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Economic Implications of the Global Financial Crisis

edited by
Marek A. Dąbrowski
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Editorial

Ten years ago the global financial crisis broke out with the bankruptcy of the U.S. investment bank Lehman Brothers on September 15, 2008. According to the BIS timeline, that bankruptcy initiated the third stage of the crisis and was preceded by the 'prelude' (June 2007 to mid-March 2008) and 'events leading up to the Lehman Brothers bankruptcy' (mid-March to mid-September 2008) (BIS, 2009). But these first two stages were mostly related to problems in mortgage and financial markets in the U.S. economy. In the third stage, the 'crisis of confidence quickly spread across markets and countries' (BIS, 2009, p. 23). The following two stages, 'global downturn' (late October 2008 to mid-March 2009) and 'first signs of stabilisation' (from mid-March 2009), were marked by global macroeconomic and financial spillovers working through trade and financial channels. In 2009 the GDP growth declined in comparison to its eight-year average by 4.4 p.p. in the world economy and the trade volume of goods and services by 16.7 p.p. (data from IMF, 2018).

The early studies of the global financial crisis were focused on crisis resilience since there was a lot of heterogeneity in the impact on individual countries (see, e.g., Bussière Cheng, Chinn, & Lisack, 2015; Didier, Hevia, & Schmukler, 2012; Dąbrowski, Śmiech, & Papież, 2015). Many countries responded to the crisis with expansionary macroeconomic policies: policy rates were cut to very low levels and fiscal policies were relaxed. The direct effects included sharp cuts in interest rates and the build-up of public debt. The interest rates were decreased to virtually zero in advanced economies and major central banks had to resort to the use of unconventional tools. Even though central banks in emerging market economies retained some leeway for conventional monetary policy, the policy rate cuts were equally deep, e.g. the policy rate decreased by more than 3.5 p.p. on average in BRICS countries between September 2008 and December 2009 (data from the BIS Statistics Explorer). The fiscal stimuli inflated the public debt by almost 20% of GDP in advanced economies and 4% of GDP in emerging market and developing economies between 2008 and 2010. After ten years from the outbreak of the global financial crisis some countries have not fully recovered from it (e.g. Croatia, Finland, Italy) and/or experienced a very low rate of economic growth (e.g. France, Latvia, Serbia) (data from IMF, 2018). Thus, more recently, research has shifted towards medium-term and long-term implications of the crisis (see, e.g., Ball, 2014, Summers, 2015).

This issue is focused on direct and indirect effects of the global financial crisis. The articles contribute to the discussion on the impact of the global financial crisis on such issues as the relation between international trade financial development, economic growth and business cycles and macroeconomic policy.

The article by Paweł Kawa and Marta Wajda-Lichy, entitled *Trade-Finance Nexus: Was it Distorted in the Aftermath of the Global Financial Crisis?*, investigates directly the relations between international trade and financial development. Their findings lend support

to a positive answer to the eponymous question: indeed in almost all middle-income countries and half of high-income countries structural changes are found. The evidence of a strong increase in finance development and 'trade plateau' in middle-income countries in the wake of the crisis are presented and some explanations are offered.

The next two articles discuss economic growth and business fluctuations in middle-income European economies. Nenad Stanišić, Nikola Makojević and Tijana Tubić Ćurčić investigate the process of economic convergence in their article entitled *EU Enlargement and Income Convergence: Central and Eastern European Countries vs. Western Balkan Countries*. Using the unit root tests that allow for endogenous breaks in time-series, they find that the majority of the Central and Eastern European (CEE) economies converge in income per capita to the average level in the EU15. This, however, is not the case of Western Balkan countries, possibly because they embarked on structural reforms later than CEE countries.

Cyclical behaviour of GDP growth, rate of unemployment and inflation rate in Central and Eastern Europe is examined by Bartosz Pawęta in his article entitled *Impact of the Global Financial Crisis on the Business Cycle in the Visegrad Group*. The pre-crisis and post-crisis periods are compared with respect to the duration, amplitude and intensity of business cycles. It is demonstrated that the impact of the global financial crisis both on economic growth and fluctuations was far from being negligible.

The next three papers discuss the issues related to macroeconomic policy. Tomasz Uryszek in his article entitled *Fiscal Sustainability of Local Governments in the Visegrad Group Countries* investigates whether fiscal balances of local governments in the Visegrad Group countries are sustainable. His main finding is that all the countries considered showed some potential to have primary surpluses at the local level, especially in the post-crisis period, but the actual fiscal policies of local governments need to be tighten to make them sustainable.

In their article entitled *Assessing the Fiscal Sustainability in Ukraine: TVP and VAR/VEC Approaches*, Victor Shevchuk and Roman Kopych focus on the case of Ukraine. Specifically, they examine the relation between the primary budget surplus and the difference between real interest rate and real GDP growth, and find that Ukraine lacks fiscal sustainability.

In the aftermath of the global financial crisis, major central banks reduced their policy rates to very low levels and adopted an unconventional monetary policy. The interesting case of the Swiss National Bank (SNB) that set its policy rate below zero is discussed by Elisabeth Ziegler-Hasiba and Ernesto Turnes in their article under the title *Negative Interest Rate Policy in Switzerland*. Not only do they present the negative interest rate policy of the SNB, but also discuss its implications for the real economy and the financial markets. They contribute to the debate on the relation between monetary policy, financial stability and asset price bubbles, i.e. the controversy on the 'leaning against the wind' policy versus 'cleaning up' policy.

Jacek Lewkowicz discusses foundations and research apparatus of law and economics in his article under the title *What is Law & Economics and how could it have contributed to preventing the Global Crisis?* The main point is that law and economics provide an approach that allows to analyse legal issues with economic tools. His claim is that on the one hand the legal framework in which economic agents operate should be included in economic analysis to a greater extent, and on the other hand research

apparatus of law and economics is still not good enough to allow for analysis of legal regulations and informal institutions.

This issue includes five other articles that are included in the 'Other Articles' section.

Marek A. Dąbrowski
Thematic Issue Editor

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Trade-Finance Nexus: Was it Distorted in the Aftermath of the Global Financial Crisis?

Marta Wajda-Lichy, Paweł Kawa

ABSTRACT

Objective: The objective of this article is to examine whether the trade-finance nexus was distorted in the aftermath of the global financial crisis.

Research Design & Methods: We estimated OLS regressions between trade and finance for 36 countries. The Quandt-Andrews breakpoint test and Bai-Perron multiple breaking point test were used to test for structural breaks in the trade-finance nexus.

Findings: The results show that a structural break in the trade-finance relationship occurred in 2008 in the majority of the examined countries. The structural changes were relatively more often identified in middle-income countries than in high-income ones. This finding confirms our suppositions inferred from the stylized facts that reactions of international trade and financial development in the crisis era differed across the countries depending on their level of development.

Implications & Recommendations: Our study partly fills the gap between theory-based approaches to the trade-finance nexus and empirical evidence. It also emphasizes the need of a revision of traditional theoretical arguments, including those referring to the linkages between the financial and the real sides of economy.

Contribution & Value Added: Our article contributes to the theoretical discussion in three ways. Firstly, we examine a still bothering question on the relationship between the financial and the real sides of economy. Secondly, while the main strand in the literature deals with finance-growth and trade-growth interactions, we focus directly on the trade-finance linkages. Thirdly, our finding that a break in the trade-finance nexus was more pronounced for the middle-income countries may provide some insight into better understanding of the global financial crisis of 2008 and its consequences.

Article type:	research article
Keywords:	financial development; international trade; trade-finance nexus; financial crisis
JEL codes:	F10, F11, F40, G10

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INTRODUCTION

It is widely confirmed that trade openness and financial development are relevant determinants of economic growth. Extensive literature on trade-growth (e.g. Dollar & Kraay, 2003; Frankel & Romer, 1999; Edwards, 1998) and finance-growth linkages (e.g. King & Levine, 1993; Dornbusch & Reynoso, 1989; Levine, Loayza, & Beck, 2000; Wachtel, 2003) explores the mechanisms through which these two factors influence growth.

Classical arguments for international openness date back to Adam Smith's analysis of production specialization based on absolute advantages and David Ricardo's theory of comparative advantages. Both approaches emphasise that openness promotes efficient allocation of production factors and leads to wealth increase. Traditional theories of trade also indicate that outward-oriented countries enable enterprises to exploit economies of scale. Neo-classical theories of growth confirm higher effectiveness of resources allocation in open economies, underlining the role of international trade in promoting competitiveness and dissemination of knowledge and technological progress (Frankel & Romer, 1999). There are also arguments for learning-by-doing effects which occur through both export and import channels (Baldwin & Gu, 2004).

Modern theories of economic growth, as well as empirical studies reveal, however, that growth effects of trade openness should not be taken for granted. They may depend on a variety of structural characteristics, including the level of competitiveness and development (Helpman, 1984; Helpman & Krugman, 1985; Bahgwati & Srinivasan, 2001), market flexibility, institutional quality (Acemoglu, Johnson, & Robinson, 2005) or the political environment (Bordo & Rousseau, 2012; Rajan & Zingales, 2003). Rodrik (1992) claims that trade openness may cause macroeconomic uncertainty and thereby lead to macro-level shocks which undermine growth. These arguments are formulated neither against open-oriented economies, nor in favour of autarky. Instead, they rather explain ambiguous effects of trade-led growth strategies adopted by different countries at different times.

The history of theoretical and empirical research on financial development and economic growth extends into the second part of the 19th century. A well-developed financial sector was commonly regarded as favourable for accelerating growth by increased accumulation of savings, stimulating investment through lower cost of capital, more adequate investment projects appraisal, and better risk management (Schumpterer, 1934; King & Levine, 1993; Dornbusch & Reynoso, 1989). Also from a political economy perspective, financial development was traditionally considered as a 'key to growth' (Hoenig, 1995). However, some economists (e.g. Robinson, 1952; Lucas, 1988) point out a possible reverse causal link: it is not a well-developed financial system which fuels economic growth, but it is economic growth which generates demand for financial services and determines how well the system of financial intermediation is developed.

The recent global financial crisis evoked a renewed interest in financial markets' impact on economic growth. As the crisis had its origins in substantial turbulences experienced in financial markets, more emphasis was put on identifying negative consequences of development or 'over-development' of financial markets. The main concern which arises is that some countries may have 'too large' financial systems in relation to the size of their real economies that could make them more vulnerable to disturbances. The global crisis also exposed a foreign trade as an important channel of shocks transmission across countries.

A sudden collapse in trade in 2009, then its short-term recovery (both of them much more intensive than the concurrent changes in GDP), and finally a 'trade plateau' observed since 2012 imply that these disturbances were caused not only by demand factors.

Despite a wide range of theoretical and empirical evidence on how foreign trade and financial development affect growth, the interactions between trade and finance are still relatively rarely discussed in literature. The perturbations caused by the financial crisis induce to rethink the trade-finance nexus both from theoretical and empirical perspective.

The aim of our article is to examine whether the trade-finance nexus was distorted during the last financial crisis of 2008. We also want to test whether changes in international trade and financial development were different in the middle- and the high-income countries. In our interpretation of the findings, we refer to a theoretical background and empirical evidence of the trade-finance nexus.

The article is divided into the following sections. We start with the theoretical aspects of the trade-finance linkages. Then, we present data and methods of our research. This section consists of two parts. In the first one, we report on trade openness and financial development in the period 1993-2016 and present the stylized facts for the two groups of countries: the middle- and the high-income economies. In the second one, we focus on quantitative methods used to test for structural breaks in the trade-finance nexus. Then, we present and discuss the results of two statistical tests applied in our research. The conclusions are formulated in the last part of the article.

LITERATURE REVIEW

A traditional approach to the trade-finance linkages indicates that trade and financial development are complementary. This relationship is described by two hypotheses which stand for the directions of the causalities between these two variables.

The first one, known as a demand-following hypothesis, reflects the causality from trade to finance. It can be justified with a claim that real economy needs finance. In other words, demand for financial services should induce financial development. This hypothesis is supported by Robinson (1952) who pointed that 'where enterprise leads, finance follows'. It is worth adding that the real sector uses external sources not only for financing direct production activity, but also for promotion, research, and training expenditure. In open economies demand for credits or other financial instruments is expected to be larger because of the specificity of cross-border transactions. Firstly, both exporters and importers require financial instruments to hedge their transactions against external risks, like exchange rate fluctuations, transport damages or delays. Secondly, demand for finance is a consequence of higher competition from foreign enterprises. To build comparative advantages and deal with higher foreign competition domestic producers need reliable, adequate and efficient financing, both long-term (for investment and human capital development) and short-term (for current cross-border transactions and production processing). Thirdly, as export producers want to exploit economies of scale they need more external financing to undertake new investments and research. Some economists, e.g. Beck (2002, 2003) and Rajan and Zingales (2003), found that the causality running from trade to finance development is indeed significant. Their research contributed to an important strand of the literature on trade openness and finance nexus, underlining the role of political economy in the financial development.

The second approach to the trade-finance nexus, known as a supply-leading hypothesis, indicates causality from finance to trade. It was formulated in the finance-growth literature, suggesting a positive impact of finance on economic growth, but then it was extended to other implications of finance, e.g. for international trade. It suggests that well developed financial markets may constitute a source of comparative advantages for the foreign traders, thus enhancing trade and increasing openness of the economy. The starting point of a discussion could be an argument put forward by Schumpeter that financial services support savings and investments and are necessary to foster economic growth (Schumpeter, 1934). Referring to the Schumpeterian concept of creative destruction, King and Levine (1993) underline the influence of a financial system on entrepreneurship. They define four channels of that influence, that may extend trade capacities: selecting the most promising investment projects, employing resources to fund well-auguring projects, enabling investors to diversify their risks and finally, exposing potential additional benefits of innovations. According to Beck *et al*. (2009), credit removes financing constraints that otherwise exporters would have to face, thus leading to greater investments and potentially greater exports. Using fundamentals of the Greenwood and Jovanovic (1989) model with an endogenous financial system, Acemoglu (2009) confirmed that financial intermediation lowers costs and increases rate of return on capital. According to Greenwald, Salinger and Stiglitz (1992), financial development eliminates some market failures and reduces high risks typical for technologically advanced projects which are a source of country's competitiveness. This argument is shared by Chang, Hung and Lu (2005) who explored the possible relevance of financial development and R&D activities in promoting international trade. Manova (2013) stated that limited financial development does not only restrict trade by lowering output, but it also disrupts trade by precluding potentially profitable firms from exporting (extensive margin) and restricting exporters' sales abroad (intensive margin). In his empirical work Beck (2002) confirmed that the mature financial markets induce higher volume of trade, as well as influence its structure. Some other empirical findings basically lend support to the supply-leading hypothesis (Hur, Raj, & Riyanto, 2006; Becker, Chen, & Greenberg, 2013). Although the link between financial development and exports would also suggest a positive impact of finance on imports, the related empirical findings either do not explicitly examine the effect on imports or find a considerably weaker impact of finance on imports than on exports (Beck, 2002).

Analysing theoretical background of the trade-finance nexus, a bi-directional causality should also be discussed. It means that finance and trade can be mutually dependent. In other words, the real sector demand for financial services induces financial development and vice versa, i.e. the well-developed financial system is a pre-condition for trade openness. Aizenman and Noy (2009) constructed a theoretical framework leading to two-way feedbacks between finance and trade openness and identify these linkages empirically. The authors focused on bi-directional causalities between *de jure* and *de facto* financial and trade openness. They confirmed the importance of the lagged trade openness in Granger-causing financial openness, as well as the significance of the lagged financial openness in accounting for trade openness. A bi-directional causality was also examined in the seminal paper of Bordo and Rousseau (2012). They analysed 17 high-income economies over the period 1880-2004 using a sum of exports and imports to GDP as a measure of trade openness and a ratio of broad money (aggregate M2) to GDP as a proxy for financial development. For the final

sub-period 1960-2004, the financial development was proxied by a ratio of private credit to GDP. The authors explored that bi-directional causalities occurred before 1930, but after 1945 these linkages do not persist. Bordo and Rousseau (2012) concluded that due to the changes in the macroeconomic and political environment, trade and finance may settle into a new equilibrium, where outside factors dive the relationship between them more than mutually reinforcing effects. A general approach to bi-directional causality is reflected in Rodrik *et al.* (2004) figure which helps to analyse interdependencies between institutional, geographical and trade related factors in determining income level.

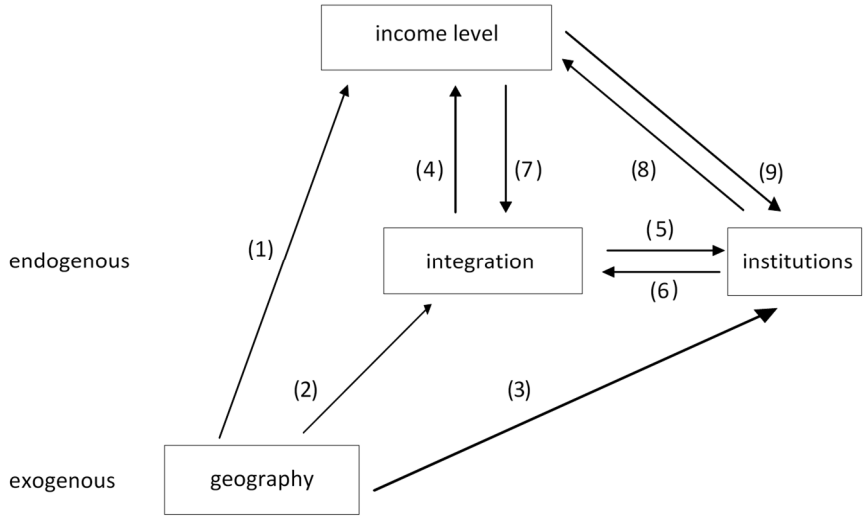

Figure 1. The 'deep' determinants of income
Source: Rodrik *et al.* (2004).

Rodrik *et al.* (2004) suggest three-fold classification of income determinants: geography, integration which is related to trade openness, and institutions which include a quality of financial system. Long-term development is a complex phenomenon and one of the fundamental difficulties lies in sorting out a complex web of causalities. Figure 1 shows that the only exogenous determinant is geography. The extent to which an economy is integrated with the rest of the world and the quality of its institutions are both endogenous. The arrows 5 and 6 going in opposite directions indicate bi-directional causalities between these two factors. These interactions should be considered by researchers trying to identify channels through which trade and finance influence economic growth.

Having reviewed the relevant literature we conclude that the empirical studies provide ambiguous results on the predominance of any of the above-mentioned hypotheses related to trade openness and financial development nexus. Some economists confirm that financially developed countries trade more (Beck, 2002; Manova, 2013; Becker *et al.*, 2013), whereas others emphasize weak or conditioned causality from finance to trade (Chang, Kaltani, & Loayza, 2009; Menyah, Nazlioglu, & Wolde-Rufael, 2014). There is also evidence of links from international openness to finance, which is conditioned on economic or political institutions (Rajan & Zingales, 2003; Baltagi, Demetriades, & Law, 2009; Bordo & Rousseau, 2012; Zhang, Zhu, & Lu, 2015).

MATERIAL AND METHODS

Preliminary Observations: Stylized Facts on Trade Openness and Financial Development

Before applying statistical tests to identify structural breaks in the trade-finance relationship we present the stylized facts on trade openness and financial development in high- and middle-income countries over the period 1993-2016. We use aggregates from the World Bank database. According to the World Bank classification, the group of high-income countries comprises the economies with GNI per capita equal to USD 12 235 or more. The group of middle-income countries includes lower-middle and upper-middle ones. We refer to upper-middle economies which are classified by the World Bank as countries with GNI per capita between USD 3 956 and USD 12 235.

One of the most striking aspects of the crisis was a sharp collapse in trade in 2009. The average annual declines in exports reached 11% in high-income countries and 9% in middle-income ones. Reductions in imports were even stronger, reaching 12% and 14%, respectively (Figures 2 and 3).

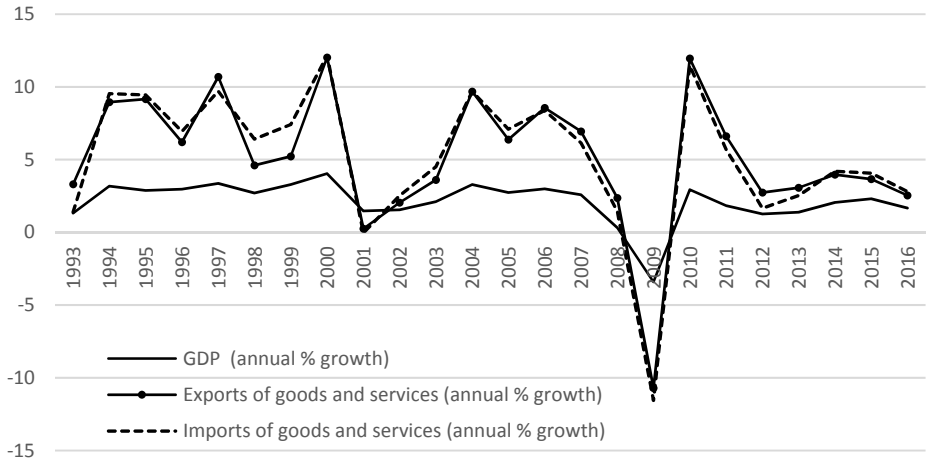

Figure 2. Exports, imports and GDP: annual rates of growth in high-income countries over the period 1993-2016

Source: own elaboration based on the World Bank data available on http://databank.worldbank.org/data/

It is easy to notice that in the both groups of countries the fluctuations in exports and imports were higher than changes of GDP. In 2009, a reduction of the GDP growth was extremely big, however exports and imports diminished even more. Such uneven changes affected both groups of countries and contributed to the deterioration of their trade openness.

Figures 4 and 5 present an index of openness which in 2009 declined significantly in the two groups of countries. Trade openness is measured as a sum of exports and imports divided by GDP. Figures 4 and 5 present also financial development which is proxied by domestic credit to private sector by banks in relation to GDP. The two groups of countries differ significantly in their level of financial development. In the mid-1990s, financial markets in high-income economies were almost twice as deep as in middle-income countries.

In 2008, the average financialization in rich economies reached nearly 100% of GDP[1], whereas in middle-income economies the level of financial development was around 60% of GDP. It is interesting that since 2009 credit-to-GDP ratio has been decreasing in high-income countries, whereas in middle-income economies it has been increasing. This preliminary observation suggests that trade openness and finance behaved differently in these two groups of countries. A break in trade-finance linkages during the financial crisis of 2008 seems to be more pronounced for middle-income countries.

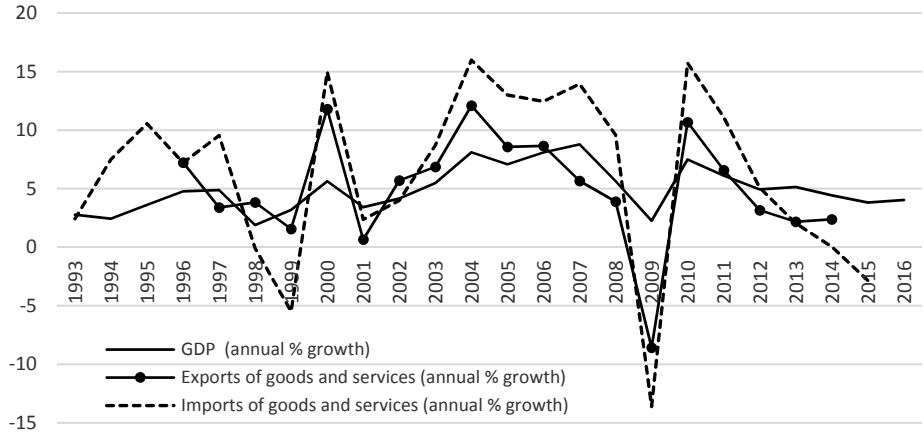

Figure 3. Exports, imports and GDP: annual rates of growth in middle-income countries over the period 1993-2016

Source: own elaboration based on the World Bank data available on http://databank.worldbank.org/data/

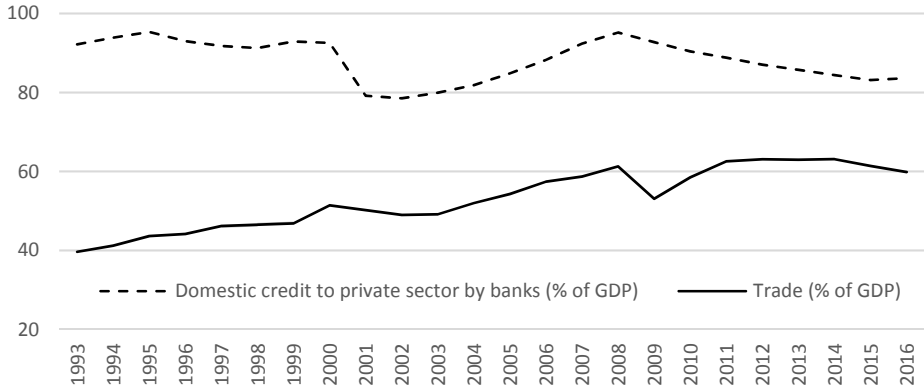

Figure 4. Trade openness and financial development in high-income countries over the period 1993-2016

Source: own elaboration based on the World Bank data available on http://databank.worldbank.org/data/

[1] Some countries, however, had significantly higher indices of financial development. In the United Kingdom domestic credit provided to the private sector by banks amounted for almost 200% of GDP, in Denmark, Spain, Ireland, Portugal, Switzerland and Korea it was more than 150% of GDP. When proxing financial development with the use of domestic credit to private sector Cyprus, Iceland, the United Kingdom and Denmark reached about 200% of their GDP, the United States, Japan, Spain, Ireland, Portugal and Switzerland more than 150%, respectively.

