on accessing funding sources and their performance. From the social embeddedness view, it has been argued that relations with managers of banks and financial institutions may help them get a bank loan (Uzzi, 1999). However, it is unknown how such relationships shape and affect their access to formal sources of finance.

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Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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