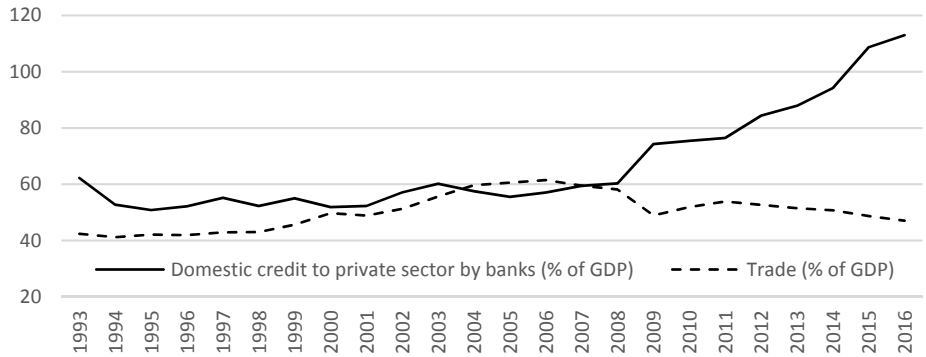

Figure 5. Trade openness and financial development in the middle-income countries over the period 1993-2016

Source: own elaboration based on the World Bank data available on http://databank.worldbank.org/data/

Statistical Tests on Structural Break in the Trade-Finance Nexus

To analyse whether the trade-finance nexus was distorted during the crisis era we tested changes in trade openness and financial development for 36 countries, comprising 15 middle-income economies and 21 high-income economies. We assigned a particular country to one of these groups if for most of the period under consideration it belonged, according to the World Bank classification, to this group.

For each country we estimated simple OLS regressions reflecting the relationship between trade openness and financial development. The former was approximated by exports and the latter was measured by domestic credit to private sector by banks as a percentage of GDP. The growth rate of exports was set as a dependent variable, and all of the regressions were calculated with a constant term. It is worth noting that this simple approach does not allow us to definitively infer on the direction of the trade-finance nexus, as we do not control for potential confounding factors. It also does not involve any explicit tests for causality. However, it provides us with a framework to track changing interdependencies between trade and finance, both before and after the global financial crisis, and examine whether parameters of the models are stable across different data subsamples. The quarterly data calculated as changes to the same period of the previous year was taken from the OECD and BIS databases. We examined the period of 1992Q1-2017Q3 for the middle-income countries and 1990Q1-2017Q3 for the high-income countries. After obtaining estimation results and regression residuals the breakpoints tests were performed both for constant terms and coefficients. We do not choose *a priori* any dates of a potential structural break for each regression, but rather refer to the procedures that facilitate detection of previously unspecified dates marking the shift in the nexus under investigation.

The Quandt-Andrews breakpoint test was applied to test for unknown structural breakpoints. It is based on a multiple application of the Chow test. The idea of the breakpoint Chow test is to fit the equation separately for each subsample and to see whether there are significant differences in the parameters of estimated equations. A significant difference indicates a structural change in the relationship. The idea behind the Quandt-

Andrews test is that a single Chow breakpoint test is performed at every observation between each possible pair of dates in the sample. The test statistics from these Chow tests are then summarised into one test statistic for a test of the null hypothesis of no breakpoints (Andrews, 1993). The null hypothesis was formulated as follows: there are no breakpoints within 15% trimmed data (symmetrically 15% of observations from the beginning and from the end of the estimation sample were excluded).

Bai-Perron multiple breakpoint test (Bai & Perron, 1998) was used as an extension of the Quandt-Andrews framework by allowing for multiple unknown breakpoints. It is an intuitive approach for detecting more than one break which involves sequential application of breakpoint tests. Thus sequential (one-by-one) rather than simultaneous estimation of multiple breaks is investigated. It starts with the full sample and performs a test of the constancy with an unknown break. If the test rejects the null hypothesis of the constancy, the break date is identified, the sample is divided into two subsamples and a single unknown breakpoint test is performed in each subsample (error distributions differences are allowed across breaks what provides robustness of the test to error heterogeneity). Each of these tests may be viewed as a test of the alternative of L+1 breaks versus the null hypothesis of L breaks. The procedure we applied was repeated until all of the subsamples do not reject the null hypothesis at a significance level of 0.05. The critical values were taken from Bai and Perron (2003).

RESULTS AND DISCUSSION

The test results are presented in Table 1 for the middle-income countries and in Table 2 for the high-income ones. According to the Quandt-Andrews test, the Maximum LR F-statistic fails to reject the null hypothesis of no structural breaks for almost all of the considered countries, which allows to expect that the structural change in the trade-finance nexus occurred. The maximum statistic was computed in the vast majority of the countries in 2008Q4, and that is the most likely breakpoint location. The breakpoint date indicates a structural change in the trade-finance nexus and a start of a new regime.

Table 1. Break dates in trade-finance nexus in the middle-income countries

Country	Data range* (Equation Sample)	Quandt-Andrews test		Bai-Perron test		
		Max LR F-statistic	Breakpoint	Break test	Scaled F-statistic	Break dates (sequential)
Argentina	1993Q1-2017Q3	13.3671 (0.0000)	2002Q3	0 vs. 1 1 vs. 2	26.2490 17.1680	2002Q3 2008Q2
Brazil	1997Q1-2017Q3	13.5915 (0.0000)	2012Q2	0 vs. 1 1 vs. 2 2 vs. 3	50.1187 15.0318 46.2162	2012Q2 2008Q2 2002Q3
Chile	1997Q1-2017Q3	8.2996 (0.0056)	2008Q4	0 vs. 1 1 vs. 2 2 vs. 3	18.4126 45.0272 18.3039	2008Q4 2004Q1 2001Q1
China	1993Q1-2017Q3	8.4329 (0.0049)	2008Q2	0 vs. 1 1 vs. 2 2 vs. 3	17.6614 31.4508 15.0585	2008Q2 1999Q4 2003Q2

Country	Data range* (Equation Sample)	Quandt-Andrews test		Bai-Perron test		
		Max LR F-statistic	Breakpoint	Break test	Scaled F-statistic	Break dates (sequential)
Colombia	1995Q4-2017Q3	28.3110 (0.0000)	2012Q2	0 vs. 1 1 vs. 2 2 vs. 3	87.4612 28.0703 17.2572	2012Q2 2003Q3 1999Q3
Czech Republic	1994Q1-2017Q3	18.5788 (0.0000)	2008Q4	0 vs. 1 1 vs. 2 2 vs. 3	34.4082 20.6079 21.0472	2008Q4 1998Q4 2005Q2
Hungary	1993Q1-2017Q3	28.0249 (0.0000)	2008Q4	0 vs. 1 1 vs. 2	48.7774 58.7964	2008Q4 2012Q2
India	1993Q1-2017Q3	8.5577 (0.0044)	2012Q1	0 vs. 1	34.1214	2012Q1
Indonesia	1993Q1-2017Q3	8.5953 (0.0043)	2012Q2	0 vs. 1 1 vs. 2	27.6426 15.0557	2012Q2 2004Q3
Korea	1993Q1-2017Q3	14.7983 (0.0000)	2008Q4	0 vs. 1 1 vs. 2 2 vs. 3	35.2556 18.7406 52.6228	2008Q4 2002Q3 1998Q2
Mexico	1993Q1-2017Q3	16.9380 (0.0000)	2008Q4	0 vs. 1 1 vs. 2	27.1914 47.9863	2008Q4 2001Q1
Poland	1993Q1-2017Q3	23.0481 (0.0000)	2008Q4	0 vs. 1 1 vs. 2	51.4236 63.1984	2008Q4 2002Q4
Russia	1996Q2-2017Q3	12.4535 (0.0001)	2008Q4	0 vs. 1 1 vs. 2 2 vs. 3	25.6690 47.7416 52.2234	2008Q4 2002Q4 1999Q4
South Africa	1993Q1-2017Q3	27.4950 (0.0000)	2010Q1	0 vs. 1 1 vs. 2 2 vs. 3 3 vs. 4	108.6732 18.8208 42.6226 20.2237	2010Q1 2006Q3 2002Q4 1997Q3
Turkey	1993Q1-2017Q3	19.6161 (0.0000)	2008Q4	0 vs. 1 1 vs. 2 2 vs. 3	41.3264 45.9187 41.1445	2008Q4 2002Q2 2012Q2

Notes: *differences in data range result from data availability.
p-values in parentheses; both tests with 15% trimmed data; Bai-Perron test significant on 0.05 level.
Source: own calculations in EViews 10.

Table 2. Break dates in trade-finance nexus in the high-income countries

Country	Data range* (Equation Sample)	Quandt-Andrews test		Bai-Perron test		
		Max LR F-statistic	Breakpoint	Break test	Scaled F-statistic	Break dates (sequential)
Australia	1991Q1-2017Q3	38.8697 (0.0000)	2010Q3	0 vs. 1 1 vs. 2	71.1055 21.3618	2010Q3 1997Q2
Austria	1991Q1-2017Q3	26.5458 (0.0000)	2011Q4	0 vs. 1 1 vs. 2	69.6271 14.2886	2011Q4 2007Q4
Belgium	1991Q1-2017Q3	17.1244 (0.0000)	2008Q4	0 vs. 1 1 vs. 2 2 vs. 3 3 vs. 4	29.0423 49.8944 45.3290 15.4764	2008Q4 2012Q4 2002Q3 1996Q1

Country	Data range* (Equation Sample)	Quandt-Andrews test		Bai-Perron test		
		Max LR F-statistic	Breakpoint	Break test	Scaled F-statistic	Break dates (sequential)
Canada	1991Q1-2017Q3	7.0972 (0.0162)	2011Q4	0 vs. 1	17.7132	2011Q4
Denmark	1991Q1-2017Q3	13.7502 (0.0000)	2008Q4	0 vs. 1 1 vs. 2 2 vs. 3 3 vs. 4	24.0986 53.9370 15.8902 8.5968	2008Q4 2002Q2 2013Q4
Finland	1991Q1-2017Q3	13.0920 (0.0001)	1996Q1	0 vs. 1 1 vs. 2 2 vs. 3	35.4553 26.8089 72.4845	1996Q1 2008Q4 2002Q3
France	1991Q1-2017Q3	7.3327 (0.0132)	2008Q4	0 vs. 1 1 vs. 2	13.2953 31.3606	2008Q4 2002Q4
Germany	1991Q1-2017Q3	23.2214 (0.0000)	2008Q4	0 vs. 1 1 vs. 2	44.4457 9.9971	2008Q4
Greece	1991Q1-2017Q3	5.0050 (0.0943)	1995Q4	0 vs. 1	-	-
Ireland	1991Q1-2017Q3	22.8422 (0.0000)	2008Q4	0 vs. 1 1 vs. 2	55.8165 20.1530	2008Q4 2013Q4
Italy	1991Q1-2017Q3	10.8428 (0.0005)	2000Q1	0 vs. 1 1 vs. 2	31.7353 14.6309	2000Q1 2008Q4
Japan	1991Q1-2017Q3	5.2810 (0.0755)	2012Q3	0 vs. 1	36.0198	2013Q4
Nether-lands	1991Q1-2017Q3	11.3339 (0.0003)	2008Q4	0 vs. 1 1 vs. 2 2 vs. 3 3 vs. 4	22.8194 42.5256 21.0323 19.4542	2008Q4 2002Q3 2013Q3 1997Q1
New Zea-land	1991Q1-2017Q3	25.4483 (0.0000)	2008Q4	0 vs. 1 1 vs. 2	55.5195 59.1777	2008Q4 2003Q3
Norway	1991Q1-2017Q3	12.4355 (0.0001)	2008Q4	0 vs. 1 1 vs. 2 2 vs. 3	24.7376 31.0776 24.5743	2008Q4 1999Q3 1995Q3
Portugal	1991Q1-2017Q3	10.3552 (0.0008)	2012Q1	0 vs. 1 1 vs. 2	21.5969 14.9426	2012Q1 1995Q1
Spain	1991Q1-2017Q3	10.0296 (0.0011)	1998Q1	0 vs. 1	18.1847	1998Q1
Sweden	1991Q1-2017Q3	6.7417 (0.0221)	2002Q2	0 vs. 1 1 vs. 2	18.3263 72.7805	2002Q2 2011Q4
Switzer-land	1991Q1-2017Q3	5.1795 (0.0819)	2002Q2	0 vs. 1	–	–
United Kingdom	1991Q1-2017Q3	6.3080 (0.0320)	2011Q1	0 vs. 1	29.0001	2011Q1
United States	1991Q1-2017Q3	23.1635 (0.0000)	2010Q1	0 vs. 1 1 vs. 2	75.6688 66.2511	2010Q1 1998Q2

Notes: *differences in data range result from data availability.
p-values in parentheses; both tests with 15% trimmed data; Bai-Perron test significant on 0.05 level.
Source: own calculations in EViews 10.

The sequential test results indicate that in the majority of the examined countries there were more breaking dates than one. For example, in Chile three breakpoints were identified: the null hypotheses of 0, 1, and 2 breakpoints were rejected in favour of the alternatives of 1, 2, and 3 breakpoints, respectively. As the scaled F-statistic exceeded the test critical value at a significance level of 0.05, the test of 4 versus 3 breakpoints did not allow to reject the null hypothesis. The sequential testing procedure also identified 2008Q4 as a first breaking point in the majority of countries from both groups. These results suggest a structural change in the trade-finance nexus that occurred shortly after the outbreak of the financial crisis. It is worth noting that a structural break in the trade-finance nexus was more characteristic for the middle-income countries. If we refer to 2008 as a breakpoint date, then in 9 (Chile, Czech Republic, China, Hungary, Korea, Mexico, Poland, Russia, Turkey) of the 15 middle-income countries we examined the trade-finance nexus was distorted, whereas only 8 (Belgium, Denmark, France, Germany, Ireland, Netherlands, New Zealand, Norway) of the 21 high-income countries experienced such a break. Including the results of 1 vs. 2 breakpoints in the sequential approach of Bai-Perron test, we may indicate two more countries in each group (Argentina and Brazil in middle-income group, and Finland and Italy in the high-income group) with such a break in 2008Q4 (in these 4 countries the test results suggest 2008Q4 as the second breakpoint). When we take into account that the crisis did not start in all the countries simultaneously, as the trade and financial channels of crisis transmission did not act immediately, a broader perspective can be applied. Including breaking dates from 2008 till 2010, a break in the trade-finance nexus can be identified in almost all of the middle-income countries (12 of 15) and only in a half of the high-income countries (12 of 21).

We suggest several arguments that could explain the structural trade-finance break in the crisis and post-crisis era. In the majority of the high-income countries the reaction of trade and finance was in accordance with the above-discussed hypotheses. This seems to be in line with our supposition derived from the stylized facts. Sharp declines in international trade flows, as well as 'definancialization' were a consequence of the recession, deterioration of private and public sector balance-sheets positions, and prudential regulations imposed on banking, and non-banking financial institutions. As the crisis originated partly from the accumulation of toxic assets in banks' balance-sheets, their reaction – forced to a certain extent by macroprudential regulations – was to deleverage. Owing to higher uncertainty and risk aversion, banks were not eager to provide credit to the economy. On the other hand, the enterprises faced investment constraints problem which resulted from the lack of investment projects gaining satisfactory returns on capital (a possible explanation of the secular stagnation hypothesis). Besides, financial markets have evolved in ways that allow firms to raise money through stocks, bonds and wholesale money markets, by-passing traditional bank lending. The high-income countries experienced relatively faster growth of private bond markets, stock markets, mutual funds and pension funds markets than the banking system. Another structural characteristic of the high-income economies is that whereas in the recent 20 years the size of the banking system remained largely stable (in 1993 banking credit to GDP amounted to 90% and similarly it did in 2016 with a peak of nearly 100% in 2008), the share of shadow banking system (assets of nonbanks) increased significantly (as a result total credit provided by banks and

other non-bank financial institutions increased from 120% of GDP in 2003 up to 150% in 2016 reaching a peak of 165% of GDP in 2008).

The middle-income economies, which in the three decades before the outbreak of the crisis had extensively opened their economies, were also severely hit by negative external shocks during the global financial crisis. Their openness shrank from 60% of GDP in 2008 to 50% of GDP in 2009, however, private credit to GDP increased from 56% of GDP in the 1990s to 74% of GDP in 2009, reaching a peak of 113% of GDP in 2016 (Figure 5). We explain this as follows. Firstly, despite the crisis, the majority of these countries registered both positive rate of GDP growth (in 2009 average annual rate of GDP growth in middle-income countries was 2.25%) and financial development. This seems to be consistent with the demand-following hypothesis, which in its original version assumed that the real sector development drives financial development. Secondly, many of middle-income countries are emerging economies which catch up with high-income economies. Capital accumulation and investment decisions which are underpinned by financial markets are important determinants of this process. Sharp increase in finance development and "trade plateau" evidenced in middle-income countries in the aftermath of the global crisis can be also explained by the fact that many of these economies reached Lewis turning point. It refers to the phase of economic development when urban factories have finally absorbed the labour surplus from rural areas (Koo, 2016). This stage of industrialisation induces higher wages, loss of competitiveness and deterioration in exports. To continue their expansion and development, middle-income countries need innovations, which are finance-intensive. In fact, many emerging market economies, in order to avoid a 'middle-income' trap, started investing in the advanced-technology industries, as well as in human capital.

CONCLUSIONS

The objective of our article was to examine whether the trade-finance nexus was distorted in the aftermath of the global financial crisis. We tested changes in exports and financial development in 36 countries, of which 15 were classified as middle-income economies and 21 as high-income ones.

The Quandt-Andrews breakpoint test and the Bai-Perron multiple breakpoint test were applied to test for structural breaks in the trade-finance linkages. For the majority of the examined countries the tests showed that a structural break in trade-finance relationship occurred in 2008Q4. We also observed that structural changes were relatively more often identified in middle-income countries than in high-income ones. When we refer to 2008 as a breakpoint date, the trade-finance nexus was distorted in 9 of the 15 middle-income countries, whereas the breakpoint was identified only in 8 of the 21 high-income countries. When we consider the breaking dates from 2008 till 2010, a break in the trade-finance nexus was indicated in almost all of the middle-income countries (12 of 15) and in only a half of the high-income countries (12 of 21) examined. This finding was in line with the stylized facts which showed that adjustments of international trade and financial development in the crisis era differed across countries depending on their level of development.

We are aware, however, of the limitations of the methods employed in the article, which allow only for a rough first approximation of the breaks in the trade-finance nexus. The analysis could be enriched by employing panel data regressions, aimed at

uncovering differences in the trade-finance nexus between high- and middle-income economies. It is also worth rethinking whether the measures of finance are relevant as the modern financial system has become more and more multifaceted. While banks are typically the largest and most important financial institutions, investment banks, insurance companies, mutual funds, pension funds, venture capital firms, and many other types of nonbank institutions start to play a substantive role. According to Adu, Marbuah and Mensah (2013) and Sare *et al.* (2018), the empirical results may lead to significantly different conclusions depending on the proxy used for financial development. Therefore, relying solely on the single, bank-centred measure may be a simplification. To overcome the shortcomings of a single indicator of financial development, a comprehensive index capturing both financial institutions and markets could be used, for example that one proposed by IMF (Svirydzenka, 2016).

A structural break in the relationship between exports and financial development supports the view that there were important changes in economic relationships at the end of 2008, i.e. during the most severe phase of the global financial crisis. Understanding such breaks and their impact on economies needs further research. As the findings on the trade-finance nexus are still inconclusive, the question about the direction of these linkages remains still an intellectual challenge for economic researchers. The future studies in this field of trade-finance nexus could be also enhanced if a larger group of countries in a longer time span, as well as a conceivable endogeneity in this relationship were considered. Moreover, possible non-linearities in the above-mentioned nexus could be included (Gries, Kraft, & Meierrieks, 2009; Gächter & Gkrintzalis, 2017). The crisis emphasized the necessity of the revision of traditional theoretical approaches, including those referring to the linkages between the financial and the real sides of economy. The exploration of the nature of the causal relationships between trade and finance would undoubtedly contribute to the interpretation of their role in economic growth.

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The EU Enlargement and Income Convergence: Central and Eastern European Countries vs. Western Balkan Countries

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ABSTRACT

Objective: This article analyses the stochastic convergence of income per capita between the Western Balkan (WB) and the Central and Eastern European (CEE) countries compared to developed EU countries (EU15).

Research Design & Methods: Stochastic convergence implies that all shocks in country's income relative to the average income of the group are only temporary. In order to test stochastic convergence, the tests of the unit root were used. The Augmented Dickey-Fuller (ADF) test is supplemented with the Zivot-Andrews (ZA) unit root test, which allows for the structural breaks in time series of income per capita.

Findings: Results confirm the existence of stochastic convergence of income per capita toward the EU15 average in the cases of the Czech Republic, Slovakia, Poland, Slovenia, Estonia, Latvia and Romania. Income convergence is not found in the case of the Western Balkan countries.

Implications & Recommendations: While income convergence toward the EU15 average level was found in the case of 7 CEE countries, it was not found in the case of any WB country. This could be a proof of the importance of further support to reforms in the Western Balkan countries.

Contribution & Value Added: The scientific contribution of the article is reflected in the fact that the existing literature dealing with income convergence of the Western Balkan countries toward the income of the EU15 countries is still very limited in number, as is the number of studies that compare convergence of income per capita toward the EU15 between the Western Balkan and CEE countries.

Article type: research paper

Keywords: income convergence; transition economies; European Union; unit root tests

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INTRODUCTION

In the last few decades, one of the macroeconomic issues that has become increasingly important is whether convergence exists between countries – defined as the process of reducing differences in income per capita over time and whether poorer countries can catch up with richer countries in terms of the standards of living. The theoretical importance and the interest in this issue derive from the fact that testing for the existence of convergence presents the answer that confirms the validity of one out of two alternative theoretical approaches (Islam, 2003). While income convergence is an integral part of the neoclassical growth model (Solow, 1956), new theories of growth – theories of endogenous growth – imply that convergence does not occur automatically when the countries differ in income levels and that additional factors determine the existence of the convergence process (Romer, 1986; Lucas, 1988). In addition to different predictions regarding convergence, recommendations for conducting regional policies are also different (Hofer & Worgotter, 1997). New theories of economic growth advocate the idea that economic policies can influence not only the level of production, as discussed in the traditional neoclassical theory, but also the equilibrium rate of economic growth.

The rapid growth of poorer countries in comparison with their richer counterparts and a decrease in disparity in income per capita in the neoclassical growth model, is the result of the decreasing rate of return on capital, due to the fact that the marginal product of capital in poor countries, with smaller income per capita, is higher compared to richer regions with a higher volume of capital per capita (Cherodian & Thirwall, 2015). Income per capita converges towards various equilibrium stages (conditional convergence) or towards a mutual equilibrium stage (absolute convergence), independently from the initial level of income. The differences in equilibrium income between countries reflect differences in the rate of savings, the growth rate of population and the capital depreciation rate (Miller & Upadhuay, 2002). Supporters of the theories of endogenous growth reject the assumption of decreasing returns and faster growth of poor countries compared to the more affluent ones and stress that returns are either constant or growing. Due to growing income, production activity will be concentrated in a certain number of countries and inequalities in development will be intensified – divergence between countries will appear.

Europe consists of heterogeneous countries which have significant disparities in income per capita, so the question of convergence or the possibility of decreasing economic inequalities is a key economic and political challenge (Sutherland, 1986). During the last 25 years, significant transformations have taken place in ex-communist European countries, which have resulted in their integration into the global economy and an increase in living standards. However, for the first several years of transition towards the market economy framework, reforms of political and regulatory systems were followed by a drastic decrease in output, high inflation and an increase in the unemployment rate in these countries (Fisher, Sahay, & Vegh, 1998; Fisher & Sahay, 2000). An initial recession period was followed by divergence in income per capita between socialist countries and the rest of Europe, as well as within the countries themselves. In all countries, the transition towards a market economy was accompanied by numerous issues. However, countries in the Western Balkans (WB) had particular difficulties, where, due to war, political instability, sanctions, economic instability and isolation, the transition process began a decade later compared to the

other countries of Central and Eastern Europe (CEE). Despite economic progress in the last 15 years, which is reflected in an increase of gross domestic product (GDP), GDP per capita and convergence of income between the WB countries and developed EU countries, the speed at which reforms have been implemented is insufficient, hence, the entire region has still not completed the transition process (Stanišić, 2016).

In order to gain initial insight into the development of the WB countries thus far and the comparative disparity with EU member states, the dynamics of the change in the GDP per capita in these countries for the period 1993-2015 was analysed. Figure 1 depicts the trends of average GDP per capita measured by purchase power parity (PPP) in the EU15 (Germany, France, Italy, Netherlands, Belgium, Luxembourg, United Kingom, Denmark, Ireland, Greece, Spain, Portugal, Austria, Sweden and Finland), the CEE10 (Poland, Czech Republic, Slovakia, Slovenia, Hungary, Latvia, Lithuania, Estonia, Romania and Bulgaria) and the WB countries (Croatia, Bosnia and Herzegovina, the Republic of Serbia, Montenegro, FYR Macedonia and Albania).

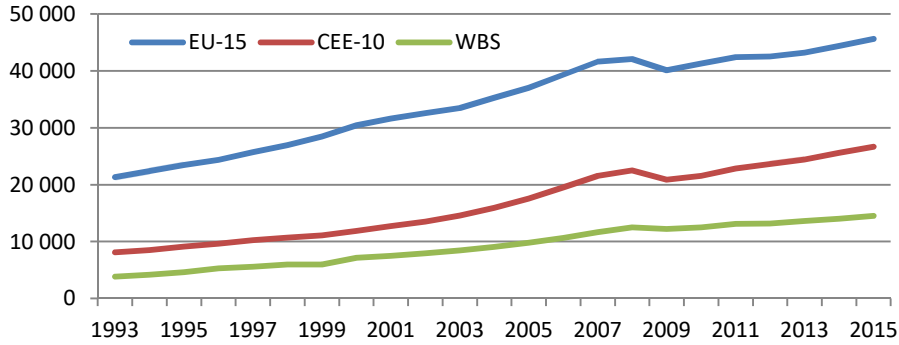

Figure 1. Trends of average GDP per capita (PPP) in EU-15, CEE-10 and WB, in the period 1993-2015, in current international dollars
Source: World Economic Outlook (2016).

The level of living standards, measured by average GDP per capita, increased in all three groups of countries observed. The prosperity which characterised European transition countries at the beginning of the 21st century was suddenly halted due to the beginning of the global financial crisis, primarily in new EU countries. The crisis demonstrated that growth was not sustainable in many countries. In the long run, the manner in which economic growth is generated is important and not only via sudden increases in production. The lowest standards of living were found in the WB countries. In 2015, the standard of living was two times lower compared to that in the CEE10 countries and three times lower than in developed EU countries (EU15). The gap in GDP per capita between these groups of countries can be attributed to constantly lower productivity, higher unemployment and lower levels of human capital and competitiveness in the WB region (Holzner, 2016).

Based on these facts, the subject of the research is the convergence of income of the CEE and WB countries toward the average income per capita of developed EU countries. The aim of the research is to examine, through theoretical and empirical analysis, whether

the CEE and WB countries are converging towards developed countries in terms of income per capita. In line with this, the following research hypothesis is going to be tested:

The Western Balkan and Central and Eastern European countries are converging to the EU15 in terms of income per capita.

The article consists of five sections. Firstly, the results of relevant empirical research on the convergence of income are presented. There then follows an explanation of the data used and the applied methodology of the research, with the results of the research then presented. Lastly, the conclusions of the article are summarised and further direction for research in the area is outlined.

LITERATURE REVIEW

As a topic of scientific research, the income per capita convergence between different countries has increased in importance since the appearance of the so-called "controversy on convergence", which arose as a result of theoretical and scientific debate after the appearance of the theory of endogenous growth (Azzoni, 2001). In literature, the question of convergence has been analysed in various manners. Papers that analyse convergence can be divided into two groups (Bernard & Durlauf, 1996). The first group of authors use cross-sectional data analysis, in order to examine dependence between the income growth rate from its initial level and proved hypotheses on convergence, whereas the other group uses the approach of time series. The time series approach uses unit root tests in order to prove hypotheses related to convergence. The use of various methods and the analysis of different time frames have resulted in mixed conclusions. For this reason, the question of convergence in real income per capita between European countries is still a highly controversial topic.

Cross-sectional studies mainly confirm the existence of the convergence of income. Matkowski and Prochniak (2004) examined the convergence of income between CEE countries (CEE8) and 'old' EU members, as well as in CEE8 countries themselves. The authors confirmed the existence of convergence for eight new member states, as well as a decrease in the gap in development compared to the EU15 members. A later study, conducted by the same authors using the same sample three years later but over a longer timeframe, confirms the existence of income convergence between 'old' and 'new' EU members (Matkowski & Prochniak, 2007). A decrease in the gap in development between 'old' and 'new' EU members was confirmed in the papers of Kaitila (2004); Vojinovic & Oplotnik (2008); Vojinovic, Acharya, & Prochniak (2009); Rapacki & Prochniak (2009); Vojinovic, Oplotnik, & Prochniak (2010); Głodowska (2015).

The different results of these papers are demonstrated in the speed of the convergence. The existence of convergence between new members and the EU15, as well as huge differences in the speed of convergence was asserted in the papers of Vamvakidis (2008) and Cavenaile and Dubois (2011). Szeles and Marinescu (2010) confirm the existence of absolute and conditional convergence in CEE countries. A decrease in the gap in development between the CEE10 and the EU15 countries was confirmed by Stanišić (2012), with the negative impact of the global financial crisis affecting the speed of convergence.

The approach of using time series in order to prove the existence of convergence started in the last decade of the 20th century. Some of these studies which based their

analysis on this approach include Kutan and Yigit (2005), who analysed stochastic convergence and proved the existence of significant progress of new members in convergence towards the EU. Brüggemann and Trenkler (2007) compared the convergence in income per capita between the Czech Republic, Hungary, Poland and the EU15 economies. The results demonstrated that stochastic convergence existed only between the Czech Republic and the EU15 countries. Cunado and Perez de Grazia (2006) proved a decrease in the gap in the standard of living of Poland, the Czech Republic and Hungary compared to the German economy in the period between 1990 and 2003. Kocenda, Kutan and Yigit, (2006) and Ingianni and Zdarek (2009) proved a decrease in income divergence among new members was present, as well as between new and old members, accentuating that differences exist among countries in the speed of catching up living standards, compared to developed EU members. Reza and Zahra (2008) confirmed the existence of absolute convergence, but not conditional convergence of income per capita between new and developed EU members. The process of the catching up between new and old members was confirmed in the papers of Gligoric (2014) and Strielkowski and Hoschle (2016), who analysed convergences in income in the EU during the last few decades of expansion and they found proof of the existence of convergence within the EU.

Although studies on income convergence of new EU members are numerous, there are few studies concerning the convergence between the Western Balkan countries and the EU15. El Ouardighi and Somun-Kapetanovic (2007) analysed the process of income per capita convergence between the WB countries and the EU24 during the period 1989-2005. They confirmed that after an increase in the gap in development between the two groups of countries during the period 1991-1993, the gap decreased but remained very significant, and the process of convergence with the EU remained very slow. Tsanana, Katralikidis and Pantelidis (2012) analysed income convergence between Balkan countries and the EU15 and concluded that it could be confirmed only in the cases of Slovenia and Greece, but not in the case of other Balkan states. Two years later, Tsanana and Katralikidis (2014) used unit root tests to prove the existence of income convergence among countries in the Balkans, as well as between these countries and the EU, remarking that although all WB states recovered after the year 2000, most of the countries were hit by the global economic crisis and therefore the convergence of their income toward average income of the EU countries remains under question.

A study of the International Monetary Fund (Murgasova, Ilahi, Miniane, Scott, & Vladkova-Hollar, 2015) examined the speed at which new member states of the EU (NMS) and the WB countries catch up the average GDP per capita of developed EU members (EU15). It was concluded that a very slow convergence between WB and the EU15 countries was achieved in the period 2000-2007, explained by the fact that the growth of less developed countries such as Bosnia and Herzegovina and Albania was slower compared to developed countries like Croatia. In the same period, significant convergence of income between NMS and the EU15 was achieved. After the beginning of the economic crisis, authors proved the existence of convergence for the WB countries, although slower than achieved by NMS countries. Stanišić (2016) tested the speed and existence of convergence of income in the Western Balkans countries and developed EU countries, compared to NMS. The results suggested that although convergence was achieved in the pre-crisis years, the global financial crisis halted the decrease in the gap in the economic

development between the EU15 and the WB countries, while at the same time the income gap between the WB countries and NMS increased.

A study of the European Investment Bank (Berthomieu, Cingolani, & Ri, 2016) demonstrated that although the gap in the standards of living between countries in the Western Balkans and the EU15 is decreasing, it is still very high. A period of at least twenty years will need to pass for the region to achieve the income per capita of the EU15, unless the growth rate of the Western Balkan countries were to increase to 6% per year, while being at a level of 1% in the EU15. If the growth rate of the WB countries were smaller, i.e. 4% per year, 14 years or more would be needed to achieve equal standards of living.

The scientific contribution of this article is reflected in the fact that there are few studies on income convergence between the Western Balkan countries and the EU15, as is the number of studies that compare convergence of income per capita toward the EU15 between WB and the CEE10 countries.

MATERIAL AND METHODS

There are two main methodological approaches to test the existence of income convergence. One is based on cross-sectional analysis of panel data, while the other one is based on time-series analysis. Since Friedman (1992) criticised the cross-sectional approach of testing the impact of initial level of income on the rate of economic growth, there is an increasing number of researchers who explores the existence of income convergence based on time-series analysis. This approach examines the existence of so called 'stochastic convergence', as first time described in Carlino and Mills (1993). Stochastic convergence implies that all shocks in country's income relative to the average income of the group which a country belongs to are only temporary. In accordance with that, econometric tests of stochastic convergence are based on unit root test applied to time series of natural logarithm of a country's income relative to the average countries group income. The rejection of null hypothesis of unit root in time-series is considered as a proof of income convergence, and vice versa.

This article examines the existence of stochastic income convergence among the Western Balkan states (WBS) and New EU member states (Central and East European countries, CEE10) on the one hand, and the most developed members of the EU (EU15), on the other hand.

Econometric approach of testing the income convergence is based on differentiation between two types of non-stationarity of time-series with a trending mean, which are:

1. Trend stationary: The mean trend is deterministic. Once the trend is estimated and removed from the data, the residual series is a stationary stochastic process,
2. Difference stationary: The mean trend is stochastic. Differencing the series D times yields a stationary stochastic process.

The distinction between a deterministic and stochastic trend has important implications for the long-term behaviour of a process:

1. Time series with a deterministic trend always revert to the trend in the long run (the effects of shocks are eventually eliminated),
2. Time series with a stochastic trend never recover from shocks to the system (the effects of shocks are permanent), which is why there is no convergence.

In order to examine the existence of stochastic income convergence, two different unit root tests are used in this article: Augmented Dickey-Fuller (ADF) test and Zivot-Andrews (ZA) test of unit root.

The augmented Dickey-Fuller tests if a variable follows a unit-root process. The null hypothesis is that the variable contains a unit root, and the alternative is that the variable was generated by a stationary process. Giving the fact that time-series of income of the WBS and the CEE10 relative to the EU15 average income over time have trend, ADF test that includes the trend is used.

The main drawback of ADF unit root test is that it ignores the existence of structural breaks in time-series, which could be of high importance in income time-series analysis. Therefore, Zivot and Andrews (1992) suggest the utilisation of unit root test which allows a single break in intercept and/or trend. As the existence of structural changes and shocks is common for the process of economic transition in the WBS and the CEE10 countries, ADF test is supplemented with the ZA unit root test in this article. If potential structural changes are not allowed for in the specification, but are, in fact, present, the results may be spurious because they can be biased towards the non-rejection of the non-stationarity hypothesis (Perron & Zhu, 2005).

The following equation that allows one time change in both the level and the slope of the series is estimated to test for the unit root:

$$x_i = \alpha_0 + \alpha_1 DU_i + d(DTB)_i + \gamma(DT)_i + \beta t + \rho x_{t-1} + \sum(\phi_i \Delta x_{t-1}) + e_i$$

Where the intercept dummy DU_t represents a change in the level (DU_t = 1 if $t>TB$, and zero otherwise); the slope dummy DT_t represents a change in the slope of the trend function ($DT_t = t$ if $t > TB$, zero otherwise); DTB_t is the crash dummy (DTB_t = 1 if $t = TB$ +1, and zero otherwise); and TB is the break date; t is the time trend variable, while Δ denotes the first difference. The model has a unit root with a break under the null hypothesis. The alternative hypothesis is a broken trend stationary process.

The data used for the theoretical and empirical analysis were taken from a data base of World Economic Outlook (2016) and cover the period 1993-2015. As a measure of income per capita, quarterly data on real GDP per capita in the countries of the Western Balkans, the Central and Eastern European countries (CEE10), and developed EU countries (EU15) were used, adjusted by purchasing power parity of the currency.

RESULTS AND DISCUSSION

Table 1 summaries the results of Augmented Dickey-Fuller test of unit root in time-series with trend and with one year time lag.

Based on the ADF unit root test results, the income convergence toward the average income of the EU15 countries is proved only in the following three cases: Slovenia and Latvia from the CEE10 group of countries, and Bosnia and Herzegovina from the WB group. In all other cases it was not possible to reject null hypothesis of the existence of unit root in income ratio time-series.

As the economic transition process in all countries of both the CEE10 and the WBS groups was marked with structural shocks, more reliable results are expected from ZA unit root test which allows for endogenous break in time-series. Table 2 summarises the results of ZA test, with breaks in trends and intercepts allowed.

Table 1. ADF test results

country	*t-statistics*	*p value*
CEE10		
Bulgaria	-2.997	0.13
Czech R.	-2.337	0.41
Estonia	-2.999	0.13
Hungary	-2.382	0.38
Latvia	-3.136*	0.09
Lithuania	-2.121	0.53
Poland	-1.676	0.76
Romania	-2.484	0.33
Slovak R.	-2.434	0.36
Slovenia	-3.739***	0.01
WBS		
Croatia	-1.950	0.62
Bosnia and Herzegovina	30.330***	0.00
Serbia	-1.969	0.61
Montenegro	-1.790	0.70
FYR of Macedonia	-2.062	0.56
Albania	-2.758	0.21

Note: Boundary value of t-statistics for 10% significance is -3.240, for 5% significance it is -3.600, and for 1% significance it is -4.380
Source: own study.

Table 2. Results of ZA unit root test

country	*t-statistics*	*Break year*
CEE10		
Bulgaria	-2.993	2011
Czech R.	-5.379**	1997
Estonia	-5.982***	1997
Hungary	-3.173	2002
Latvia	-5.792***	2005
Lithuania	-3.172	2003
Poland	-3.767*	2001
Romania	-5.093**	1997
Slovak R.	-4.334**	1999
Slovenia	-5.951***	2008
WBS		
Croatia	-3.170	2002
Bosnia and Herzegovina	-3.263	2008
Serbia	-2.447	2012
Montenegro	-3.950	2007
FYR of Macedonia	-3.204	2001
Albania	-3.028	1997

Note: Boundary value of t-statistics for 10% significance is -4.82, for 5% significance it is -5.08, and for 1% significance it is -5.57
Source: own study.

ZA unit root test results confirm the existence of stochastic income convergence in all CEE countries except Bulgaria, Hungary, and Lithuania. In all other cases the existence of unit root in time-series of relative income is confirmed. No convergence was proven within the WBS group.

Compared to ADF unit root test results, the number of the countries for which the income convergence can be confirmed in the case of ZA unit root test is higher: seven compared to three. Beside Slovenia, and Latvia, the stochastic income convergence can be confirmed also in the cases of Czech Republic, Slovakia, Poland, Estonia, and Romania as well.

Looking at the years of breaks in time-series, it is possible to conclude that these years are mostly from 1990s transition period, or from the recent financial and economic crisis.

Income convergence towards an average level of income of the EU15 in the identified CEE countries is due to a number of reasons. The main reasons why the Czech Republic, Slovakia, Poland, Slovenia, Estonia and Latvia are catching up with the living standards of developed European economies could be found in a relatively short and successful period of the transition process, as well as in the quality of institutional reform. The intensive inflow of direct foreign investment in these economies could be one of the reasons for their faster convergence. This factor is considered one of the most crucial for a decrease in the developmental gap in Romania, compared to developed EU countries. In contrast, convergence in Bosnia and Herzegovina (proven only by ADF test) is probably the result of significantly low income at the beginning of the observed period due to the civil war.

The results obtained in this article are generally in line with findings in the existing literature, especially for the CEE countries, although obtained with a different research method. Comparable results obtained with different methodological approaches serve as a kind of proof of robust income convergence between almost all CEE countries and the EU15. As far as the Western Balkan states are concerned, results are in line with Tsanana, Katralikidis and Pantelidis (2012), and Tsanana and Katralikidis (2014), where the income convergence between WB states and the EU15 were not found. Even studies that have shown convergence in income between WB states and the EU15 found it to be very slow, as in Murgasova *et al*. (2015).

CONCLUSIONS

The basic expectation for European transition economies after the initiation of the transition process and the EU accession was in reaching the standards of living enjoyed by developed European economies. In accordance with this, the subject of the analysis within this article is the examination of stochastic income convergence between the Western Balkan and the Central and Eastern European countries on one side, and developed EU countries (EU15) on the other side, in the period 1993-2015. The examination of income convergence between European countries is important from the aspect of analysing the achieved success and overlooking differences in the level of income per capita in Europe.

The scientific contribution of the article is reflected in the fact that the existing literature dealing with income convergence of the Western Balkan countries toward income of the EU15 countries is still very limited in number, as is the number of studies that compare convergence of income per capita toward the EU15 between the Western Balkan countries and new EU members (CEE10). Also, research on stochastic convergence between the Western Balkan countries and developed EU15 is barely in existence.

In order to examine the stochastic convergence of income, an approach based on time series was applied in the article. Two unit root tests were used: the Augmented Dickey-Fuller (ADF) test and the Zivot-Andrews (ZA) test. The results of the ADF test demonstrate the existence of income convergence towards the average level of income of developed EU countries only in the case of three countries: two from the CEE10 group – Slovenia and Latvia, and one from the WB group – Bosnia and Herzegovina. In all other cases, it was not possible to reject null hypothesis on the existence of a unit root test in a time series of income ratio of the country and average income of the EU15. Due to the fact that the transition process in the CEE10 and the Western Balkan countries was characterised by significant structural changes and shocks, an addition to the ADF test, the ZA test was also used, with endogenous breaks in the time series permitted. The results of this test demonstrate that income convergence exists in the case of seven countries, all from the CEE10 group; the Czech Republic; Slovakia, Poland, Estonia; Latvia, Romania and Slovenia. In all other cases, a null hypothesis of the unit root test was confirmed. The income convergence toward the EU15 was not confirmed for any Western Balkan country.

According to the results obtained, the hypothesis that a convergence of income toward the EU15 average level exists among the CEE10 and the WB countries can be only partially accepted. The absence of convergence in the case of any WB state could be a proof of the importance of further support to reforms in the Western Balkan countries, whose economies are still very vulnerable to economic shocks, both internal and external.

The main research limitation of the article is the relatively short period of the observed time, and even more importantly the fact that the Western Balkan countries were faced with many social and political issues, and even conflicts during the 1990s, which greatly influenced their income.

The research conducted suggests several options for further development. Above all, a broader insight is necessary to identify factors that determine the existence of convergence and explain why some countries experienced the reduction of development gap, while the other ones did not.

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Impact of the Global Financial Crisis on the Business Cycle in the Visegrad Group

Bartosz Pawęta

ABSTRACT

Objective: The aim of the research was to analyse morphological changes in the Visegrad Group business cycles before and after the global financial crisis of 2007/2008, and to provide comparison of their overall economic performance in terms of the real GDP growth, unemployment rate changes and price stability.

Research Design & Methods: Visegrad Group's business cycles were determined by employing Hodrick and Prescott filter to extract cyclical fluctuations, while Bry and Boschan algorithm was applied to identify the turning points of the cycles. Morphological features of business cycles were examined. The analysis was supplemented by examining unemployment rate and price stability.

Findings: The financial crisis resulted in the drop of the GDP growth and a periodical increase in unemployment. Nevertheless, in the 20 analysed years the unemployment rate tends to attain lower values, while prices become more stable. The last two economic cycles resulted in post-crisis rebound of the GDP growth. At the same time, the performance of the countries (except for outperforming Poland) becomes more and more correlated.

Implications & Recommendations: The Visegrad Group was affected by the crisis and it is plausible that any future disturbances in the world economy might affect it again. Further research aiming at deeper understanding of how a particular country was affected could help mitigate a negative impact of future crises.

Contribution & Value Added: The article helps to understand how the crisis affected the V4 economies in terms of the real GDP growth, unemployment rate and price stability. It indicates how the economic aggregates behaved before and after the crash.

Article type: research paper

Keywords: economic cycle; business cycle; Visegrad Group; financial crisis

JEL codes: F44

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INTRODUCTION

On September 15th 2008, the article on the front page of The Wall Street Journal announced: *'Crisis on Wall Street'*, *'The American financial system was shaken to its core'*. It was one of the most memorable dates of the 2007/2008 financial crisis which made not only the American investment banks struggle for survival but also had a spill-over effect on the entire economy. According to The National Bureau of Economic Research (NBER), almost 40% of the American households suffered from either unemployment, arrears on their mortgage payments, or even foreclosure. What is more, one quarter of the population in their fifties lost more than 35% of their retirement savings (Hurd, Rohwedder, 2010). These figures clearly show that millions of people suffered because of the crisis. Some lost their jobs, wages went down, prices of assets (real estate, equities) dropped, life savings perished.

In the era of globalisation there are various channels through which shocks are spread from one country to another. The contagion effect (Rigobon, 2001), which had been observed several times in the history (e.g. the Debt crisis in 1982, the Mexican *Tequila* effect in 1994, the Asian *Flu* in 1997, the Russian *Cold* 1998, the Brazilian *Sneeze* in 1999, and the NASDAQ *Rash* in 2000), took its toll also in the 2007/2008 financial crisis, affecting both financial markets and the real economy. On September 22nd 2008, US Forbes headline said *'Financial Crisis Goes Global'*. It meant that the financial crisis had become a real problem to the people worldwide. Undoubtedly, understanding the phenomenon is of utmost importance to many researchers around the globe. Questions have been raised on how global crisis affected local economies. Understanding the economic performance before the crisis could help us identify the next crisis coming. Knowing effects it may bring could help us prepare for the next economic slowdown. The cyclical nature of economy suggests a crucial question about the behaviour of the economic (business) cycle, namely: 'H*ow did the global financial crisis affect the economic cycle?*' In this article the question will be answered taking into account the Visegrad Group (known as the "V4" and composed of Czech Republic, Hungary, Poland, Slovakia).

The aim of this article is to: (1) analyse morphological changes in the V4's business cycles both in pre- and post-crisis periods and (2) provide comparison of the overall economic performance before and after the crisis both on the Visegrad Group level as well as on the country level.

For this, Visegrad Group's business cycles will be determined using Hodrick and Prescott filter and Bry and Boschan algorithm. Next, their morphological features will be examined. As the economic cycles are usually measured by changes in national output, in order to have broader understanding of the overall economic performance, the analysis will be supplemented by the assessment of the labour market and price stability.

The plausible outcome of the article could help understand how the crisis affected the V4 economy in terms of GDP growth, unemployment rate and price stability. It might indicate how the economic aggregates behaved before and after the crash. Possibly, the results might suggests reasons for different (better/worse) economic performance of individual countries. The article is organised in the following way. Firstly, general overview

of economic cycles theories and the latest findings in that field related to the V4 economies are summarised. Secondly, methodology and data employed in the research are explained. Thirdly, results are presented and followed by discussion and conclusions.

LITERATURE REVIEW

Economic fluctuations have fascinated researchers for centuries. From the first official announcement of the existence of fluctuations, made by Clement Juglar in 1860 and Stanley Jevons who compared economic fluctuations with sunspot cycles (see Marczak & Piech, 2009), through some of the most famous economists of the 20th and 21st century. It was J.M. Keynes whose theories become fundamentals for economy stabilising methods and who employed aggregates as variables in economic models. His revolutionary works led to establishing a new school of economic thought called Keynesian economics, developed by P. A. Samuelson and J. R. Hicks, who proposed the theory of multiplier-accelerator model (see Jakimowicz, 2005, pp. 21-47; pp. 62-88). Together with ideas presented by Smithies (Smithies, 1966) and Goodwin (Goodwin, 1951), they form a group of so-called endogenous concepts of economic cycles.

These concepts, although significantly influencing current research of the subject, had some imperfections – e.g. they failed to fully explain simultaneous occurrence of high inflation and high unemployment in the 1970's (see Barczyk & Kowalczyk, 1993, p. 45). This led to the emergence of other (so-called exogenous) concepts. For instance, according to Lucas's *Equilibrium Theory of Business Cycle*, the elasticity of prices and wages allows the economy to stabilise itself at the full employment level almost immediately. The reasons for fluctuations are unexpected or coincidental money shocks caused by the state, and a delay in information dissemination (Lucas, 1975). Monetary policy of the state is of great power (Friedman & Schwartz, 1963) and causes disproportions between supply and demand in the market through the bank loan (see: overinvestment theory by Hayek and Mises in Barczyk, 2006, pp. 65-68). They claim that the state should not stimulate consumption in the age of a crisis, but it should try to minimise the impact of the monetary policy on the economy, preferably while the economy is still in its growth phase. Moreover, the more rapid and long economic expansion is, the more dramatic slowdown it will be followed by. This idea leads to the financial instability theory (see Minsky & Kindleberger in Marczak & Piech, 2009), according to which so-called Minsky's moment occurs when highly indebted market participants suddenly are no longer able to pay back their loans. What is more, the economy of a country (or countries, e.g. emerging markets) is in growth phase, foreign capital flows into that economy making it expand faster. Minsky calls such rapid growth 'the euphoric economy', which suggests even greater frailness of the system. When the first fracture of the system is observed, the foreign capital is withdrawn from the economy causing its collapse (Minsky, 1982).

The theories mentioned above have become the foundation for further investigation of the cyclical nature of economy. Nowadays, empirical analyses of the phenomenon are conducted across all geographies. A systematic approach to the subject was adopted by Barczyk (1993, 2006), Jakimowicz (2005), Marczak and Piech (2009). Sectorial analysis of the Polish economy was conducted by e.g. Skrzypczyńska (2013) who found out that cycles in the Polish economy last for approximately 3.5-4.5 years and are of various amplitudes. Slightly different results were obtained by Lenart, Mazur

and Pipień (2016), who stated that the length of the cycle varies from 2 to 3.5 years. The latter authors also claim that morphological features of the business cycles in Poland (especially frequencies) have not changed due to the crisis.

Cross-country analyses with respect to globalisation and crisis effects on the business cycles in the region have been already conducted. Pacześ (2015) claims that business cycles in the Visegrad Group countries differ despite the close geographical location. They are often driven by political decisions. Tvrdon (2011) investigated the impact of the crisis on the labour market and observed an increase in unemployment in the most EU Member States (especially in the group of low-skilled labour force with pre- and primary education). Spectral analysis was conducted by Kijek (2017) who indicated that although the V4 countries may cooperate on the political level, they are rather competitors in the field of economy. Synchronisation investigated by Janus and Beck (2014), as well as Hanus and Vacha (2015) indicated that the Visegrad countries are well-synchronised and their cycles last for 2-4 years.

The study of the V4 contains another interesting element. On January 1st 2009,one of its members, Slovakia, adopted euro as its currency. This allowed to raise a series of very important questions in terms of impact of flexible exchange rate and monetary policy. Some studies have shown that the exchange rate flexibility in Poland contributed to the absorption of real shocks (Dąbrowski & Wróblewska, 2016). The comparison of the V4 performance in the last decades leads to the conclusion that adopting euro is nothing but political will (Carroll, 2012).

MATERIAL AND METHODS

Aim

The aim of this article is to:

1. Analyse morphological changes in the Visegrad Group's business cycles before and after the crisis.
2. Provide comparison of the overall economic performance before and after the crisis both on the Visegrad Group level as well on the country level.

Definitions

Fluctuations of economy defined as economic (or business) cycles are just one type of fluctuations, when classifying them according to their time span (see Rekowski, 1997, pp. 18-19). Based on that criterion, we may define: development trend, periodic fluctuations, random fluctuations and economic fluctuations. Clearly, there is no strict division between each type of fluctuations. It is also difficult to define which of the economic fluctuations can be defined as cyclical. Economists argue about what should be the length of the cycle, its phases, and regularity. So far, the unquestioned statement is that a cycle is a consecutive positive and negative relative change in a process.

Classical definition of the cycle was proposed by Burns and Mitchell (1946): 'Business cycles are a type of fluctuations found in the aggregate economic activity of nations that organise their work mainly in business enterprises'. The cycle consists of expansion phase occurring simultaneously in many economic activities, which is followed by general recession, contraction, and finally revival which leads to expansion phase of the next cycle. This definition was modified by Mintz (1972), who introduced the term

'growth cycle', which defines phases of the cycle depending on the deviation of empirical value of an economic indicator (e.g. GDP) from its estimated trend line. In such a cycle, two phases are distinguished, namely: period of relatively high growth rates, and period of relatively low growth rates. In analysis, so called deviation cycle is often constructed. For analysis in this article the following definition is adopted: *Economic cycle* – systematic changes of general economic activity oscillating around a long-term trend. The economic activity is measured by absolute or relative changes in time of main economic indicators, preferably Gross Domestic Product (Barczyk, 2006).

Other definitions used in this article include (Barczyk & Kowalczyk, 1993; Pangsy-Kania, 2004):

1. Turning points – upper and lower turning points are distinguished. The upper are called peak' or 'downturn', while the lower are called 'trough' or 'upturn'. On that basis, it can be stated that a cycle is the time span between two consecutive turning points of the same type.
2. Phase – based on the identification of turning points, cycle phases can be defined as the time span between two consecutive, but opposite, turning points. In modern cycles, often two phases are distinguished only. These are periods of relatively high growth rates, and periods of relatively low growth rates (originally referring to the growth cycle by Mintz, 1972).
3. Length (or duration) – both the length of the cycle as well as the length of its phases can be determined. The length of a phase is its duration in time. Obviously, the length of a cycle is its time duration in time, being equal to the sum of durations of all its phases.
4. Amplitude – it refers either to a phase or the cycle. The amplitude of a phase is equal to the absolute value of the difference between value that the phase attains at its maximum and minimum. In other words, it is the absolute value of the difference between values attained at the turning points of the phase. The amplitude of a cycle is defined as the difference between the amplitude of the growth phase and the amplitude of the decline phase.
5. Intensity – measures the strength of growth or decline in each phase, or the whole cycle. The tool used in this procedure is the standard deviation of data series. The higher value of the standard deviation is, the more intensive the cycle is.

Data

Data used in the research are:

1. Real Gross Domestic Product (GDP) changes quarter to quarter of previous year. The time span covers the period 1996Q1-2017Q3. This economic aggregate will be employed in the business cycle analysis.
2. Consumer Price Index (CPI). The time span covers the period 1996Q1-2017Q3. Employing this indicator will allow to observe how economic growth/decline corresponded to price changes in economy.
3. Unemployment rate. The time span covers the period 1996Q1-2017Q2, however, as some data-points are missing, the full set of data is available only since 1999Q4.

Unemployment level, together with GDP and CPI, provides the overall description of the economic situation in a given point in time. Data were retrieved from the Organisation

for Economic Co-operation and Development (OECD) online database on 05th Dec 2017 and for countries forming the Visegrad Group (V4), namely: the Czech Republic, Hungary, Poland and Slovakia.

Methodology

The research is based on the morphological analysis of the Visegrad Group's business cycles. For this, the V4 business cycle was constructed from data for individual countries. One of the methods used in decomposition of the time series is to apply filters, such as Baxter and King (1999), Hodrick and Prescott (1997) or Christiano and Fitzgerald (1999). In this article real GDP change Q/(Q-4) data were employed to construct deviation cycle using Hodrick and Prescott filter with the parameter $\lambda = 1600$.

In order to determine turning points, and consequently phases, the algorithm developed by Bry and Boschan (1971) was used:

1. The peak (trough) of the cycle is attained in the quarter *t*, if the value of the cycle in the preceding and the following quarter is lower (higher) than in the quarter *t*;
2. Each phase of the cycle must be at least 2 quarters long;
3. The length of the cycle cannot be shorter than 5 quarters;
4. When a given cycle ends, another one starts.

Furthermore, additional criteria were adopted, as in the case of modern cycles it might be problematic to precisely indicate the occurrence of turning points as they often are so-called *turning zones* (Barczyk & Kowalczyk, 1993):

1. They cannot be identified at the end of the analysed series, unless data from the following time periods confirms that it is justified;
2. In case of double-top (double-bottom), turning point is identified at the second peak (trough), after which decline (growth) is observed;
3. If the analysed cycle attains its maxima (minima), but it is impossible to precisely indicate the turning point, as similar values occur for several time periods, then the turning point is identified at the end of this period, after which change in values is observed.

As a supplementary analysis, the assessment of CPI and unemployment levels is made, their behaviour before and after the crisis analysed and correlations between the V4 countries determined. Post-crisis period is defined as the one starting one quarter after the end of the decline phase caused by the crisis.

RESULTS AND DISCUSSION

Business Cycle Analysis

In the time interval analysed, seven business cycles in the Visergad Group economy were identified (Figure 1). The point in time when cycle number 5 ends (2009-Q2) is the quarter when the average GDP growth rate in the V4 reached its minimal value after the crisis. In 2009-Q3 the post-crisis recovery started.

The average length of the cycles observed is equal to 2.75 years (see Table 1) which is in line with the results obtained by Lenart, Mazur and Pipień (2016). The two post-crisis cycles (number 6 and 7) lasted slightly longer with their length of 3.5-3.75 years, which corresponds to the results presented by Skrzypczyńska (2012). The results are also similar to those obtained

by Janus and Beck (2014), as well as Hanus and Vacha (2015). Even if we treated cycles 3 and 4 as extraordinary (very rapid economic growth just before the crash) and do not include them in the observations, post-crisis cycles are longer than those which occurred until 2002-Q2.

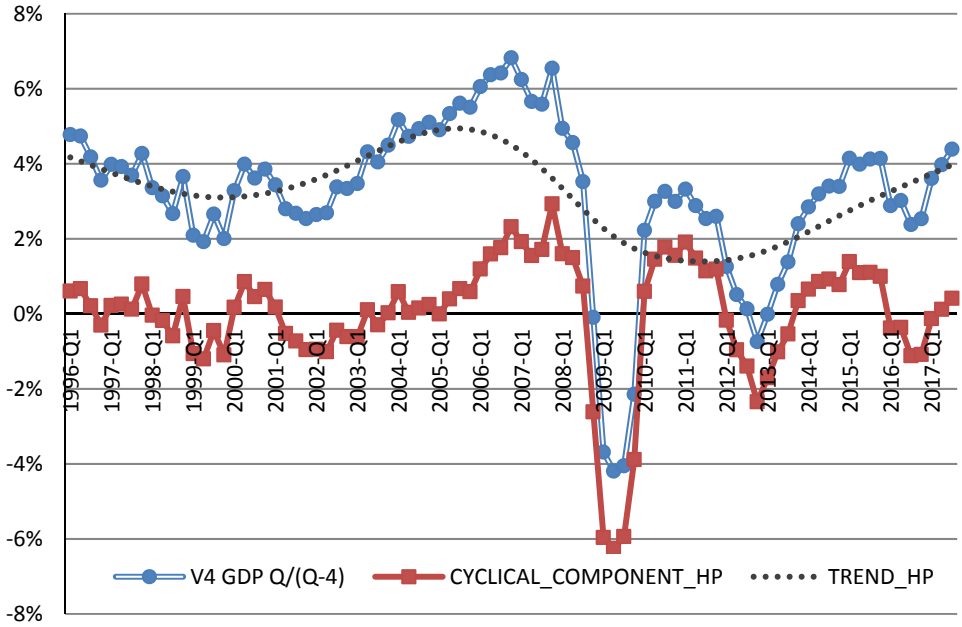

Figure 1. Economic fluctuations in the Visegrad Group in the years 1996-2016
V4 GDP Q/(Q-4) – real GDP growth quarter to quarter previous year
TREND_HP – trend line estimated with the Hodrick and Prescott filter
CYCLICAL COMPONENT_HP – deviation from the HP trend line
Source: own calculations based on OECD data.

The average length of the cycles observed is equal to 2.75 years (see Table 1) which is in line with the results obtained by Lenart, Mazur and Pipień (2016). The two post-crisis cycles (number 6 and 7) lasted slightly longer with their length of 3.5-3.75 years, which corresponds to the results presented by Skrzypczyńska (2012). The results are also similar to those obtained by Janus and Beck (2014), as well as Hanus and Vacha (2015). Even if we treated cycles 3 and 4 as extraordinary (very rapid economic growth just before the crash) and do not include them in the observations, post-crisis cycles are longer than those which occurred until 2002-Q2.

Although within each cycle, the number of growth and decline quarters differ (consequently, the cycles are not symmetrical with respect to the length of their phases), in the time span covered by seven cycles (79 quarters from 1996-Q4 to 2016-Q3) there is almost equal proportion of growth and decline quarters (40 growth, 39 decline). In the post-crisis cycles there is natural higher amplitude observed, which is the result of the rebound after a sharp decline of the GDP growth in cycle 5. Since that time, both post-crisis cycles have positive amplitudes. They also have higher intensity indicating that the oscillations around the trend line after the crisis diverge from the trend line more than they used to do. High diver-

Table 1. Morphological analysis of the Visegrad Group business cycles in the years 1996-2016

Category	Cycle 1	Cycle 2	Cycle 3	Cycle 4	Cycle 5	Cycle 6	Cycle 7	Average values		
Beginning*	1996-Q4	1999-Q2	2002-Q2	2005-Q1	2007-Q2	2009-Q2	2012-Q4			
End	1999-Q2	2002-Q2	2005-Q1	2007-Q2	2009-Q2	2012-Q4	2016-Q3			
Turning points										
Lower	1996-Q4	1999-Q2	2002-Q2	2005-Q1	2007-Q2	2009-Q2	2012-Q4			
Upper	1997-Q4	2000-Q2	2004-Q1	2006-Q4	2007-Q4	2011-Q1	2015-Q1			
Length**								**Total period**	**Until 2009-Q2 (inclusively)**	**After 2009-Q2**
Growth phase	4	4	7	7	2	7	9	6	5	8
Decline phase	6	8	4	2	6	7	6	6	5	7
Cycle	**10**	**12**	**11**	**9**	**8**	**14**	**15**	**11**	**10**	**15**
Amplitude***										
Growth phase	1.09	2.06	1.60	2.32	1.38	8.16	3.73	2.91	1.69	5.95
Decline phase	-1.99	-1.87	-0.59	-0.77	-9.18	-4.25	-2.51	-3.02	-2.88	-3.38
Cycle	**-0.90**	**0.19**	**1.01**	**1.55**	**-7.80**	**3.91**	**1.23**	**-0.12**	**-1.19**	**2.57**
Symmetry	No	No	no	no	no	No	no	n/a	n/a	n/a
Intensity****										
Growth phase	0.26	0.72	0.41	0.66	0.61	2.96	0.98	0.94	0.53	1.97
Decline phase	0.58	0.64	0.10	0.19	3.33	1.37	0.88	1.01	0.97	1.13
Cycle	**0.61**	**0.68**	**0.36**	**0.62**	**3.42**	**2.31**	**0.94**	**1.28**	**1.14**	**1.62**

* turning points (and consequently beginnings and endings of cycles) identified with Bry and Boschan algorithm

** measured in the number of quarters

*** measured in percentage points

**** standard deviation of the cyclical component

Source: own calculations based on the research results.

gence from the trend line might confirm the observation by Brender and Drazen (2005) that economic fluctuations are more volatile in relatively young democracies (such as the V4).

Overall Economic Performance Analysis

The real GDP growth of the Visegrad Group was on average 1.5 percentage points lower in the post-crisis period (see Table 2), even though the average value until 2009-Q2 contains negative impact of the crisis itself (which is the decline phase of cycle 5). In fact, since the beginning of the time series analysed (1996-Q1) until 2008-Q4 there was no decline in the real GDP observed in the total Visegrad Group performance. The rapid growth in that time was mainly driven by an increase in productivity, increasing trade with the European Union, and high entrepreneurial potential in that region (Pawęta, 2013). For the V4 Group, only the 5th economic cycle's decline phase brought severe economic slowdown. Negative yearly real GDP change occurred for 5 quarters in a row and reached a minimum of -4.2%. Another drop below the 0% growth line, which however did not attain as dramatically low values, occurred in the winter of 2012/2013.

Among the Visegrad Group countries it is Slovakia which faced the sharpest drop in the average GDP growth (Figure 2). Interestingly, before the post-crisis period it grew at the fastest pace among the V4 countries (on average 4.8% per year), but since 2009-Q3 the average growth was lower by 2.3 percentage points. This might confirm the overinvestment theory by Hayek and Mises (in Barczyk, 2006, pp. 65-68) which says that the more rapid and long economic expansion is, the more dramatic slow-down it will be followed by. High growth before the crisis could have supported the political decision of entering the euro area (Carroll, 2012). The drop, however, possibly confirms also the results obtained by other researchers claiming that Slovakia lacked its monetary policy and the exchange rate which could act like a shock absorber and could help mitigate the impact of the crisis as in those countries which did not adopt euro as their currency (Dąbrowski & Wróblewska, 2016; Konopczak & Marczewski, 2011).

The GDP growth of Poland on the other hand was the 2nd fastest after Slovakia before the post-crisis period, while in the post-crisis period it managed to maintain the highest average GDP growth of all V4 members. Poland, where there was no enough political will to enter the euro area, never faced the recession in the whole time span analysed. The economy of Poland performed well also because of a lower degree of openness and resilience of internal activity (Konopczak & Marczewski, 2011).

Hungarian and the Czech Republic's average GDP growth rates were quite similar in both time intervals. In both cases it was also lower than the V4 average. This is due to the fact that the Czech Republic was dependent on the external demand, while Hungary faced problems in the banking sector (Tvrdon, 2011). Hungary was also the least correlated member of the V4 with respect to its average GDP growth before the post-crisis period. In fact, only Slovakia and the Czech Republic were fairly correlated. This might be the result of their 75 year economic relations as Czechoslovakia (Kijek, 2017). In general, the average correlation of the V4 member states with V4 average might seem low (corr. coef. = 0.68), as the V4 countries have a lot in common: they are post-Soviet countries, they formed the Visegrad Group back in 1991, they joined the European Union together in 2004. Their economic cooperation, however, is relatively low. They rather seem to compete with each other as they try to attract foreign capital and increase their export size (Kijek, 2017). After the crisis all correlation coefficients increased (average corr. coef. = 0.82). This might be

the result of either joining the EU as their synchronisation with the EU also increases (Konopczak & Marczewski, 2011; Hanus & Vacha, 2015) or facing similar problems on their rebound path after the crisis. Increasing correlation might also be in line with the theory of Optimum Currency Area (Mundell, 1961) which claims that in order to form a successful currency area, business cycles of its individual members must be synchronised. Of all V4

Table 2. Comparison of overall economic performance of the Visegrad Group countries and their correlation before the crisis and in the post-crisis period

Average growth of real GDP Q/(Q-4)	**CZE**	**HUN**	**POL**	**SVK**	**Average**	**Median**	**St. Dev.**
Until 2009-Q2 (inclusively)	3.1%	2.8%	4.5%	4.8%	3.8%	4,0%	2,0%
After 2009-Q2	1.7%	1.5%	3.2%	2.5%	2.3%	2.9%	1.9%
Change	-1.3%	-1.3%	-1.3%	-2.3%	-1.5%	-1.1%	-0.2%
Country correlation to average V4	**CZE**	**HUN**	**POL**	**SVK**	**Average**	**Median**	**St. Dev.**
Until 2009-Q2 (inclusively)	0.82	0.57	0.49	0.82	0.68	0.70	0.15
After 2009-Q2	0.96	0.89	0.58	0.86	0.82	0.88	0.14
Change	0.13	0.32	0.09	0.04	0.14	0.18	0.00
Cross-country correlation	**CZE-HUN**	**CZE-POL**	**CZE-SVK**	**HUN-POL**	**HUN-SVK**	**POL-SVK**	
Until 2009-Q2 (inclusively)	0.41	0.24	0.58	0.01	0.23	0.27	
After 2009-Q2	0.81	0.55	0.78	0.34	0.68	0.31	
Change	0.40	0.32	0.20	0.33	0.46	0.04	
Average Consumer Price Index value	**CZE**	**HUN**	**POL**	**SVK**	**Average**	**Median**	**St. Dev.**
Until 2009-Q2 (inclusively)	4.3%	9.3%	6.4%	6.2%	6.5%	5.5%	3.8%
After 2009-Q2	1.4%	2.5%	1.6%	1.2%	1.7%	2.0%	1.6%
Change	-2.9%	-6.8%	-4.8%	-5,0%	-4.9%	-3.5%	-2.2%
Country correlation to average V4	**CZE**	**HUN**	**POL**	**SVK**	**Average**	**Median**	**St. Dev.**
Until 2009-Q2 (inclusively)	0.81	0.96	0.97	0.4	0.79	0.88	0.23
After 2009-Q2	0.81	0.93	0.96	0.91	0.9	0.92	0.06
Change	0.00	-0.02	-0.02	0.51	0.12	0.04	-0.17
Cross-country correlation	**CZE-HUN**	**CZE-POL**	**CZE-SVK**	**HUN-POL**	**HUN-SVK**	**POL-SVK**	
Until 2009-Q2 (inclusively)	0.76	0.77	0.02	0.95	0.22	0.27	
After 2009-Q2	0.65	0.64	0.80	0.90	0.72	0.84	
Change	-0.11	-0.13	0.78	-0.05	0.51	0.57	
Average unemployment rate	**CZE**	**HUN**	**POL**	**SVK**	**Average**	**Median**	**St. Dev.**
Until 2009-Q2 (inclusively)	7.3%	6.8%	14.3%	14.8%	11.2%	11.8%	1.8%
After 2009-Q2	6,0%	8.8%	8.6%	12.7%	9,0%	10.1%	1.8%
Change	-1.2%	2.0%	-5.7%	-2.2%	-2.1%	-1.7%	0.0%
Country correlation to average V4	**CZE**	**HUN**	**POL**	**SVK**	**Average**	**Median**	**St. Dev.**
Until 2009-Q2 (inclusively)	0.88	-0.80	0.90	0.83	0.45	0.86	0.73
After 2009-Q2	0.99	0.97	0.98	0.98	0.98	0.98	0.01
Change	0.11	1.78	0.07	0.15	0.53	0.12	-0.72
Cross-country correlation	**CZE-HUN**	**CZE-POL**	**CZE-SVK**	**HUN-POL**	**HUN-SVK**	**POL-SVK**	
Before 2009-Q2	-0.59	0.81	0.88	-0.85	-0.85	0.93	
After 2009-Q2	0.96	0.94	0.97	0.92	0.93	0.98	
Change	1.55	0.14	0.1	1.76	1.77	0.05	

Source: own calculations based on the research results.

members, until today only Slovakia has joined the euro area and naturally its business cycle has become more and more coherent with the euro zone (Hanus & Vacha, 2015). The lowest degree of correlation with individual V4 members as well with the V4 average is noticed in the case of Poland, which is a natural consequence of Poland outperforming other V4 members in terms of the average GDP growth.

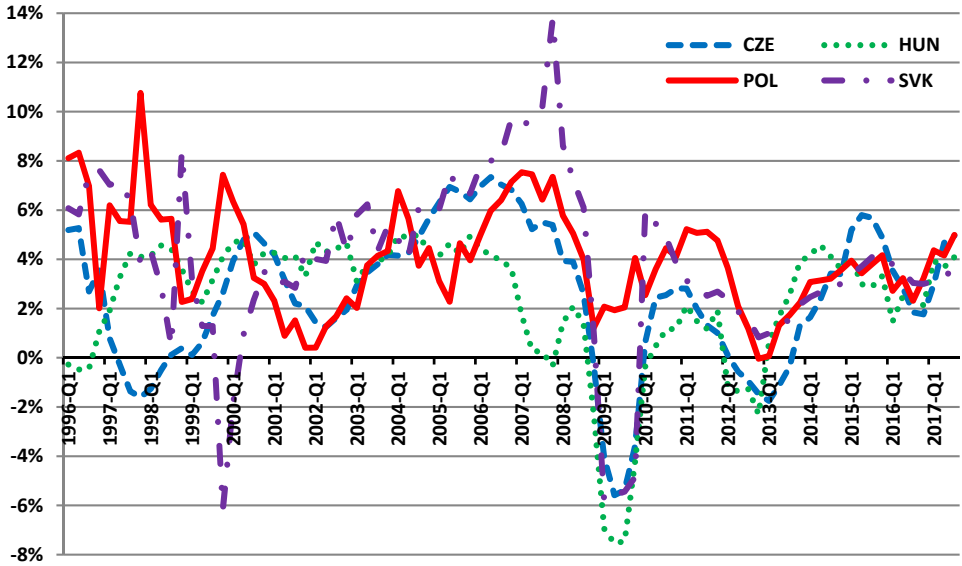

Figure 2. Real GDP growth (quarter to quarter of previous year) in the V4 countries, 1996-2016
Source: OECD

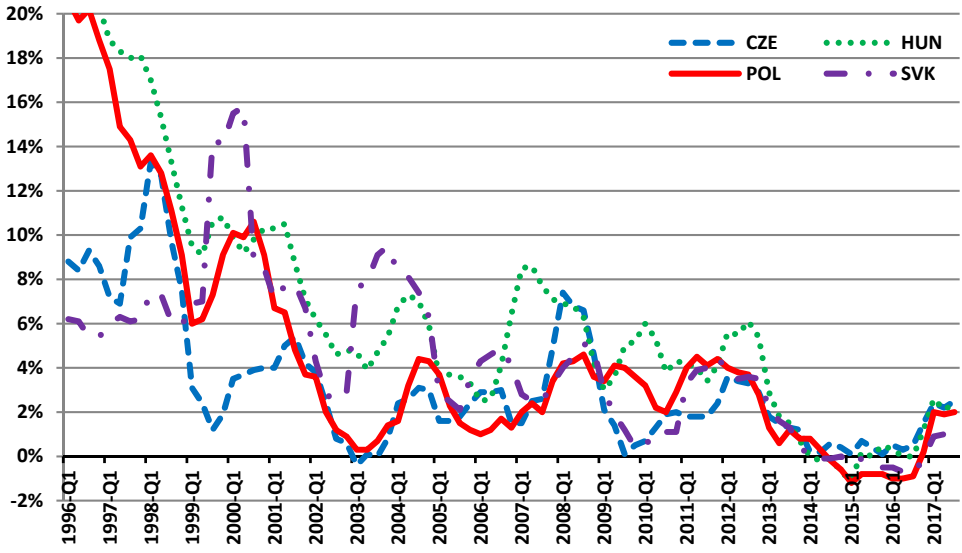

Figure 3. Consumer Price Index in the V4 countries, 1996-2016
Source: OECD

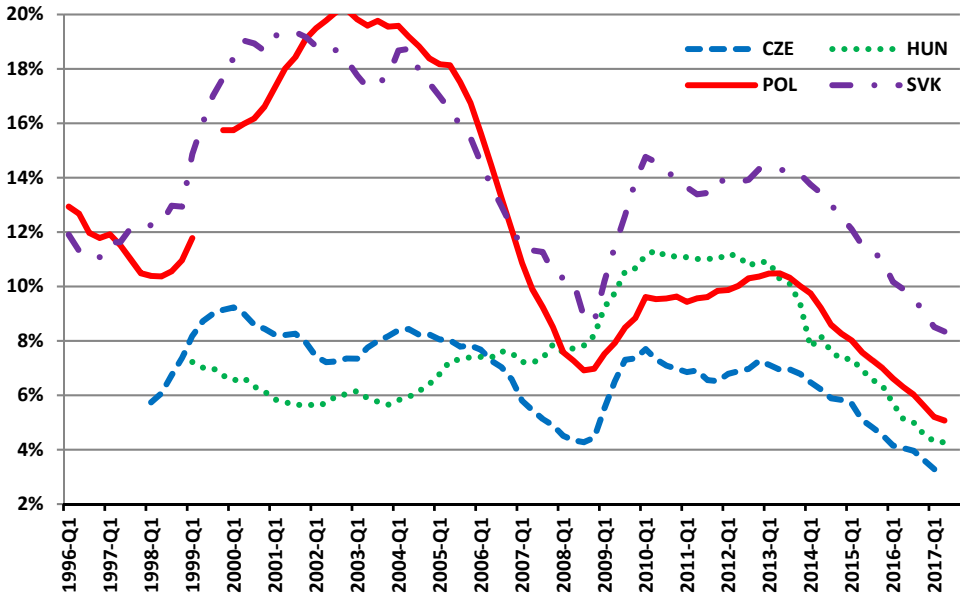

Figure 4. Unemployment rate in the V4 countries in the years 1996-2016
Source: OECD

In the time interval analysed, the price changes trend line, measured with the Consumer Price Index, was negative (Figure 3). This might be explained by a (1) drop from high level inflation that all countries suffered from after political and economic transformation, (2) improvements in the monetary/fiscal policy and (3) lower real GDP growth as a result of the financial crisis. Also CPI oscillations have become less volatile, which indicates higher stability in the economy. When compared pre- and post-crisis averages, it can be noticed that the highest drop of CPI inflation occurred in Slovakia and Hungary, which corresponds to their highest drop in the GDP growth. After the crisis, the lowest average CPI inflation was observed in the only euro area member of V4 – Slovakia. The post-crisis correlation of price changes is quite high among all V4 members.

Similarly to CPI inflation, the V4's unemployment rate trend line is on average downward-sloping in the time span analysed (Figure 4). The rate of unemployment as well as its behaviour in time differs across countries. Prior to the EU accession Slovak and Polish unemployment rates were over 2 times higher than in Hungary and the Czech Republic. After that date, a decline of the unemployment rate was observed in all the countries (except for Hungary which struggled with unstable fiscal situation) and reached its minimal value in the second half of 2008. The financial crisis resulted in the increase in unemployed rate and that number remained high until 2013, when the economic cycle number 7 started. At the end of the time series analysed all unemployment rates are on the level of around 5% or less, with only Slovak unemployment rate almost twice higher than in the rest of the V4. The results are coherent with previous research on the impact of the financial crisis on

the labour market, while more detailed view of the labour market in the Visegrad Group was presented by Tvrdon (2011).

CONCLUSIONS

This article can help to understand how the crisis affected the V4 economy. It indicates how the economic aggregates behaved before and after the crash. A specific aim of the research was to analyse morphological changes in the Visegrad Group business cycles before and after the financial crisis of 2007/2008 and provide comparison of their overall economic performance in terms of the real GDP growth, unemployment rate changes and price stability. The analysis included both the Visegrad Group level as well as individual countries – Poland, Slovakia, Hungary and the Czech Republic.

For this, Visegrad Group's business cycles were determined. The Hodrick and Prescott filter was used to extract cyclical fluctuations, while Bry and Boschan algorithm was applied to identify turning points of the cycles. In the research morphological features of the cycles were examined. Additionally, in order to have broader understanding of the overall economic performance, the analysis was supplemented by the assessment of the labour market (by examining unemployment rate) and price stability (measured by CPI inflation).

There were seven business cycles observed in the Visegrad Group in the time span analysed (1996-2016). Each of them differed in terms of symmetry, but in the 20 year period there was equal number of growth quarters and decline quarters. What shall be underlined is that until the financial crisis, there was no GDP drop observed until 2008-Q4. In 2009-Q3 post-crisis cycles started. Their duration was longer (3.5-3.75 years), while their amplitude and intensity higher than in the pre-crisis period.

The financial crisis not only influenced morphological characteristics of the business cycle in the Visegrad Group, but also affected its overall economic performance. The real GDP growth of the V4 was on average 1.5 percentage points lower in the post-crisis period, even though the former time interval contained the crisis itself. The financial crisis seemed to have the biggest impact on Slovakia, which had the highest pace of growth before the crisis and (due to adopting euro as its currency) no flexible exchange rate and no monetary policy to mitigate crisis effects. The best economic performance was observed in Poland, where due to strong internal demand and relatively low openness, the GDP growth dropped the least, while historically high unemployment rate fell below the V4 average.

As a result of the crisis, in all V4 members an increase in the unemployment rate occurred, but it was also Slovakia where the value was almost twice higher than in the rest of the V4. Nevertheless, over the whole time span analysed, the overall trend line of unemployment rate was negative, although it differed from country to country.

The trend line of price stability was also negative, however the correlation of price changes is quite high among all V4 members.

In the case of GDP growth, unemployment rate and price stability, different levels of correlations were observed before the post-crisis period. In the post-crisis era economic performance of all countries (except Poland and its higher GDP growth) is highly correlated. It could be caused by increasing economic integration after joining the EU or facing similar problems while mitigating negative impact of the financial crisis. It also seems to be in in line with the Theory of Optimum Currency Area – in order to form a successful

currency area, economic performance of its members should be similar. This is crucial for Hungary, Poland and the Czech Republic to join Slovakia in the euro area.

The limitation of this article is the fact that only basic economic aggregates were employed. Expanded research could include monthly data of other aggregates such as industrial production, investments, etc. It would be also recommended to use filters other than HP to determine cyclical components and compare the results. Moreover, perhaps dividing the sample into three subperiods could be considered: pre-crisis, crisis itself and post-crisis. Another limitation is the time span of the research in which only two post-crisis cycles occurred so far. Conducting similar analysis in a few years could definitely add more value to examining impact of the financial crisis on the business cycles. Further research aiming at deeper understanding of how particular country was affected could help mitigate impact of future crises.

The research indicated that through contagion effect the Visergad Group was affected by the crisis and it is plausible that any future disturbances in the world economic system might affect it again. The overall impact of the 2007/2008 financial crisis resulted in a drop in the GDP growth and periodical unemployment growth. Nevertheless, in the 20 years analysed the unemployment rate tends to attain lower values, while prices become more stable. The last two economic cycles formed a post-crisis rebound of the GDP growth. At the same time, countries performance of the countries (except for outperforming Poland) became more and more correlated. This might unite the Visegrad Group not only in terms of their common history and their political goals, but also in the field of economy.

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Fiscal Sustainability of Local Governments in the Visegrad Group Countries

Tomasz Uryszek

ABSTRACT

Objective: The main goal of the article is to assess the level of fiscal sustainability at the local government level in the Visegrad Group (V4) economies.

Research Design & Methods: Two different methods of fiscal sustainability measures were used in the article to verify whether the local government deficit is sustainable: estimations of the no-Ponzi conditions, and calculations of the threshold primary balance. The research period covered the years 2001-2016. Data were taken from the Eurostat database.

Findings: Three out of four V4 countries met the initial no-Ponzi condition. The sums of discounted primary balances of their local governments were positive (Poland was the only exception). However, those sums were insufficient to cover the initial debt volume. It was possible in Hungary only. The Ponzi scheme was significantly reduced during the recovery time after the financial crisis of 2008-2009.

Implications & Recommendations: Generally, all the countries showed the potential to produce primary surpluses at the local level and they have been generally able to stabilise the local debt to GDP ratio. However, these surpluses in the Czech Republic, Slovakia and Poland were insufficient to cover the initial level of debt. Especially Poland should try to generate higher primary local surpluses to avoid the Ponzi scheme and increase the level of fiscal sustainability at the local government level in the future.

Contribution & Value Added: The originality of this work lies in using the Ponzi scheme and the values of the threshold primary gap to assess the fiscal sustainability of local government levels in the Visegrad Group Economies.

Article type: research paper

Keywords: primary net lending; public debt; threshold primary balance; no-Ponzi condition; sustainability; Visegrad countries (V4)

JEL codes: H62, H63

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INTRODUCTION

Fiscal deficits and public debts are nowadays immanent characteristics of almost all free market economies. Public borrowing seems to be an attractive source of financing for current expenditures not only for the central government but also for local government sectors. This situation can be observed not only in the old EU member states (EU-15), but also among the new EU member states, including Central European economies. Under such circumstances, we should check whether the central government is the only culprit here, or the local sectors also play the Ponzi games.

The main goal of the article is to assess the level of fiscal sustainability of local government sectors in the Visegrad Group (V4) economies. This goal is accompanied by three following hypotheses: (1) local governments in V4 countries have been playing Ponzi games, (2) the Ponzi scheme effects were strengthened by the last financial crisis, (3)the primary net borrowing values prevent from stabilising local debt volumes.

The research period covers the years 2001-2016. The Visegrad countries investigated in the article are the Central European EU member states: the Czech Republic (CZ), Hungary (HU), Poland (PL) and Slovakia (SK).

Two different research methods were used in the article: first, the no-Ponzi conditions were checked. Then, the values of the threshold primary balance were estimated.

The article is organised as follows: the literature review outlines the idea of sustainable fiscal policy and deals with the different methods of fiscal sustainability measures. Then the research methods used in the article as well as data are presented. The next part discusses the empirical results of the study. The most important findings and conclusions are shown in the last part of the article.

LITERATURE REVIEW

The idea of sustainable fiscal policy dates to the first classical economists, such as Adam Smith, David Hume and David Ricardo (see e.g. Rowley, Shughart, & Tollison, 2002), and is well developed in the literature (see e.g. Adam, 2015; Potrafke & Reischmann, 2015; John & Kurian, 2009; Tsuchiya, 2016; Bohn, 1991). Fiscal sustainability has been already examined in Central and Eastern European countries (see e.g. Krajewski, Mackiewicz, & Szymańska, 2016), including V4 economies (Sávai, 2016). Sustainable fiscal policy literature deals mostly with the volume of public debt, intertemporal budget constraints and primary (im)balances (see e.g. Neck & Sturm, 2008; Collard, Habib, & Rochet, 2015; Legrenzi & Milas, 2012; Molendowski & Stanek, 2012).The main assumption of sustainable public finances is that fiscal authorities cannot run Ponzi games (see e.g. Martins-da-Rocha & Vailakis, 2012; Wigger, 2009; Minea & Villieu, 2010), meaning that governments cannot use ever-increasing debt. According to the literature review, sustainable fiscal policy excludes situations '…where the government systematically services the cost of existing debt exclusively by issuing new one' (Fan & Arghyrou, 2013, p. 961). To meet this criterion, the sum of future discounted primary net lending values should cover the volume of outstanding debt. Fiscal sustainability is then based on generating primary budget surpluses and controlling public debt volume (Gevorkyan, 2010, p. 169). This is necessary to reduce growing debt servicing costs. Nowadays, '…trust in fiscal sustainability is key…' (Steger, 2012, p. 62). The main shortcoming of

this method is the necessity to predict all the future primary balances, which seems to be burdened with a large estimation error. Ex post estimations allow to solve this problem, but in such case a question about the number of observations arises.

Using the idea of present value of budget constraints (see e.g. Chalk & Hemming, 2000, p. 5), McCallum (1992) argued that public debt should not grow faster than the interest rate. Based on that, Barro (1989) and Kremens (1989) proved that if the economic growth rate is lower than the real interest rate, the public debt to GDP (or the public debt to output) ratio shall be reduced.

Another group of measures are sustainability indicators. The outcomes for these indicators synthetically show how far fiscal policy in a given economy departs from sustainability (Chalk & Hemming, 2000, p. 7). The indicators focus on public debt volume, economic growth rate, interest rates, and primary budget balances. As they do not need specific prerequisites, they can easily be used in the international comparisons in a given period of time. An important disadvantage of the sustainability indicators is that they are used in an environment without uncertainty (Chalk & Hemming, 2000, p. 9). Uncertainty should be incorporated into fiscal sustainability analyses to make the study more comprehensive (Bohn, 1995; Hajdenberg & Romeu, 2010; Tanner & Samake, 2008; Barnhill Jr. & Kopits, 2004).

The third group of fiscal sustainability measures are statistical tests and methods (Burnside, 2005). Most of them derive from the Hamilton and Flavin (1986) investigation on the sustainability of US public debt and focuses on the stationarity and cointegration testing of macrofinancial variables: mostly public revenues and expenditures (see e.g. Baglioni & Cherubini, 1993; Holmes, Otero, & Panagiotidis, 2010; Afonso & Jalles, 2016; Trehan & Walsh, 1988; Chen, 2016; Westerlund & Prohl, 2010).

The measures of fiscal sustainability of local governments used in practice by fiscal authorities are often country or even local specific. For example, ten different indicators are used in the State of Michigan to monitor the fiscal situation there (Crosby & Robbins, 2013, p. 529). In the literature the problem of local governments' fiscal sustainability is linked with managing skills of local leaders (Tang *et al.,* 2014; Okubo, 2010), building relevant strategies, intergovernmental fiscal relations (Ji, Ahn & Chapman, 2015) or spatial planning systems (Wójtowicz, 2015; Wójtowicz, 2016). Fiscal sustainability of the local government level is also relevant to adapted fiscal rules (Moździerz, 2015), level of decentralisation (Maličká, 2016) and institutional framework (Nam & Parsche, 2001).

MATERIAL AND METHODS

As many of methods for fiscal sustainability measurement are country and local specific, they can hardly be used for international comparisons. That is why more general methods were used in this article. They can easily be used in the international comparisons.

Estimation of the threshold primary balance (TPB) was the first step of the research. It was used in the form proposed by Blanchard (1990). The TPB can be presented as follows (Blanchard, 1990; Chalk & Hemming, 2000, p. 8):

$$\overline{d} = (r_t - n_t)b_t \tag{1}$$

where:

$\overline{d}$ - is the primary balance necessary to stabilise the debt to GDP ratio (i.e. the threshold primary balance);

r_t - is the real interest rate on public borrowing in period t;
n_t - is a real economic growth rate in period t;
b_t - is public debt volume to GDP in period t.

The value of $\overline{d}$ greater than the current, actual primary balance (d_t) suggests that the deficit is too large (or the surplus is too small) to stabilise the debt ratio, which means that the fiscal policy is unsustainable.

The no-Ponzi condition was checked as the next step of the empirical research. It can be formally written as follows:

$$B_t = \sum_{j=0}^{\infty} R(t, t+j)^{-1} D_{t+j} \quad (2)$$

where:

B_t - is public debt outstanding in period t;
D_t - is primary balance (net lending/borrowing less interest on public debt);
$R(t, t+j) = \prod_{k=0}^{j} R_{t+k}$ - is the discount factor applying between periods t and $t+j$, $R_{t+k} = 1 + r_{t+k}$;
r_{t+k} - is the real interest rate on public debt instruments in the period $t+k$, the same for all assets, assuming perfect foresight (O'Connell and Zeldes 1988, p. 434).

The equation 2 formally describes the situation when the sum of all the future, discounted primary balances covers the existing (initial) level of debt. If this criterion is met in a particular economy, the government (the fiscal agent) does not play Ponzi game and the fiscal policy can be considered sustainable.

The formula for fiscal sustainability empirical testing was changed slightly. To avoid the *ex ante* estimation error, the historical data were used (16 yearly observations form the period 2001-2016). The period seems to be long enough in the light of the average terms to maturity of public borrowing instruments (Eurostat, 2017). The following formula was estimated:

$$\sum_{j=1}^{16} R(t, t+j)^{-1} D_{t+j} \geq 0 \quad (3)$$

As the debt volumes are large, the initial requirements for the investigated economies were relaxed. It was necessary to check whether the sum of the discounted primary net lending values at the local level for the investigated period was at least positive. If so, one could say that the local government level in the given economy was at least able to pursue the path to repay the existing level of debt.

Then, the second condition for no-Ponzi scheme was estimated. I checked whether the sum of primary net lending values in the given period was able to cover the initial level of debt. It can be formally written as:

$$\sum_{j=1}^{16} R(t, t+j)^{-1} D_{t+j} \geq B_0 \quad (4)$$

where:

B_0 - is the initial level of local government debt (i.e. form the year 2000), the rest, as in equation 2.

Formal stationarity and cointegration tests were not used in the article. The most popular Dickey-Fuller or Phillips-Perron tests could not be used because of their severe finite sample power and size problems (see e.g. DeJong, Nankveris, Savin, & Whiteman, 1992).The data sample seemed too small even for the DF-GLS test which is characterised by the best overall performance in small samples (see: Elliott, Rothenberg, & Stock, 1996).

It is worth mentioning that tests for cointegration between revenues and expenditures have been widely used in empirical research. However, rejections of sustainability using those tests can be invalid. The intertemporal budget constraint may hold satisfied even if the revenues and expenditures are not cointegrated (Bohn, 2007).

Data for empirical research were taken from Eurostat, and they cover 16 yearly observations between 2001 and 2016 (besides the data on the level of local government debt in 2000 were used as the initial level of debt for Ponzi scheme testing). I used data denominated in EUR, national currency, and in per cent of GDP.

RESULTS AND DISCUSSION

Performing empirical analyses, one must remember that all the Visegrad Group countries have had some problems with fiscal sustainability at the general government level (Uryszek, 2015a). They are relatively centralised economies, where the fiscal role of local governments has been relatively limited[1]. The results of the research show that fiscal autonomy is scarce there (Uryszek, 2015b). Besides, data analyses show that the share[2] of the local level in the total public debt sector in all the investigated economies is relatively small (Table 1).

Table 1. Local government expenditures' share in general government expenditures in the V4 economies (in %)

Year	Czech Rep.	Hungary	Poland	Slovakia
2001	22.8	24.9	31.3	6.6
2002	23.7	24.9	29.7	7.8
2003	25.2	26.6	28.3	17.9
2004	27.4	25.9	29.3	16.7
2005	26.0	25.6	29.6	17.0
2006	26.9	24.6	30.4	16.8
2007	26.0	23.2	30.8	16.7
2008	26.1	23.3	31.7	16.6
2009	26.6	23.7	32.2	16.5
2010	26.3	25.4	32.7	17.3
2011	28.5	23.0	31.9	16.6
2012	25.3	19.1	31.0	15.8
2013	26.7	15.2	30.8	15.4
2014	27.3	15.9	31.6	15.9
2015	27.0	15.8	30.8	16.4
2016	25.7	12.8	31.3	15.8
average	26.1	21.9	30.8	15.4

Source: own calculations based on data from Eurostat.

All the investigated economies can use public borrowing process. However, the levels of the local debt are relatively small (Table 2). The data in Table 2 show that Hungary

[1] According to Eurostat, the only self-government level in V4 countries is the local one. The regional levels are not recorded there (which can be moot and controversial, considering e.g. Polish voivodships).

[2] The scope of the local level in the whole public sector is measured here as the share of the local government level expenditure in the total general government expenditure.

was the only V4 country which had not fulfilled the Maastricht criterion relevant to the public debt. The other economies' public debt volumes were significantly lower than 60% of GDP. On the other hand, the levels of local debt in all the V4 countries were limited and could not play a significant role in the process of public borrowing. The local debt levels should therefore be relatively easy to repay by self-government units. It is, of course, dependent on the level of primary net lending (Figure 1).

It is necessary to check whether the net lending values in the investigated economies were sufficient to stabilise the debt to GDP ratio. The estimations of equation 1 were made and the values of the threshold primary balance (TPB) were calculated to answer this question. In this way it is possible to compare the theoretical, threshold values of primary gaps (or minimal values of surpluses) necessary to stabilise the debt to GDP ratio ('TPB' in Fig. 1 and in Table 3) with the volumes of the actual primary balance ('APB' in Fig. 1 and in Table 3). The outcomes of this comparison are shown in Figure 1.

Table 2. Public debt in V4 economies (in % of GDP)

Year	Czech Republic		Hungary		Poland		Slovakia	
	General gov.	Local gov.	General gov.	Local gov.	General gov.	Local gov.	General gov.	Local gov.
2001	22.8	1.6	51.4	1.1	37.3	1.3	48.3	1.3
2002	25.9	1.8	54.6	1.5	41.8	1.7	42.9	1.3
2003	28.3	2.0	57.1	1.5	46.6	1.8	41.6	1.3
2004	28.5	2.3	58.0	1.6	45.0	1.8	40.6	1.2
2005	27.9	2.4	60.0	1.8	46.4	2.1	34.1	1.4
2006	27.7	2.5	64.1	2.3	46.9	2.4	31.0	1.6
2007	27.5	2.4	65.0	3.0	44.2	2.2	30.1	1.7
2008	28.3	2.3	71.0	3.8	46.3	2.3	28.5	1.7
2009	33.6	2.3	77.2	4.1	49.4	3.0	36.3	2.1
2010	37.4	2.5	79.7	4.6	53.1	3.8	41.2	2.4
2011	39.8	2.5	79.9	4.3	54.1	4.2	43.7	2.6
2012	44.5	2.6	77.6	3.7	53.7	4.2	52.2	2.4
2013	44.9	2.8	76.0	1.5	55.7	4.3	54.7	2.2
2014	42.2	2.7	75.2	0.1	50.2*)	4.3	53.5	2.2
2015	40.0	2.4	74.7	0.2	51.1	4.2	52.3	2.3
2016	36.8	1.9	73.9	0.2	54.1	3.9	51.8	2.2
average	32.5	2.3	67.7	2.1	47.8	2.9	43.1	1.8

*) The significant decrease in the general government debt in Poland in 2014 was the outcome of the reform of Polish social security system.
Source: own elaboration based on data from Eurostat.

Data analyses show that the most significant differences between the theoretical values of primary net lending necessary to stabilise the debt to GDP ratio and the actual volumes of primary net lending were recorded during the global financial crisis. However, Hungary had strong problems with stabilising the local debt even before the crisis. The Czech Republic and Poland also produced too large primary deficits. It could affect the lack of fiscal sustainability of the local level in these countries. The positive results recorded during the recovery time diminished or even removed that threat.

The values of the primary gap were calculated as the volume of actual primary balances less the theoretical primary balance volumes necessary to stabilise debt to GDP ratio. The outcomes are presented in Table 3.

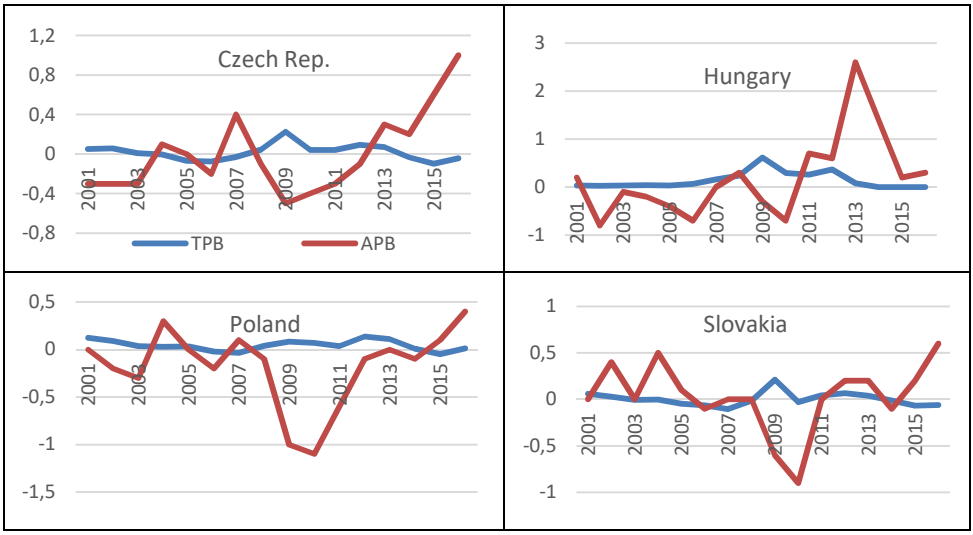

Figure 1. Threshold primary balance (TPB) vs. actual primary balance (APB) values in the local government sectors of V4 countries (in % of GDP)
Source: own calculations based on data from Eurostat.

The negative values of the primary gap mean that the actual local deficits were too large to stabilise the local debt to GDP ratio. Positive values prove that the actual local net lending values were sufficient to stabilise this ratio. An interesting finding is that the averages of the primary gap for the local governments in all the investigated economies were close to zero (Poland recorded a negative value, but still the gap was relatively small). It means that, on the average, during the last 16 years all V4 countries recorded the net lending values just enough (or almost enough) to stabilise the volume of local debt. In other words, all the countries were able to enter the sustainable fiscal path at the local level.

Using this key finding, it is necessary to check whether these values were high enough to cover the initial level of debt. That is why the next part of the empirical study were the estimations of formulas 3 and 4. First, I checked whether the sums of the discounted primary net lending values in V4 countries were positive (equation 3). The results are shown in Table 4.

The results show that Poland was the only country which did not pass the initial test of the no-Ponzi scheme at the local government level. The rest of V4 countries passed. The next step was the estimation of equation 4 for the investigated economies. The outcomes are presented in Table 5.

The results show that Hungary was the only country which fulfilled the condition for no-Ponzi scheme for the years 2001-2016. The rest of the V4 countries failed. It means that the Czech Republic, Poland, and Slovakia we unable to repay the initial level of local governments debt (i.e. the debt volume recorded in 2000). In other words, their borrowing needs were higher than their fiscal capacity at the local level. To avoid problems with the

debt repayment the V4 countries need to tighten their fiscal policies at the local level or give more revenue rising capacity to the local governments.

Table 3. Values of primary gap in in the local government sectors of V4 economies (APB less TPB, in % of GDP)

Year	Czech Rep.	Hungary	Poland	Slovakia
2001	-0.4	0.2	-0.1	-0.1
2002	-0.4	-0.8	-0.3	0.4
2003	-0.3	-0.1	-0.3	0.0
2004	0.1	-0.2	0.3	0.5
2005	0.1	-0.4	0.0	0.1
2006	-0.1	-0.8	-0.2	0.0
2007	0.4	-0.2	0.1	0.1
2008	-0.1	0.1	-0.1	0.0
2009	-0.7	-0.9	-1.1	-0.8
2010	-0.4	-1.0	-1.2	-0.9
2011	-0.3	0.4	-0.6	0.0
2012	-0.2	0.2	-0.2	0.1
2013	0.2	2.5	-0.1	0.2
2014	0.2	1.4	-0.1	-0.1
2015	0.7	0.2	0.1	0.3
2016	1.0	0.3	0.4	0.7
average	0.0	0.1	-0.2	0.0

Source: own calculations based on data from Eurostat.

Table 4. No-Ponzi scheme – empirical results for the local government sectors in V4 economies (outcomes for formula 3)

Country	national currency*)		EUR**)	
	million	unit per capita	million	unit per capita
Czech Rep.	4 890.1	463.1	281.2	26.6
Hungary	300 383.8	30 595.2	806.6	82.2
Poland	-19 463.1	-512.9	-4 781.6	-126.0
Slovakia	119.5	22.0	47.7	8.8

*) Slovakia entered Eurozone in 2009. Slovak koruna was the domestic currency before that date. After that euro is the national currency there.

**) The data are converted into euro using annual average exchange rates from Eurostat.

Source: own calculations based on data from Eurostat.

The problem of unsustainable fiscal situation of local governments has been presented in the literature. The research methods differ but the results of these studies are mostly consistent with the outcomes of this research: the Polish local finance sector seems to be unsustainable (see e.g. Sroka & Pogan, 2015). The level of local debt in Poland has been rising and sometimes it is even hidden by the local authorities (Poniatowicz, 2011). Czech Republic also has problems with fiscal sustainability at the local government level (Pospisil, Oancea, & Dragoescu, 2017). On the other hand, Hungary, after strong crisis, started to stabilise public finance not only at the central but also at the local level (Jankovics, 2016).

Table 5. No-Ponzi scheme – empirical results for the local government sectors in V4 countries (outcomes for formula 4)

Country	national currency*)		EUR	
	million	unit per capita	million	unit per capita
Czech Rep.	-31 194.9	-2 954.1	-732.3	-69.3
Hungary	205 168.3	20 897.2	443.5	45.2
Poland	-26 175.4	-689.7	-6 469.1	-170.5
Slovakia	-299.6	-55.2	-245.3	-45.2

*) see note in Table 4.
Source: own elaboration based on data from Eurostat.

CONCLUSIONS

Analyses show that all the V4 countries are characterised by relatively centralised public finance systems. The scope of the local sector is limited there. The average share of local governments' expenditure in the total public spending of the V4 economies, in the years 2001-2016, was between 15.4% in Slovakia and 30.8% in Poland. The level of debt was also low (between 1.8% of GDP in Slovakia and 2.7% in Poland, on average). Such a situation should make local debt repayments easy. In other words, the local governments in the V4 economies should have no reason to play Ponzi games. The empirical results show that it is only partly true (as well as the first research hypothesis is). Three out of four countries fulfilled the initial no-Ponzi condition, i.e. the sums of discounted primary balances of their local government levels were positive. Poland was the only exception here.

However, the sums of discounted local governments primary net lending were insufficient to cover the initial debt volume. It was possible in Hungary only. At the same time Hungary was the only V4 country which has not fulfilled the public debt Maastricht criterion. Such a situation suggests that the local level was used by the fiscal authorities to reduce the instability of the whole public sector. The low level of fiscal autonomy of local governments in all the investigated economies does not let these governments to expand expenditures and use more of debt financing. However, the empirical results of no-Ponzi scheme investigation show that the V4 countries did not achieve the full fiscal sustainability at the local level.

The results for the threshold primary balance and the values of the primary gap showed significant imbalances during the last financial crisis. The primary deficit values during crisis were high and at the same time too large to stabilise the local governments debt to GDP ratio, which lends empirical support to the second hypothesis. The Ponzi scheme was then significantly reduced during the recovery time after the crisis. Generally, all the countries showed the potential to produce primary surpluses at the local level and they have been able to stabilise the local debt to GDP ratio. The average values of the primary gap for the whole research period were very close to zero. The large primary deficits recorded in Hungary and Slovakia during the crisis were fully covered by surpluses generated before and after the crisis (and they were almost covered in Poland). Paying a significant interest rate on public debt, Poland should try to generate slightly higher primary local surpluses to avoid the Ponzi games at the self-government level in the future. The third hypothesis in then false.

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Assessing Fiscal Sustainability in Ukraine: TVP and VAR/VEC Approaches

Victor Shevchuk, Roman Kopych

ABSTRACT

Objective: The purpose of this article is to investigate fiscal sustainability in Ukraine, using quarterly data sample for the period between 2000 and 2016, in accordance with a recursive algorithm derived from the law of motion of the debt-to-GDP ratio developed by Croce and Juan-Ramon (2003).

Research Design & Methods: An assessment of fiscal sustainability in Ukraine is provided according to a recursive algorithm derived from the law of motion of the debt-to-GDP ratio, developed by Croce and Juan-Ramon (2003). Both time-varying parameters (TVP) and vector error-correction autoregression (VAR/VEC) models are used.

Findings: It is found that there is causality running from the budget surplus to the gap between real interest rate and GDP growth rate, however it is not sufficient to guarantee a sustainable debt to GDP ratio.

Implications & Recommendations: Our findings argue in favour of fiscal policy actions aimed at an increase in the government revenues, combined with the public sector expenditure cuts, as current policies do not seem to be sufficient to achieve fiscal sustainability. A more detailed study is needed in order to identify most efficient approaches for a decrease in the budget deficit across a detailed 'menu' of expenditure and revenues. Any attempts to decrease interest rate and/or stimulate output growth by an expansionary monetary stance are likely to be counterproductive in the presence of substantial public external debt.

Contribution & Value Added: This empirical study provides an indication of the possibility of default on foreign public debt liabilities in Ukraine.

Article type: research paper

Keywords: fiscal sustainability; budget surplus; real interest rate; Kalman filter; VAR/VEC; Ukraine

JEL codes: E17, E62, F34

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INTRODUCTION

Recent worsening of the budget balance and the build-up of public debt in Ukraine raises concerns about the sustainability of current fiscal policies marked by a simultaneous increase in both government revenues and expenditures (Figure 1). The primary budget balance was in surplus since mid-2000, in sharp contrast to the profligate fiscal policies of 1990s, but there was a reversal in the fiscal policy stance in the wake of the world financial crisis of 2008-2009. Public external debt was on a steady decline since the beginning of the previous decade, but a steep rise in the government foreign liabilities was followed by two financial crises of 2008-2009 and 2014-2015, as the main way of deficit financing, with a likely relation to the exchange rate developments. As indicated by trends of fiscal variables, steady worsening of the fiscal stance since 2005 lasted until 2013, mainly due to an accelerated increase in the government expenditure. A number of factors contributed to this outcome, such as the growing state support for economic activities, expansion of higher education or modernisation of transport infrastructure, but the most important factor was a significant increase in social transfers. As the latter episode of raising public external debt occurred against the backdrop of a military conflict with neighbouring Russia, there has been a significant increase in expenditure on defence.

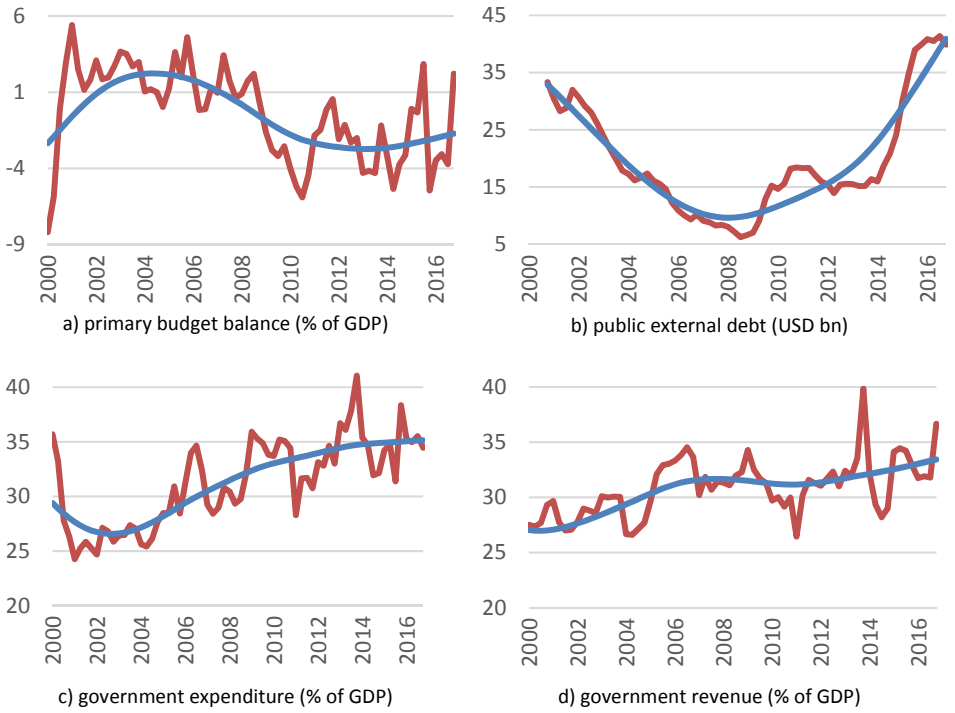


Figure 1. Ukraine: selected fiscal policy indicators, 2000-2016

Note: the trends of all fiscal variables are obtained with the Hodrick-Prescott filter.

Source: the Ukraine's Ministry of Finance online database.

The purpose of this article is to investigate fiscal sustainability in Ukraine using quarterly data sample between 2000 and 2016, in accordance with a recursive algorithm derived from the law of motion of the debt-to-GDP ratio developed by Croce and Juan-Ramon (2003). It is hypothesised that fiscal policy has a potential to affect the level of interest rate, thus laying foundations for sustainability of public debt, which is perceived as an ability to meet long-term public sector liabilities with unchanged monetary policies. To the best of our knowledge, this is the first empirical study of fiscal sustainability in Ukraine using one of the well-known fiscal response functions.

The remaining part of this article is organised as follows: section 2 provides a brief review of fiscal sustainability issues. Section 3 presents data and preliminary test results. Section 4 discusses the main results of the empirical testing of the relationship between budget surplus and GDP-adjusted real interest rate. Conclusions are presented in section 5.

FISCAL SUSTAINABILITY: THEORY AND EMPIRICAL STUDIES

Fiscal sustainability means that public debt does not exceed present value of expected future primary budget surpluses (Besancenot, Huynh, & Vranceanu, 2004; Bravo & Silvestre, 2002), being dependent upon the actual values of real interest rate, exchange rate, output growth, etc.[1]. Fiscal sustainability is about guarantees of fiscal solvency in the future and implies an ability to meet long-term public sector liabilities (Giammarioli, Nickel, Rother, & Vidal, 2006). Intertemporal fiscal sustainability used to be associated with the lack of public debt bubble, when the value of government liabilities is growing faster, compared to the debt service capacity (Mihaljek, 2005; Mendoza & Ostry, 2008). Sustainability requires achieving solvency with unchanged policies (Croce & Juan-Ramon, 2003).

It is common to assess fiscal sustainability with stationarity and cointegration tests (Afonso, 2005). As the initial value of public debt should be equal to the present value of future budget surpluses, the present value of future public debt should be equal to zero. Thus, fiscal sustainability implies stationarity of budget balance or public debt. For empirical verification of this fact, the Augmented Dickey-Fuller (ADF), the Phillips-Perron (PP) or Kwiatkowski-Perron-Schmidt-Shin (KPSS) tests are frequently used. However, the unit root methodology is criticised on the grounds of the measurement bias towards positive results (Herzog & Dausch, 2015). For example, it is found that both ADF and PP tests result in over-optimistic evidence of public debt sustainability for such countries as Cyprus or Portugal, which were not good examples of debt management in past decades. On the contrary, in a study of 11 EU countries, only 2 out of 22 time series for the budget balance and the public debt are stationary, brought in favour of fiscal sustainability and they do not envisage any fiscal problems (Bajo-Rubio, Diaz-Roldán, & Esteve, 2009). Another issue is that fiscal sustainability tests are based on the past developments of public debt and budget deficit. The test outcome could be dominated by an influential, but anomalous period in distant past, which is not relevant to the current fiscal policy stance.

In a wider context, a sustainable fiscal policy must satisfy the standard solvency condition according to which the initial stock of public debt should be equal to the present

[1] See Chalk and Hemming (2000), Hemming and Petrie (2000) or Tanner (2003) for a detailed survey of fiscal sustainability issues.

value of future primary budget surpluses. In the most general form, fiscal sustainability implies maintaining the inter-temporal budget constraint:

$$\int_0^{\infty}(G-T)_t e^{-rt}dt = B_0 \quad (1)$$

where:

B_0 - the initial level of public debt,
r - the real interest rate,
G - government expenditure,
T - government revenue.

If $\lim_{t\to\infty} B_t\, e^{-rt} = 0$, i.e. discounted present value of public debt is zero, then current public debt should be equal to future budget surpluses. If we assume that

$$\int_0^{\infty}(T^*-G)_t e^{(y-r)t}dt = \frac{B_0}{Y_0} \quad (2a)$$

then

$$T^* - G = \frac{B_0}{Y_0}(r-y) \quad (2b)$$

where:

y - the output growth rate,
T^* - the equilibrium value of government revenues.

It is clear from the equation (2b) that an increase in the interest rate or a slowdown in the output growth requires higher budget revenues in order to achieve fiscal sustainability.

Despite the popularity of stationarity and cointegration tests to assess if deficits are sustainable, there are numerous arguments that such tests are incapable of rejecting sustainability (Bohn, 2007). It is suggested that error-correction-type policy reaction functions are better tools for understanding deficit problems. One of the approaches implies testing the reaction of budget balance to public debt, and another one refers to the relationship between the budget balance and interest rate.

Croce and Juan-Ramon (2003) proposed a recursive algorithm based upon the law of motion of the debt to GDP ratio to analyse the sustainability of fiscal policy as follows:

$$b_t = \beta_t b_{t-1} - g_t \quad (3)$$

$$g^* = (\beta^* - 1)b^* \quad (4)$$

$$g_t = g^* + \lambda_t(b_{t-1} - b^*) \quad (5)$$

where:

b_t - the stock of public debt (% of GDP);
g_t - the primary budget surplus (% of GDP);
g^* - the equilibrium primary budget surplus (% of GDP);
β^* - the discount coefficient that allows for the convergence to steady-state level of public debt b^*.

Equation (3) shows that the share of public debt in GDP (domestic and foreign) is increased by the primary deficit and the interest payment on lagged public debt. As coefficient β_t measures the relationship between interest rate and output growth, $\beta_t = (1+r_t)/(1+y_t)$, where r_t is the real interest rate and y_t is the GDP growth rate, an increase in the cost of borrowing or a slowdown in output contribute to a public debt build-up, along with persistent budget deficits.

Target variables are defined in Equation (4), which refers to both fiscal variables and discount factor that would prevail in the steady-state. Equation (5) characterises the government reaction function. The primary fiscal surplus is divided into (1) primary surplus ratio g^* associated with the steady-state and (2) the policy response to the public debt gap $\lambda_t(b_{t-1} - b^*)$.

After necessary substitutions we obtain

$$b_t = (\beta_t - \lambda_t)b_{t-1} - (\beta^* - \lambda_t - 1)b^* \quad (6)$$

Consequently, it is proposed to use $\beta_t - \lambda_t$ as the indicator of sustainability, with

$$\beta_t - \lambda_t = \left[\frac{1 + r_t}{1 + y_t} - \frac{g_t - g^*}{b_{t-1} - b^*}\right] \quad (7)$$

Values of $\beta_t - \lambda_t$ below 1 indicate a sustainable position, while values consistently above or equal to 1 signal unsustainability. It is assumed that the debt-to-GDP ratio would converge to its long-term target only if $(\beta_t - \lambda_t) < 1$. In practical terms, the value of β_t is determined by the difference between real interest rate and GDP growth rate, $r_t - y_t$. It is assumed that $\beta_t \approx 1$ for stable industrial economies, $\beta_t > 1$ for economies with capital scarcity, and $\beta_t \gg 1$ for unstable economies (with risk of default). The parameter λ_t measures a ratio between (1) the deviation of the observed primary budget surplus ratio with respect to the primary budget balance that stabilises the public debt dynamics and (2) the deviation of the actual public debt ratio with respect to the target debt ratio, indicating the intensity of the policy response at time *t*, given the debt-ratio gap in the previous period. Empirical testing of fiscal sustainability implies identification of the causality $\lambda \Rightarrow \beta$, which is considered as a sign of public debt convergence towards its steady-state. In fact, the algorithm is about whether an improvement in the primary budget balance (higher λ_t) contributes to a decrease in the spread between real interest rate and GDP growth rate (lower β).

Empirical investigations concerning fiscal sustainability used to be conducted in a testing framework based on stationary or co-integration properties of fiscal variables (Afonso, 2005), even though they were subjected to numerous criticisms such as restrictive assumptions on the real discounting rate, a bias in unit-root tests due to ignorance of cyclical components of primary surplus (like output gap or government cyclical spending), time series structural breaks or existence of an upper bound on the primary budget balance (or the public debt-to-GDP ratio) requiring additional economic considerations, such as the existence of distortionary taxation (Aldama & Creel, 2016). Another approach implies calculation of synthetic indicators of fiscal sustainability, for example Rudin and Smith (1994), Blanchard (2000), Talvi and Vegh (2000). Indicators of fiscal sustainability S1 and S2 are calculated up to 2050 for the European countries (EU Sustainability, 2010), accounting for the long-term effects of ageing costs and assumptions concerning the level of deficit-debt adjustments and the interest rate on public debt. Several proposals are based on the construction of fiscal response functions which test the backward-looking relationship between the primary budget surplus and (1) the initial public debt ratio (Bohn, 1995; Mendoza & Ostry, 2008) or (2) the gap between the real interest rate and GDP growth rate (Croce & Juan-Ramon, 2003) in econometric way. It is quite popular to test fiscal reaction functions between government revenue and expenditure, for example Ciżkowicz, Rzońca and Trzeciakowski (2015) for 12 euro area member states.

Empirical studies for the CEE countries utilise various approaches for testing fiscal sustainability. Based on the analysis of the gap between real interest rate and GDP growth rate,

it is established that Hungary's government debt left the sustainable path in 2001/2002 (Tóth, 2012). Several indicators of fiscal sustainability are used for the analysis of Croatia (Mihaljek, 2005), the Czech Republic (Krejdl, 2006), Slovenia (Genorio, 2005) and Poland (Green, Holmes, & Kowalski, 2001). On the eve of the world financial crisis of 2008-2009, it was found that fiscal sustainability seemed to be a problem in the Czech Republic, Hungary, Poland, as well as in Albania and Croatia (Aristovnik & Bercic, 2007). More recently, it is found that fiscal policy in Poland is 'weakly sustainable', as there is bi-directional causality between expenditure and revenues (Tronzano, 2017). On the whole, it is suggested that sustainability of public debt stock in the CEE countries has improved (Wysocki, 2017), but only 'in a weak sense' (Krajewski, Mackiewicz, & Szymańska, 2016). However, it is established that that current public debt ratio as of 2015 for Bulgaria and Romania is not sustainable (Bökemeier & Stoian, 2016). Among other countries, the recursive algorithm of Croce and Juan-Ramon (2003) is used for empirical assessment of fiscal sustainability for several Latin American countries (Cruz Rodriguez, 2014; Paunovic, 2005).

DATA AND STATISTICAL TESTS

Quarterly data on the primary budget balance, g_t (% of GDP) between 2000 and 2016 are taken from the Ukraine's Ministry of Finance online database. The budget balance is seasonally adjusted by means of the Census X-11 method. We build time series for the gap between real interest rate and GDP growth rate, $r_t - y_t$ (%), by using data from the IMF *International Financial Statistics* online database. The lending rate of commercial banks is used as an indicator of a nominal interest rate.

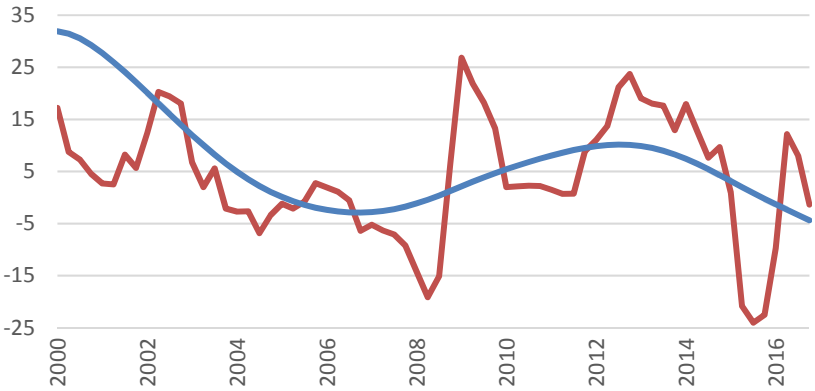


Figure 2. Ukraine: actual and equilibrium trend values of the gap between real interest rate and GDP growth rate $(r_t - y_t)$, 2000-2016

Note: trend values are obtained by the Hodrick-Prescott filter, using a longer sample of 1997Q1 to 2016Q4.
Source: personal calculations based upon the IMF *International Financial Statistics* data.

As it is seen in Figure 2, equilibrium value of $r_t - y_t$ increased to as high as 30% in the wake of the 1998-1999 financial crisis, but it gradually decreased to negative values in the period of 2005-2007. Actual values of $r_t - y_t$ had low records in 2007-2008, on the eve of the world financial crisis of 2008-2009, with an overshooting above trend in 2009. Another peak of the gap between real interest rate and GDP growth rate is observed in 2012, when the National

Bank of Ukraine lost 7.2 bn USD (or 23%) of its international reserves due to a strong demand for foreign currency by residents, followed by a gradual decline in this indicator over the next two years and a sharp drop in 2015, due to an outburst of inflation that was not confronted with a proportional increase in the nominal interest rate. As of 2016, both actual and trend values of $r_t - y_t$ seem to be stabilised at rather comfortable level around zero.

As a preliminary testing exercise, results of the Ganger test for two-way causality between g_t and $r_t - y_t$ that proxies the $\lambda \Rightarrow \beta$ causality are presented in Table 1 for the 2000Q1-2016Q4 sample and two sub-samples[2]. The choice of sub-samples is motivated by the timing of the two financial crises in 2008-2009 and 2014-2015, and aims at detecting possible changes in the relationship between g_t and $r_t - y_t$. It is clear that the budget balance has an impact on the GDP-adjusted real interest rate only for the 2000Q1-2008Q4 sub-sample. There is no reverse causality between both variables, either.

Table 1. Granger causality test

Sample	Lags	Source	
		g_t does not cause $r_t - y_t$	$r_t - y_t$ does not cause g_t
2000Q1-2008Q4	1	3.053 (0.09*)	0.041 (0.83)
2000Q1-2012Q4	1	1.269 (0.28)	0.843 (0.36)
2000Q1-2016Q4	4	0.407 (0.80)	1.575 (0.19)

Source: own elaboration.

However, the Johansen test indicates that there is a long-run relationship between the budget balance and the GDP-adjusted real interest rate in a four variable framework including a nominal exchange rate (local currency per U.S. dollar), e_t, and the current account balance (% of GDP), ca_t (Table 2)[3]. Accounting for both exchange rate and current account balance is justified on the grounds of heavy reliance of Ukraine's budget revenues upon the exports of metals and agricultural commodities as well as because of close links of government expenses to the prices of imported natural gas and crude oil. As indicated by the Akaike and Schwartz information criteria, two lags are included in the short-run component of the model. Both trace and eigenvalue tests indicate the presence of two co-integrating equations (the results do not differ substantially if the model is run with three and four lags). The same result does hold for the sub-samples of 2000-2008 and 2000-2012.

[2] Although the original algorithm by Croce and Juan-Ramon (2003) is based upon the assessment of target values of the debt and primary surplus ratios, in practice it is quite difficult to find proper values of both b^* and g^*, especially for the economy with significant structural instability, as it is the case for Ukraine. Under such circumstances, identification of causality between g_t and $r_t - y_t$ could be considered as a reliable alternative to calculation of the value of $\beta_t - \lambda_t$, being in line with the logic of proposed fiscal sustainability algorithm which is about whether an improvement in the primary budget balance brings about a decrease in the spread between real interest rate and GDP growth rate in the first place. Even if unobserved, target values of b^* and g do play a greater role, their importance should not be overstated if compared with the ability of budget surplus to bring about a decrease in $r_t - y_t$., which is of uncontestable instrumental flavor in attaining fiscal sustainability.

[3] Both budget surplus and the GDP-adjusted real interest rate have a unit root, or I(1), according to the KPSS test, although ADF and PP tests indicate weak stationarity of g_t and $r_t - y_t$ (results are available on request). All tests imply unit root for e_t and ca_t.

Table 2. The Johansen test for cointegration between g_t , $r_t - y_t$, e_t, and ca_t

Number of cointegrating equations		Trace statistic	0.05 Critical value	Prob.	Max-Eigen statistic	0.05 Critical value	Prob.
H_0: $r = r_0$	$r = 0$	64.43***	47.85	0.00	35.78***	27.58	0.00
	$r = 1$	28.64*	29.79	0.06	19.78**	21.13	0.07
	$r = 2$	8.86	15.49	0.37	8.42	12.26	0.33
	$r = 3$	0.43	3.84	0.50	0.44	3.84	0.50

Note: ***, ** and * mean rejection of null hypotheses at 1%, 5% and 10% level.
Source: own elaboration.

ECONOMETRIC METHODOLOGY AND RESULTS

First of all, we tested whether budget surplus does affect the gap between real interest rate and GDP growth rate as implied by the algorithm by Croce and Juan-Ramon (2003). Compared with more sophisticated indicators of fiscal sustainability, as proposed by Rudin and Smith (1994), Blanchard (1990) or Talvi and Vegh (2000), there are several advantages of simple approaches to the analysis of transforming economies, for instance, there is no need to assess the equilibrium levels of budget surplus. However, government expenditure and revenues that require data for quite a long period of time create difficulties even for industrial economies. In such a context, a recursive character of fiscal sustainability algorithms does compensate for inability to calculate equilibrium values of the budget balance or public debt.

Following the logic of the algorithm by Croce and Juan-Ramon (2003), our statistical model with the time-varying parameters (TVP) in a state space formulation presents as follows:

$$\Delta(r_t - y_t) = a_0 CRISIS_t + \beta_{1,t}\Delta(r_{t-1} - y_{t-1}) + \beta_{2,t}\Delta g_{t-4} + \beta_{3,t}\Delta g_{t-6} + \beta_{4,t}\Delta e_{t-1} + \varepsilon_t \quad (8)$$

$$\beta_{j,t} = \beta_{j,t-1} + \vartheta_{j,t}, \quad j = 1,2,3,4 \quad (9)$$

where:

$CRISIS_t$ - a crisis dummy (1 for 2014Q1 to 2016Q4, 0 otherwise);

ε_t and ϑ - the stochastic factors.

Except $CRISIS_t$, all variables are in the first differences. The lags of a budget balance variable are chosen according to statistical significance of estimated coefficients.

Equations (8) and (9) are the measurement equation and transition equation, respectively. The vector of coefficients β_t is formed through a stochastic generating process, with priors β_0. The recursive procedure is used. Besides indicating the magnitude of a particular effect, it is possible to trace whether any significant variation in the estimates of the coefficients occurs. It should be noticed that our estimation procedure is rather in the *spirit* of the algorithm by Croce and Juan-Ramon (2003), not its strict realisation, as we do not account deliberately for the target debt ratio. Our estimation procedure is reduced to testing whether the budget surplus brings about a decrease in the GDP-adjusted real interest rate, strong enough to keep the public debt ratio below the target ratio so that $(\beta_t - \lambda_t) < 1$.

Our filtered TVP estimates are reported in Figure 3 for two models, with control of nominal exchange rate and without it (the estimates were obtained with EViews 9.1 programme). Regardless of the specification, there is a strong positive relationship between the budget surplus and the gap between real interest rate and GDP growth rate with six

lags, representing stable pattern over the last few years. A similar positive relationship between the budget surplus and $r_t - y_t$ with four lags is largely lost in the period of 2006-2008, but estimates of β_2 show a rising trajectory since the beginning of 2010. Also, it is likely that the weakening of the coefficient on g_{t-6} is complimented with strengthening of the coefficient on g_{t-4}, meaning a shorter delay in the budget balance effects upon the gap between real interest rate and GDP growth rate. Anyway, it seems that the causality $\lambda \rightarrow \beta$ is indeed observed in Ukraine, but with a significant lag.

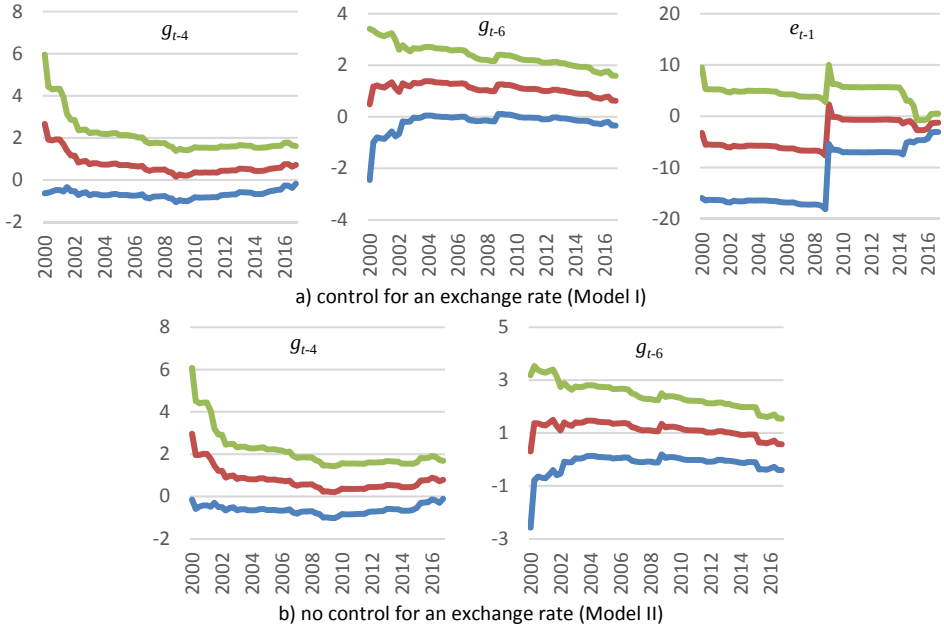


Figure 3. The budget surplus effects on the gap between real interest rate and GDP growth rate (the TVP estimates)

Note: the solid line is the point estimate, while the dotted lines represent two-standard error confidence band around this point estimate. Estimates of the coefficients for lagged GDP-adjusted real interest rate are not shown as being insignificant

Source: own elaboration.

Regarding the exchange rate effects on $r_t - y_t$, there is a clear structural break in 2009, with a disappearance of rather strong negative impact. The magnitude of negative coefficient on the lagged exchange rate increases slightly since the beginning of 2014, but it is much smaller when compared with its values over the period of 2002-2008. As it the effects of crisis dummy upon $r_t - y_t$ are not detected, it is likely that there are no any specific developments of the 2014-2016 period that are not explained by the budget balance and exchange rate variables.

The sum of the coefficients on g_{t-4} and g_{t-6} is presented in Figure 4, being an indicator of fiscal sustainability. In addition, estimates are presented for two alternative samples starting in 1998 and 1999, as it is often argued that the Kalman filter estimates could be subject to instability with respect to the choice of the sample. On the other hand, the algorithm by Croce and Juan-Ramon (2003) in its canonical form (Equation (7)) is based upon

the choice of the steady-state level of public debt b^*, which is made rather arbitrarily (Chalk & Hemming, 2000). In such a context, the initial point of the sample could be viewed as a proxy for the country-specific target debt ratio.

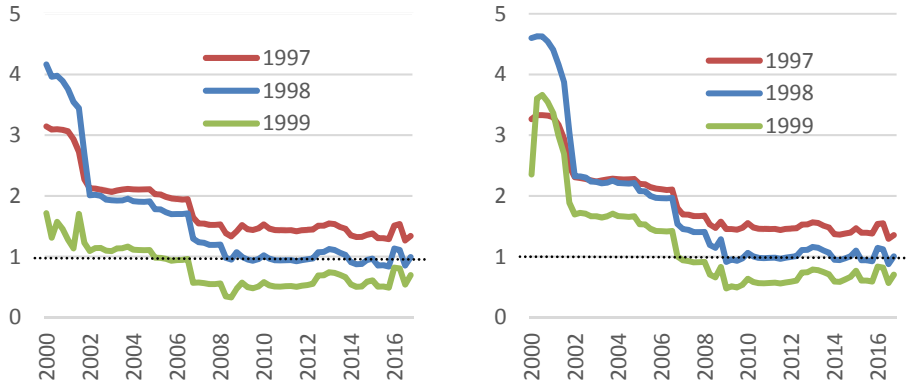


Figure 4. The aggregate effect of lagged budget surplus coefficients upon $r_t - y_t$
Source: own elaboration.

Although there are no significant differences in the pattern of TVP estimates across the two specifications, it is easily recognised that using a more recent starting point of the Kalman filter brings about a much more optimistic view of the fiscal sustainability in Ukraine. If we choose the year 1997 as a starting point for the Kalman filter, the lack of fiscal sustainability is present not only for the pre-crisis period of 2000-2008, but for the post-crisis years as well. On the other hand, estimates for 1999 as a starting year indicate fiscal sustainability since 2009, which is not a credible outcome assuming tremendous fiscal problems in the following years.

As there is a relative stability of the relationship between g_t and $r_t - y_t$ over the 2006-2016 period, especially in the specification with e_t and the year 1997 as a starting point for the Kalman filter, it is reasonable to apply the VAR methodology as an alternative way of the fiscal sustainability testing that combines both retrospective and prospective features (Tanner & Samake, 2008). Beginning in some base period, the evolution of public debt is based on either a baseline policy or accumulated shocks. Then simulations of the model allow for using of the 'fan chart' forecasts in order to calculate the average primary surplus required to stabilise public debt at a given time horizon.

Assuming co-integration of g_t, $r_t - y_t$, e, and ca, with rank r $(0 < r < n)$, all I(1) variables according to the KPSS test, the VAR/VEC model should be used as follows:

$$A(L)\Delta z_t = -\alpha\beta z_{t-1} + \varepsilon_t \quad (10)$$

where:

$A(L)$ - the matrix polynomial of degree k;
α and β - $n \times r$ matrices of rank r;
z_t - a vector of endogenous variables $(z_t = (g_t, r_t - y_t, e_t, ca_t))$;
ε_t - a vector of stochastic shocks.

It is assumed that the budget balance affects the gap between real interest rate and GDP growth rate in the current period, while being independent of the latter. However, a two-way causality between both endogenous variables is assumed for future periods. Both g_t and $r_t - y_t$ affect an exchange rate in the current period, with the changes in the current account balance to follow. The relationship between g_t and $r_t - y_t$ is tested for two specifications, with a nominal exchange rate (local currency per U.S. dollar) as an exogenous variable (Model I) or without it (Model II), and 2000-2008, 2000-2012 and 2000-2016 data samples. Also, the six-month London-Interbank Offer Rate (LIBOR) and the net foreign direct investment inflows (FDI) are included as independent variables.

The long-run coefficients for the budget surplus effect upon $r_t - y_t$ are presented in Table 3. Our results indicate the lack of fiscal sustainability regardless of samples and model specifications, as an improvement in the budget balance does not bring about a decrease in the gap between real interest rate and GDP growth rate, being in accordance with the TVP estimates.

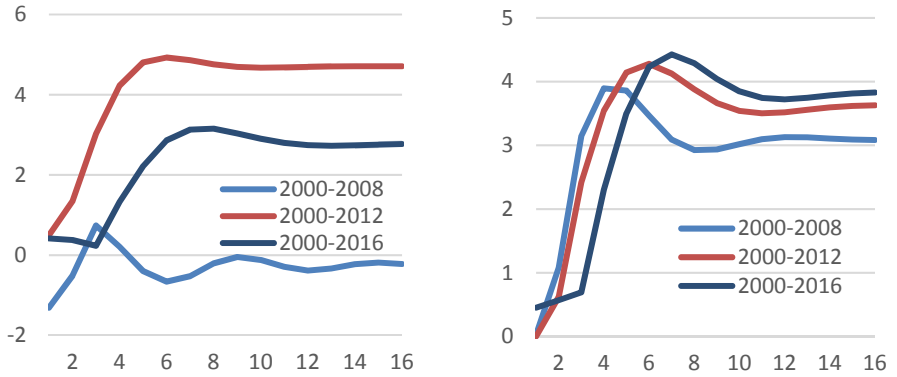
Table 3. The long-run coefficients for the budget surplus effect upon $r_t - y_t$

Sample	Model I (with exchange rate)	Model II (without exchange rate)
2000Q1-2008Q4	6.802 (3.67)	2.703 (0.73)
2000Q1-2012Q4	5.553 (0.71)	2.659 (0.70)
2000Q1-2016Q4	2.506 (0.60)	4.901 (1.51)

Note: standard errors in brackets
Source: own elaboration.

The impulse response functions to a one standard deviation shock for short-term relationships are presented in Figure 5. The estimations do not represent serial correlation, while the impulse-response functions are all stable. If we control for an exchange rate, the short-run response of $r_t - y_t$ to the budget surplus, is very similar for the 2000-2012 and 2000-2016 samples, with the response function revealing a gradual increase in the coefficient on g_t to about 5 and 3, respectively. For the 2000-2008 sample, the budget surplus seems to be neutral in respect to $r_t - y_t$. In the VAR/VEC model without exchange rate, estimates for the coefficient on g_t for the 2000-2008 sample reveal the weakest response of $r_t - y_t$, while it is the strongest for the 2000-2016 sample. However, the difference between response functions are small enough. In all cases, the value of response function implies lack of fiscal sustainability, which does not conflict with the TVP estimates. Following the budget surplus shock, it is most likely that the magnitude of the response by the gap between real interest rate and GDP growth rate does not signal the fiscal sustainability in Ukraine.

The analysis of the forecast error variance decomposition (FEVD) for the 2000-2008 sample shows that the budget surplus is responsible for up to 23% (Model I) and 32% (Model II) of changes in the gap between real interest rate and GDP growth rate with a horizon of 16 quarters (Table 4). On the other hand, this effect is twice that strong for the shorter sample of 2000-2012, while the fraction of g_t in the FEVD of $r_t - y_t$ is marginal for the 2000-2008 sample (Model I). If not control for the exchange rate (Model II), the fraction of budget surplus as a factor behind changes in $r_t - y_t$ increases above 60% for the pre-crisis period of 2000-2008, with very similar results for the 2000-2012 sample.



a) control for an exchange rate (Model I) b) no control for an exchange rate (Model II)

Figure 5. The budget surplus effects on the gap between real interest rate and GDP growth rate (the VAR/VEC estimates)

Source: own elaboration.

Table 4. The forecast error variance decomposition of $r_t - y_t$ responses to innovations in g_t (%)

Model	Sample	Forecast horizons				
		1	4	8	12	16
I	2000-2008	4	2	1	1	1
	2000-2012	1	20	44	50	53
	2000-2016	1	2	16	21	24
II	2000-2008	0	31	52	59	63
	2000-2012	0	20	41	46	48
	2000-2016	1	4	24	29	32

Source: own study.

On the whole, our results are in line with majority of empirical studies for the CEE countries which report problems with fiscal sustainability, for example Aristovnik and Bercic (2007), Krejdl (2006), Mihaljek (2009), or rather weak evidence in favour of sustainable fiscal indicators (Krajewski, Mackiewicz, & Szymańska, 2016; Tronzano, 2017). In order to correct fiscal imbalances, it is necessary to close loopholes in the tax system in the first place or implement necessary expenditure cuts, for example on natural gas subsidies for households. Compared with the CEE countries, fiscal policies in Ukraine should be more restrictive as the GDP growth rate is more volatile and vulnerable to external conditions. Consequently, it is not feasible to rely on high GDP growth as a source of budget balance improvements, similar to the experience of the Czech Republic and Poland in 2016-2017. Also, it is worth noting that excessive reliance on external public debt diminishes the attractiveness of exchange rate depreciation as an instrument of macroeconomic rebalancing, as it was the case in Poland over the 2009-2016 period. Moreover, larger exchange rate misalignments could further complicate the assessment of fiscal sustainability in the presence of significant foreign liabilities. As established by Blanchard and Das (2017), either exchange rates that appear overvalued may still imply a reasonably high probability

that debt is sustainable at the current exchange rate, or exchange rates that appear undervalued (as in Ukraine) may still come with a reasonably low probability that debt is unsustainable at the current exchange rate.

CONCLUSIONS

In the article, both the time-varying parameters (TVP) and vector error-correction autoregression (VAR/VEC) models are used in order to test for the fiscal sustainability in Ukraine. Estimation procedures are conducted in accordance with the recursive algorithm derived from the law of motion of the debt-to-GDP ratio developed by Croce and Juan-Ramon (2003). Compared with alternative approaches, it does not require data for government expenditure and revenues for quite a long period of time. The main conclusion from our study is that Ukraine lacks fiscal sustainability, as indicated by the pattern of relationship between the primary budget surplus and the gap between real interest rate and GDP growth rate. Regardless of the specification, there is a strong positive relationship between the budget surplus and the gap between real interest rate and GDP growth rate with six quarter lags, representing stable pattern over the last few years. If testing for fiscal sustainability, it is important to control for the exchange rate effects, and it is quite natural to assume that it will be a high share of foreign liabilities in the total public debt that aggravates a situation. Assuming an undervaluation of the Ukraine's currency ranging from 80 to 100% according to different estimates, it is a challenge for future studies to establish the impact of that kind of exchange rate misalignment upon the fiscal sustainability.

Our findings argue in favour of discretionary fiscal policy actions aimed at an increase in the government revenues combined with the public sector expenditure cuts, as current policies do not seem to be sufficient to achieve fiscal sustainability. However, a more detailed study is needed in order to identify most efficient approaches for a decrease in the budget deficit across a detailed 'menu' of expenditure and revenues. On the other hand, any attempts to decrease interest rate and/or stimulate output growth by an expansionary monetary stance are likely to be counterproductive in the presence of substantial public external debt under the risk of exchange rate misalignment.

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What is Law & Economics and How Could It Have Contributed to Preventing the Global Crisis?

Jacek Lewkowicz

ABSTRACT

Objective: The main goal of the article is to investigate the underpinnings and research apparatus of law & economics, as well as to expose its relevance to economists and lawyers in the context of the recent global financial crisis and preventing future crashes.

Research Design & Methods: The research objective is met with the usage of the analysis of the primary material and theoretical inquiry. The article covers theoretical dimensions of the application of law & economics to the analysis of market problems, such as the global financial crisis.

Findings: A crucial advantage of law & economics is its mix of research apparatus – economic and legal theory, as well as econometric and behavioural approaches. A detailed analysis of institutions shall enable more precise assessment of the outcome of market phenomena. The causes of the recent global financial crisis could have been addressed by research in law & economics. Popularisation of law & economics may contribute to preventing crises.

Implications & Recommendations: A deep inquiry of market phenomena relies on interdisciplinary research. Applying legal-dogmatic research to formal institutions and combining it with empirical economic analysis could lead to better understanding of market issues, like crises.

Contribution & Value Added: The article highlights the importance of law & economics for dealing with market failures. Its core value added is the popularisation of this interdisciplinary approach and description of possible applications.

Article type: conceptual paper

Keywords: law & economics; institutional economics; global crisis

JEL codes: K10, K20, G01

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INTRODUCTION

Market phenomena, such as financial crises, tend to turn away from strict assumptions of neoclassical models. Their outcomes affect organisations, households, individuals and states. Effects of market failures or even crises are multidimensional and may have both economic, sociological, or psychological character. Such market events relate to regulation. Sometimes suboptimal regulation leads to crises. One of the approaches towards the analysis of relationships between legal rules and economics is law & economics with its well-developed research apparatus relying on economic theory as well as econometric tools.

The article covers theoretical dimensions of the application of law & economics to the analysis of market problems, such as the global financial crisis. The key objective of the article is to review the underpinnings and research apparatus of law & economics, as well as to expose its relevance to economists and lawyers in the context of preventing future crises. The research objective is met with the usage of the analysis of the primarily material and theoretical inquiry. By this research we aim to provide a value-added to the broad and actual discussion over regulations regarding markets.

The article is organised as follows: it discusses general principles of law & economics, the research apparatus of law & economics, as well as law & economics in the context of the global financial crisis.

LITERATURE REVIEW

Origin and Evolution of Law and Economics

Law & economics is concentrated on relations between economics and law – mostly by analysing the law with economic research tools. Law & economics is classified in different ways. Sometimes it is treated as a subdomain of economics (Rowley, 2005), research movement (Posner, 1987), or a separate branch of science, without stating its roots (Coase, 1993). Although classification issues are still debated, law & economics is dynamically developing.

Some of the most notable precursors of law & economics were i.a. N. Macchiavelli, T. Hobbes, Ch. Wolff, C. Beccaria, D. Hume, A. Smith and J. Bentham (Mackaay, 2000). They dealt with non-market, but still economic aspects of human behaviour (Posner, 2005). However, some of the first successful attempts of regular analysis of legal institutions with the usage of economic apparatus were conducted in 19th century (Bełdowski & Metelska-Szaniawska, 2007).

The first wave of research on law & economics occurred around the middle of 19th century and its core idea was that regulations are dependent *inter alia* on economic circumstances and individual rights may be distinguished from collective resources (Bełdowski & Metelska-Szaniawska, 2007). In addition, the significance of evolution of institutions was commented. Representatives of the so-called first wave of law & economics were focused mainly on the analysis of benefits and costs from the perspective of economic actors facing scarcity of resources. American institutionalism of the end of 19th century, in turn, was concentrated on interrelationships between economic processes and legal issues. This approach gained its reputability in the 1920s and 1930s, also thanks to attempts to formulate research perspectives alternative to neoclassical modelling

(Bełdowski & Metelska-Szaniawska, 2007). Some of the key representatives of the classical institutionalism were T. Veblen, J.R. Commons and W.C. Mitchell. They managed to challenge some of the strict assumptions and tendencies widespread in neoclassical economics, such as autonomous market mechanism, static analysis, mathematical formalism, market self-regulation and separation of economic problems from cultural or social background (Wilkin, 2004). However, due to methodological weaknesses, classical institutionalism was not a leading economic approach of its times.

The first modern school of law & economics evolved at the University of Chicago. Thanks to efforts of H. Simons, F.A. Hayek and others, legal courses covered also economic readings (Mercuro & Medema, 2006). In the late 1950s *The Journal of Law & Economics* was set up. Apart from R. Coase, interdisciplinary research in economics and law was conducted among others by G. Becker and R. Posner. Becker employed economic apparatus to his analysis of crime, addiction, or discrimination (Becker, 1968). Posner made a crucial point about economic aspects of a deterrent role of legal sanctions and referred to rational approach undertaken by criminals (Posner, 1973). The aspect of deterrence is closely linked with the general issue of respecting the laws, which in fact establish a normative system that is usually being constructed by legislators in order to develop social interactions (Chauvin, Stawecki, & Winczorek, 2011). Deterrence incentives enhance the society to act in line with the disposition stated in the hypothesis of the legal norm. The Chicago school of law & economics produced a positive approach as well as a normative perspective (Mercuro & Medema, 2006).

A significant role for the evolution of law & economics was performed by the New Haven school, which was represented i.a. by G. Calabresi. His contributions include the distinction of direct costs of accidents, costs of inadequate compensation of losses and administrative costs. He and his followers were working on general deterrence and specific deterrence instruments (Calabresi, 1970). In addition, Calabresi considered also issues like income redistribution and allocation of risk (Priest, 2005). The New Haven school of law & economics explicitly refers to achievements of the Chicago school, with a special stress put on reduction of market failures by imposing optimal regulations (Katz, 1998). The New Haven school is commonly recognized as a normative one (Bełdowski & Metelska-Szaniawska, 2007).

Another approach towards law & economics is the functionalism of the Virginia school. To a large extent it is based on the public choice theory. Public choice theory, in turn, is focused on non-market mechanisms of making decisions or economic analysis of politics (Wilkin, 2005). The Virginia school of law & economics applies the model of rational choice to the analysis of politics and law. Some of the most notable representatives of this school were J.M. Buchanan and G. Tullock (Buchanan & Tullock, 1962). Public choice theory assumes rationality of political actors. Another key assumption of functional approach towards law & economics is normative individualism. It means that the analysis of law is in this context based on investigation of the structure of institutional incentives (Parisi, 2004).

The institutional school of law & economics is perceived as a branch of institutional economics or new political economy (Buchanan, 1989). Indeed, it is strongly related to new institutional economics developing since 1970s. New institutional economics enriches neoclassical theory with institutional aspects. The scope of institutional research is very broad. Some of its key interests are: contractual analysis, property rights, or the economic role of the state (Bełdowski & Metelska-Szaniawska, 2007). Institutional law & economics

covers issues like efficiency or effectiveness of regulations, legal order, institutional equilibrium, evolution of legal institutions (Medema & Mercuro, 2000). The core interest of institutional law & economics is the interrelationship between legal regulations and the economy. Naturally, the abovementioned approaches do not stand for a complete list, but they may be treated as the leading perspectives of law and economics.

MATERIAL AND METHODS

Research Apparatus of Law and Economics

Law & economics allows researchers to apply the theoretical underpinnings from institutional economics and regulatory economics to the case of a particular market.

The beginnings of law & economics were generally theoretical. Scholars adapted theorems, concepts, and research methods from economics in order to reveal an economic rationale of regulations. It turned out that formal models could relate economic outcomes to the institutional environment. Those fields of scholarship dealt with crime, contracts, property rights, torts, trials and other spheres.

Over the years, the theoretical approach in law & economics faced diminishing returns, probably because of the shrinking of remaining areas of law to be analysed. This pushed some extent scholars to switch into empirical, quantitative analysis of law, a very attractive frontier in economic analysis of regulations. Some data exist in rudimentary forms or have to be scraped, but more data sources are becoming available for quantitative law & economics, which provides data-driven conclusions useful for policymakers and economic agents. From a methodological point of view, advanced econometric tools may be applied in law & economics research. However, scarcity of data often limits the scope of empirical analyses.

Law & economics focuses importantly on transaction costs economics (Bełdowski & Metelska-Szaniawska, 2007). Basic theoretical underpinnings were provided i.a. by R. Coase, who stressed out the importance of transaction costs of exchange and provided the foundation for the remarkable insight that has come to be known as the Coase Theorem (Coase, 1960). What is crucial from the perspective of law & economics, even from early studies in institutional economics, is that the state provides a regulatory (institutional) environment that motivates contracts that tend to allocate resources optimally from private initiative. Legal obstacles affecting transactions should be eradicated from the legal system.

An important trend of increasing sophistication of economic tools can be observed in the second part of 20th century. It contributes significantly to the evolution of economics and its various applications. But it may have as a side effect the separation between academic research in economics and the practice of legal studies. Higher degree of economic specialisation and complexity of formalisation of the apparatus become more and more difficult for lawyers to understand. However, economists without any training in law, tend to treat legal institutions cursorily and amateurishly. So the challenge is to merge legal and economic knowledge and tools in one research direction – and law & economics provides the appropriate apparatus to do so.

Aims of Law and Economics

One of the most important goals of law & economics is to seek for a higher effectiveness or efficiency of law (Schaefer & Ott, 2004). However, the term of effectiveness of law is ambiguous and does not have any common definition. Lawyers claim efficiency of law as a proved potentiality to achieve assumed legislative tasks (Stelmach, Brożek, & Załuski, 2007). Economists, in turn, treat efficiency of law more broadly – as a capacity to reach assumed goals, but with the minimal usage of resources (Stroiński, 2003).

The economic approach towards legal regulations (formal institutions) is based on an assumption that they should enable the raising of the level of utility of individuals, relating to an improved allocation of resources (Georgakopoulos, 2005). Due to the fact that the effectiveness of law may be differently interpreted, several measures are applied to state the effectiveness of particular institutions – for instance: Pareto, Kaldor-Hicks and Posner criteria (Famulski, 2017). Naturally the aforementioned list of exemplary approaches is not closed and it is difficult to point out a dominant perspective.

The sphere of effectiveness of regulations is much less developed than effectiveness of markets. What is crucial, is that the law is not only assessed by its effectiveness – it encompasses also issues like social justice and others that are tough to be economically expressed (Schaefer & Ott, 2004). Effectiveness of institutions may assume also maximisation of the difference between social benefits and social costs of implementation of new laws. Some institutions, both formal and informal, can be used as tools for reducing market failures, but not always (Botero, Djankov, La Porta, Lopez-de-Silanses, & Shleifer, 2004).

Within the existing economic literature, it is relatively common to describe regulations as a substitute for market mechanisms. Regulatory interventionism, accordingly, shall be implemented in order to reach sustainable market rules. Institutions are usually endogenous, which is explained from the perspectives of legal theory, social conflict or effectiveness of institutions. With the approach undertaken in legal studies, market institutions are related to the evolution of the legal system of a state (Botero *et al.*, 2004). Institutions may express interests of groups which seek economic rents. At the same time, the character of institutions does not have to influence social welfare. Institutions may be involved by rent seeking groups, which produces a distorted allocation of assets (Acemoglu & Johnson, 2005). Thus, institutions serve as a tool for dividing rents. Institutions may be treated as a source of rents by themselves (Saint-Paul, 2000; Blanchard & Giavazzi, 2003).

Understanding regulations is not unified in economic science. The meaning of regulations depends on the context. Regulating markets occurs when the presence and activity of market agents is conditioned by the adopted system (Black, 2001). Legal regulations may be imposed in order to lower the effects of market failures, as well as to stimulate development of selected sectors and to promote competition. Thus, market regulations should serve as incentives towards approaching the optimal allocation of resources. Especially important are those regulations responsible for imperfect markets and socially important problems (Alexy, 2008).

Legal regulations are formal institutions, by definition. In general, institutions are characterised within the economic literature as systems of established social rules that structure social interactions (Hodgson 2006). They put constraints on decisions and may be permanent or stable (Glaeser, La Porta, Lopez-de-Silanes, & Shleifer, 2004). According to D.C. North, institutions are certain 'rules of the game', 'humanly devised constrains that

shape interaction' (North, 1990, p. 3), and encompass both formal and informal systems and enforcement mechanisms. Voigt (2013) emphasizes not only the difference between formal and informal rules but also refers to the issue of their enforcement. According to this perspective, institutions are 'commonly known rules used to structure recurrent interaction situations that are endowed with a sanctioning mechanism' (Voigt, 2013).

Institutions may be brought to life by organisations or groups or individuals (Leftwich & Sen, 2010). They serve as a predictable structure for economic, social, and political life by shaping people's incentives and decisions, but institutions do not always determine social behaviour, e.g. because of exogenous factors (Leftwich & Sen, 2010). Institutions change over time as a result of being reformed (Giddens, 1984). It usually takes time for social actors to adapt to a new institutional environment (Williamson, 2000). From the economic perspective, institutions may cause positive or negative effects. The nature of these outcomes depends on the type of behaviour and decisions that institutions legitimise and on the allocation of resources that they cause (Leftwich & Sen, 2010).

In a broad sense, regulations stand for all forms of influence on the market made by the state. A narrower perspective, in turn, focuses on formal institutions that affect markets (Kahn, 1991). Regulations are used also by the state as a tool in order to optimise and coordinate its responsibilities to the public. All in all, regulations function as a system of incentives imposed i.a. on market agents. If regulations are valid and are executed, they shall affect decisions of organisations and individuals (Viscusi, Vernon, & Harrington, 2005). Regulations may be a solution to market failures, market inefficiency, or market disequilibrium.

Moreover, regulations are not only related to economic aspects. Legal institutions may be supportive in fulfilling other aims, encompassing social justice. Accordingly, market regulation appears to be a method of intervention of the legislator and is *de facto* a common feature of markets. However, when it comes to the context of affecting markets, apart from the material content of legal systems, real actions may be undertaken in order to enforce regulations. Furthermore, not all of mechanism design instruments have to be based on existing institutions (Maskin, 2007). The theory of designing mechanisms states that the desired regulatory goals (economic or social) should be identified first. Then, analyses of opportunities of shaping relevant institutions or mechanisms that could lead to fulfilling such goals may be pursued. If opportunities for succeeding in this context exist, potential forms of institutional design may be considered (Maskin, 2007).

A very significant point is not only about the design of institutions, but also about the manner they are implemented. Due to the opportunism of some interest groups, the status quo may be desired. Because of some geopolitical factors, exact effects of new laws are hard to predict precisely. Discrepancies may be linked also with the pace of reforms (Nsouli, Rached, & Funke, 2005). Sequential implementation of regulations has an advantage of the ability to make gradual social adjustments to formal rules. However, it may also lead to widespread rent-seeking activity of groups established in the previous system. Shock reforms, in turn, bring fast and sometimes radical changes, but leave less space for social adaptation. The optimal manner of regulatory reforms depends on particular circumstances.

Market Failures and Institutions

Social or market attitudes towards regulation may be driven by the effectiveness of institutions, which usually assumes maximisation the difference between social benefits and

social costs of implementation of the new laws. Some institutions, either formal or informal, may be used as tools for reducing market failures (Botero *et al*., 2004). In this context, the most important challenge is the selection of adequate measures of institutional effectiveness. The point is that law & economics provides appropriate research tools for the analysis of institutional effectiveness.

Representatives of the most recognizable approaches and economic schools agree on the statement that market failures occur (Snowdon & Vane, 1998). By market failures we usually consider setbacks in allocation and motivation, which are the basic roles of markets. Market failures evolve because of, i.a., incompleteness of markets, information asymmetry, imperfect competition, externalities, public goods undersupply and problems with redistribution of income. In fact, market failures accompany almost all markets, as long as some kind of imperfection is always present. Neoclassical models did not consider market failures, but more recent theories leave no doubt that market failures exist and should be limited. One of the solutions towards market failures is market regulation.

The market may be treated as a special mechanism of coordination of assets and optimisation of their usage (Atkinson & Stiglitz, 1980). Actors functioning on markets make decisions based upon production factors, supply and demand, with reference to prices of commodities or services, as well as their own specific utility functions. Functioning of perfect markets is mainly up to the pricing mechanism (Robinson, 1934), while imperfect markets bear regulatory interventions in order to obtain higher levels of economic effectiveness, which is crucial from the perspective of social welfare.

According to the literature on the subject of imposing regulations, the existence of market imperfections is not the only reason for regulating them. Another point is that, in some circumstances, regulatory interventions may foster economic growth (Jamal *et al*., 2004). States have legitimate tools to introduce formal institutions and execute them.

Some market imperfections are negligible, but others seem to be crucial. Market failures are present in many markets and they tend to differ across states and sectors. A great challenge is to manage the issue of economic efficiency and keep a satisfactory level of justice of allocation of assets, by using legal regulations (Stiglitz, 1991). The logic of regulatory intervention of a state is that if markets are not able to reach the equilibrium by themselves and do not converge towards effectiveness, reasonable regulatory policy may correct this state (Baldwin & Cave, 1999). The following section is devoted to the recent global financial crisis seen through the lens of market failures. Remarks about the potential of law & economics in preventing such crashes will conclude.

RESULTS AND DISCUSSION

The Causes of the Global Financial Crisis

One may wonder why, having such developed research apparatus and scope of interests of economists, lawyers, and other scholars, we did not avoid the latest global financial crisis. It seems that legal professionals were carrying out the creation of specialised and complex financial instruments that finally crashed out.

A crucial point about the recent global economic crisis is that it affected not only the housing sector of the economy, but it rather brought the financial system to its knees.

Some attribute the severity of the crisis to the behaviour of banks, which had evaded regulatory capital requirements (Acharya & Richardson, 2009).

Essentially, banks repacked mortgages into mortgage-backed securities. Banks reduced the amount of capital against their loans, which increased their quasi-capacity to provide new loans (Acharya & Richardson, 2009). The effect was that when the housing bubble burst, the risk of mortgage defaults was concentrated in the involved banks and made them insolvent. It brought down i.a. Lehman Brothers. The magnitude of the financial crash was fuelled by a large decline in lending by commercial banks. Then, it affected the global financial sector.

The previous paragraph deals with the issue of the roots of the financial crisis that evolved in the United States. However, it should be noted that it spread to another countries, also to emerging market economies, and gained a global status. Emerging markets responded strongly and quickly to the situation in the American financial system. Policies undertaken in emerging markets to insulate them from the U.S. crisis aftereffects, proved inadequate in the view of changes in international trade and the credit crunch, causing a sharp decline in financial flows (Dooley & Hutchison, 2009). Relatively high global risk aversion and foreseen financial market volatility were found as the key factors causing the decrease in international bank flows during the global financial crisis of 2007-2008 (Herrmann & Mihaljek, 2013). Increased financial integration, as well as dependence on wholesale funding might have given a rise for exaggeration and global spread of the financial crisis (Claessens, Dell'Ariccia, Igan, & Laeven, 2010).

What happened may be considered a regulatory failure – banks managed to take high risks in order to achieve higher short-term profits, by evading the capital requirements imposed by legislators, who were mainly hoping to mitigate risks present in the financial sector. What happened was not only the collapse of selected investment banks, but rather a systematic failure of the securitisation market.

The crisis was preceded by a kind of a failure of financial institutions that froze up capital markets. When the bubble burst, the supply of capital to creditworthy entities or individuals was significantly reduced and it even intensified the effects of the crisis in the real economy (Acharya & Richardson, 2009). In fact, mortgages were granted to individuals without factual ability to pay them back. Those mortgages, in turn, were dependent on increases in house prices. Due to securitisation of the mortgages, credit markets were growing rapidly. However, the quality of such loans deteriorated (Berndt & Gupta, 2008). As a result, some of the securitised mortgages classified as 'AAA' instruments by rating agencies, because of modelling failures and, possibly, conflict of interests became untradeable 'toxic assets.' Such behaviour was not in line with the general idea of securitisation. Securitisation is performed mainly in order to spread risk. It is usually done by placing large concentrations of risk from financial institutions to small concentrations for disposal to smaller investors. So securitisation enables banks to avoid holding costly capital by selling it off to others – removing loans from balance sheets. During the period directly preceding the crisis, the securitisation was made to reduce the required capital for banks. But the risk remained concentrated in the financial institutions, which became over-leveraged. Moreover, conflict of interests existed in this context, the striving for fees instead of performing an appropriate risk assessment (Acharya & Richardson, 2009).

Another aspect of the global crisis that has to be considered is its behavioural character. It is discussed that economists failed in anticipating the financial crisis and even contributed to it by encouraging the policymakers to perceive more stability and risk sharing within the financial sector, that was present in fact (Colander *et al.*, 2009). Behavioural inclinations had an impact on investors, market-supporting entities and even regulatory institutions (Szyszka, 2010).

The Financial Crisis Inquiry Commission (2011) stated that the financial crisis was an avoidable disaster. The crisis was primarily caused by failures in government and financial market regulations, corporate mismanagement and inattentive risk-taking. The key regulatory fault was related to bosh mortgage lending, excessive packaging and sale of loans, as well as hazardous bets on securities backed by the loans. Regulators were blamed for disappointment in requiring big banks to hold appropriate amount of capital to absorb potential losses and dwell dicey practices.

Law and Economics in the Context of the Global Financial Crisis

With regard to the abovementioned avoidability, special attention shall be devoted even to law & economics. Research apparatus of law & economics, as it was described in previous sections, is interdisciplinary and ranges from philosophy of law to quantitative empirical methods. Regulations responsible for expansion of the crisis could have been analysed with the application of legal-dogmatic, functional, institutional and econometric perspectives, so to reveal incentives lying behind the behaviour of agents and to assess the consequences of their decisions. Advantages of law & economics compared to purely and separate legal or economic investigations are about its ability to cover the whole range of causes of the crisis.

Unfortunately, law & economics was relatively silent about the regulations determining such instruments and market practices, like the Federal Reserve Act and other relevant issues that allowed the crisis to spread. In the EU there was also a lack of interest in this perspective. However, some exceptions from those observations may be recalled, i.a. Lucian Bebchuk (2008) from Harvard Law School. On the other hand, a lot of attention shall be put to regulations that may limit the risk of more crises in the future.

The problem was a scarce amount of interaction or collaboration between economists and legal scholars. As a result, the response of law & economics to the latest global financial crisis was slow. Taking into consideration how useful law & economics may be in predicting market crashes or dealing with their consequences, this research branch should be developed before additional incidents occur. There are serious problems facing markets and societies today and they are relatively complex and structural, in the areas like financial systems or banking. Thus, a lot has to be done in terms of interdisciplinary research helping to assess and prevent future crises.

Not only do we have a need for more research to develop law & economics, but there are market needs calling for this. Higher popularity of law & economics will lead to a higher number of researchers, better access to data, and the development of empirical tools, as well as reconsideration of regulation or public policy. What must be developed are not only joint projects carried out by economists and lawyers, but also adequate educational programmes in law & economics (like the European Doctorate in Law and Economics). Last, but not least, there is a need for preparing long-term series of research on relevant legal, economic, and social issues in order to make them appropriate for law & economics.

CONCLUSIONS

The main goal of the article was to contribute to a better understanding of the character and possible applications of law & economics, i.a. to the issue of the global financial crisis. Recent cross-disciplinary research regarding the relevance of law & economics for social sciences combines economics, legal, and political science and reveals its importance. However, some of branches of law & economics still require development and more sophisticated empirical apparatus in order to deliver data-driven expertise on the efficiency of particular legal regulations and informal institutions.

Applying the proposed approach of linking economic literature with actual studies on financial systems will be useful. The more systematic empirical analysis may allow for formulating more reliable and scientifically-based recommendations on public policies in order to create a formal setting conductive to the optimal functioning of financial systems. It may allow for a more successful quest for the possibly most adequate regulatory programmes in the future responding to the needs of advanced economies, as well as emerging market and developing countries.

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Negative Interest Rate Policy in Switzerland

Elisabeth Ziegler-Hasiba, Ernesto Turnes

ABSTRACT

Objective: The purpose of this study is to present a review of the negative interest rate policy of the Swiss National Bank (SNB) after the outbreak of the financial crisis, in the context of falling real interest rates. Furthermore, the article demonstrates the implications of this unconventional monetary policy for the Swiss economy as well as the financial market stability.

Research Design & Methods: The study is completely based on literature research. The analysis should be interpreted as being mainly suggestive since empirical research based on a quantitative analysis was not conducted. This article examines and reviews extensive arguments and evidence of 97 scientific articles. The descriptive evidence presented has a strong focus on the situation in Switzerland.

Findings: In economic literature, the discussion about transmission mechanisms of the monetary policy is conducted through several channels: the interest rate channel, the ex-change rate channel and other asset price channels. In Switzerland, the impacts of the negative interest rate policy (NIRP) implemented in 2015 can so far be felt in increasing credits, especially in mortgage claims. The net income of Swiss banks from the commission and service business fell. Moreover, the exchange rate of the Swiss Franc against the Euro could be stabilised to a certain degree.

Implications & Recommendations: A negative interest rate policy has an immediate impact on short-run and long-run interest rates and on banks' interest rate margins. Currently, monetary policy is taking a turn, especially in the US. However, the leeway for higher rates in Switzerland is limited due to the interest rate differential between short-term Eurozone and Swiss money market rates.

Contribution & Value Added: This article provides insights into the determinants of real interest rates and into the short-run effects of NIRP on the Swiss economy.

Article type: research paper

Keywords: real interest rates; unconventional monetary policy; monetary transmission channels; asset price bubbles; financial stability

JEL codes: E44, E52, E58

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INTRODUCTION

In the aftermath of the financial crisis, the negative interest rate policy (NIRP) went from being a theoretical possibility to becoming practical reality in many advanced economies. An increasing number of central banks have taken unconventional measures, which relied on asset purchases as key instruments. Some started offering targeted longer-term refinancing operations and introduced negative interest rates. NIRPs were implemented as an unprecedented move by the central banks of Bulgaria, Denmark, the Eurozone, Hungary, Sweden, Japan and Switzerland, with different stated motivations. It is in light of this development that this article aims to first examine the causes of the period of unusual low interest rates based on a broad literature survey.

The article starts with an explanation of saving-investment balances (Blanchard, 2014; Bernanke, 2015; Borio, Disyatat, Juselius, & Rungcharoenkitkul, 2017; Carvalho, Ferrero, & Nechio, 2016; Bean, Broda, Itō, & Kroszner, 2015). Recently, the Bank for International Settlements (BIS) examined the empirical link between the real interest rate and saving-investment variables. The analysis covering 19 countries goes back to the 19th century (Borio *et al.*, 2017). For this time period only, a tenuous link between real rates and saving-investment determinants can be observed. Hence, the analysis is expanded to the relationship between monetary policy and the real interest rate. The main finding of this analysis is that in the long-term sample, monetary policy regimes such as the gold standard, Bretton Woods and inflation targeting go hand in hand with significant shifts in the real interest rates (Borio *et al*., 2017).

As a next step, the monetary policy of the Swiss National Bank (SNB) is described. The NIRP of the Swiss National Bank is explained by the SNB in the context of the global trend of falling real interest rates and the global saving-investment imbalances (Jordan, 2016). The goal of the NIRP of the SNB is to boost inflation and to counteract an undesirable appreciation of the Swiss Franc (IMF, 2017). In the pre-crisis era, the SNB conducted its monetary policy by steering the three-month Swiss Franc Libor as a target rate. Monetary policy only had an indirect influence on all other financial market variables as these are often affected by movements in the short-term interest rate. As the financial crisis unfolded, forward guidance and negative interest rates were applied. Forward guidance is aimed at influencing medium and long-term interest rates by providing information on the expected development of short-term interest rates (Maechler, 2017).

In economic literature, the discussion about transmission mechanisms of the monetary policy is conducted through several channels: the interest rate channel, the exchange rate channel and other asset price channels (Mishkin, 1996). Hence, the remaining sections of this report are dedicated to these transmission channels. The interest rate channel is the key monetary transmission mechanism in the basic Keynesian IS-LM model. Friedman (1957), Ando and Modigliani (1963), Mundell (1963) and Fleming (1962) describe the interest rate channel and its impact on demand and aggregate output. The exchange rate channel also involves interest rate effects. Mishkin (1996) and Boivin, Kiley and Mishkin (2010) provided evidence about the neoclassical link between short-term policy interest rates and the exchange rate. Moreover, Taylor (1993) and Smets (1995) point out that smaller, more open economies tend to have larger effects through the exchange rate channel.

In addition to the interest rate and the exchange rate channels, the monetary policy also affects the economy through asset prices, wealth and risk effects. Higher liquidity usually goes hand in hand with an accommodative monetary policy, increasing the demand for assets and boosting asset prices. Similarly, lower discount rates increase the present values of assets and hence asset prices. With respect to the wealth effect channel, higher stock and real estate prices increase the total wealth of households and thus incentivise the purchase of additional assets, driving up asset prices. Moreover, lower policy rates put pressure on long-term interest rates. Consequently, the yield on government bonds declines, forcing investors to move into riskier and higher yielding assets to generate appropriate returns. Such a development could potentially lead to an asset prices bubble, raising the question about the role of central banks in dealing with asset prices. In this context, a long-lasting debate exists between proponents of the 'leaning against the wind' policy asking central banks to fight off the build-up of asset price bubbles, and the proponents of the 'cleaning up' policy requiring policy-makers to wait until the asset price bubble bursts and then supporting the economy with an accommodative money policy. Both proponents offer compelling arguments. Nevertheless, there is a wide consensus among economists that central banks should not only rely on conventional and unconventional polices, but also on macroprudential measures.

MATERIAL AND METHODS

The purpose of this study is to present a review of the negative interest rate policy of the Swiss National Bank (SNB) after the outbreak of the financial crisis, in the context of falling real interest rates. Furthermore, the article demonstrates the implications of this unconventional monetary policy for the Swiss economy as well as the financial market stability.

The study is completely based on literature research. The analysis should be interpreted as being mainly suggestive since empirical research based on a quantitative analysis was not conducted. This article examines and reviews the extensive arguments and evidence of 92 scientific articles. The descriptive evidence presented has a strong focus on the situation in Switzerland.

LITERATURE REVIEW

Negative Policy Rates

A key question for policy makers and financial markets' participants is: 'Why are interest rates so low and where are interest rates headed?'. The persistent decrease in long-term interest rates since the beginning of the 21st century nurtured the view that there has been a substantial decrease of the natural rate into negative territory (Laubach & Williams, 2015). Starting the discussion about real interest rates, Wicksell (1936) conceptualised the natural rate of interest as the rate at which the price level is stable. According to Holston, Laubach and Williams (2017), the 'equilibrium' real interest rate provides a benchmark for monetary policy. The Swiss National Bank (SNB) refers to this development to explain the negative interest policy established in 2015 (Jordan, 2016).

Determinants of Real Interest Rates

This part examines the causes of the unusual low interest rates. The conventional view is that global real interest rates are driven by investment-saving imbalances. The decline falls into three broad categories: an increase in propensity to save; a reduction in the propensity to invest; and shifts in the demand and supply for different types of assets (Borio *et al*., 2017). Blanchard (2014) points out that global savings and investments play a key role in determining real interest rates. Bernanke (2015) explains his saving glut hypothesis through increased savings in emerging economies. Borio *et al*., (2017) also find reasons for a saving glut in the development of the population in emerging economies and their underdeveloped emerging markets. Bean *et al*. (2015) concentrate on shifts in the distribution of income.

Shifts in investments can be understood by analysing different supply factors (Borio *et al*., 2017). According to Gordon (2014), the weak productivity growth brought advanced economies to a period of stagnation. However, other researchers doubt that the rate of innovation has slowed permanently (Mandel & Swanson, 2017).

After the financial crisis, the demand for safe assets increased (Blanchard, 2014). Bean *et al*. (2015) and Broadbent (2016) put forward that the likelihood or size of bad outcomes as well as negative expectations about future growth benefit investment in safe assets. The view that real interest rates are determined by saving-investment imbalances is supported by Eichengreen (2015), Bernanke (2015) and the Council of Economic Advisors (2015).

Recently published research about the explanation of real interest rates through saving-investment imbalances shows that there is no evidence for this theory. Borio *et al*. (2017), Lunsford and West (2017) and Hamilton, Harris, Hatzius and West (2016) discovered a correlation between demographic measures and real interest rates. In many other variables they found weak evidence overall.

Borio *et al.* (2017) argue that monetary factors play a key role in determining real interest rates. According to Forbes, Kirkham and Theodoridis (2017), monetary policy has an impact on nominal and real interest rates while the interest rate is less responsive. Danthine (2017), the IMF (2017) and Jordan (2016) describe the negative interest rate policy in Switzerland.

Channels of Monetary Policy Transmission

Mishkin (1996) puts forward the importance of the interest rate channel as the key monetary transmission mechanism. This transmission channel is also described by Friedman (1957), Ando and Modigliani (1963), Mundell (1963), Fleming (1962), Blanchard (2017), Mankiw (2017) and Samuelson (2009). The SNB (2017) and the Swiss Bankers Association (2017) describe the transmission channel in Switzerland.

According to Mishkin (2017), Krugman, Obstfeld and Melitz (2014), Blanchard (2017) and Mankiw (2017) the exchange rate channel also involves interest rate effects. Thorbecke and Kato (2017) investigated the effect of exchange rate effects on Swiss exports and the profitability of Swiss firms. Their regression results indicate that exports in specific sectors will be harmed by an appreciation of the Swiss franc. However, Straubhaar (2015) points out that the Swiss economy is resistant to exchange rate fluctuations.

DSGE models play a dominant role in macroeconomic research. They stand for 'dynamic stochastic general equilibrium'. According to Blanchard (2016), the earliest DSGE

model, representing an economy without distortions, was the Real Business Cycle model developed by Edward C. Prescott and focused on the effects of productivity shocks. In later incarnations, a wider set of distortions and a wider set of shocks has come to play a larger role, and current DSGE models are best seen as large-scale versions of the New Keynesian model, which emphasizes nominal rigidities and a role for aggregate demand. The effects to aggregate demand arising from a monetary shock are discussed by Sims (1986). Bernanke and Blinder (1992) and Christiano, Eichenbaum and Evans (1996,1999) used vector auto regressions and orthogonalised innovations to the federal funds rate to estimate the effects of a shock to monetary policy.

Monetary Policy, Asset Prices and Financial Stability

Boivin *et al*. (2010) claim that interest rates have an impact on asset prices and on real economic activity while Arteta, Kose, Stocker and Taskin (2016) scrutinise the effects of interest rate cuts on the economy under positive and negative interest rate environments. In accordance with Assenmacher-Wesche and Gerlach (2008), Brunnermeier and Schnabel (2015) argue that too low interest rates for a prolonged period increase the risk of financial market imbalances and could lay the cornerstone for subsequent asset price bubbles. The relationship between interest rates and asset prices was also analysed by Rigobon and Sack (2002), Hott and Jakipii (2012), and Bordo and Landon-Lane (2013).

Hannoun (2015) describes the influence of negative interest rates on the yields of Swiss government bonds and the associated consequences for investors such as pension funds. According to Bini Smaghi (2009), Issing (2009), and Stiglitz (2016), low or negative interest rates encourage risk taking and expose the economy to a greater risk of financial instability. Jordan (2013) reports the difficulties of the Swiss National Bank in fighting against emerging asset price imbalances in Switzerland.

Monetary Policy and Asset Price Bubbles

Bernanke and Gertler (2001), Bordo and Wheelock (2004), Kohn (2007, 2009), and Christiano *et al*. (2008) argue that central banks should ignore asset price movements unless they pose a threat to price stability and real economic activity. In accordance with Bini Smaghi (2009) and Issing (2009), they claim that central banks should only intervene after the burst of an asset price bubble and hence adopt a 'cleaning up' policy. In contrast, proponents of the 'leaning against the wind' policy such as Cecchetti, Genberg, Lipsky, & Wadhwani (2000), Borio and Lowe (2002), Bordo and Jeanne (2002), Platen and Semmler (2009), and Smets (2014), want the central banks to intervene pre-emptively by raising interest rates and hence preventing the build-up of an asset price bubble.

Juselius, Borio, Disyatat and Drehmann (2016) present an augmented Taylor rule by adding a financial cycle variable. Alessi and Detken (2009) found well performing early warning indicators for asset price bubbles and Galí (2014) and Blot, Hubert and Labondance (2017) differentiate between fundamental and speculative components of these bubbles. Borio and Lowe (2002), Kuttner (2011) and Brunnermeier and Schnabel (2015) describe the relevance of macro-prudential measures in mitigating financial crises. In accordance with the policy of the Swiss National Bank, Ozkan and Unsal (2014) and Arteta *et al*. (2006) propose using a policy mix of monetary and macro-prudential measures to ensure monetary and financial stability.

DISCUSSION

Negative Policy Rates

In the aftermath of the economic and financial crisis, the central banks of advanced market economies introduced different unconventional policies to provide additional monetary stimulus. They lowered policy rates effectively to the zero lower bound (ZLB). Five central banks – Danmarks National Bank (DN), the European Central Bank (ECB), Sverige Riksbank, the Bank of Japan (BoJ) and the Swiss National Bank (SNB) – decided to push their policy rates below zero, traditionally seen as the lower bound for nominal interest rates (Bech & Malkhozov, 2016).

In January 2015, the Swiss National Bank (SNB) discontinued the minimum exchange rate against the Euro, and at the same time lowered the interest rate on banks' sight deposits at the SNB to -0.75%. As an explanation for this negative interest rate policy, the SNB cites two reasons. Firstly, the global equilibrium interest rate has fallen over recent decades. Secondly, since the financial crisis, monetary policy worldwide has been expansionary as a result of low inflation and weak economic recovery (Jordan, 2016). To explain this unusual procedure of the central banks, this section starts with the discussion of an economic concept that plays a key role in the current debate about monetary policy: the equilibrium real interest rate.

The key question for monetary policy makers is how the interest rates are going to develop in the future. In the long run, economists assume that nominal interest rates will tend toward some 'equilibrium' or 'natural' real rate of interest plus an adjustment for expected long-run inflation (Williams, 2003). The bad news is that the natural rate of interest is not observable but must be inferred from data. What exactly is the natural rate of interest?

Wicksell invented the idea of a natural interest rate more than 100 years ago: 'There is a certain rate of interest on loans which is neutral in respect to commodity prices, and this tends neither to raise nor to lower them'. According to Wicksell, the definition of equilibrium real interest rate is: 'the rate needed to maintain output at its natural rate and constant inflation.' (Wicksell, 1936, translation from 1898 text, p. 102). The natural real rate of interest provides a benchmark for measuring the stance of monetary policy, with policy being expansionary if the short-term real interest rate lies below and with policy contractionary if the short-term real interest rate lies above the natural rate (Holston *et al*., 2017). This role is illustrated clearly in monetary policy rules such as the Taylor rule (Taylor, 1993). In reality, the SNB controls a short-term nominal interest rate and has only an indirect and temporary influence on long-term real interest rates which influence investment decisions. Long-term real interest rates are primarily determined by saving and investment decisions and hence by market forces (Jordan, 2016).

Figure 1 shows the evolution of the long-term real interest rate in Switzerland. It is based on the development of the ten-year yield on Confederation bonds. If the central bank wishes to stimulate the economy and increase inflation, it cuts the policy rate. Since inflation does not react immediately, real interest rates temporarily fall below the equilibrium rate. This leads temporarily to higher growth and more inflation. 'Temporarily' means that if monetary policy was to target real interest rates below the equilibrium rate on a sustained basis, inflation would continue rising but this policy would not result in higher real growth in the long term. For the mandate of price stability to be fulfilled, the policy

rate must be set such that, at the desired inflation rate, the real interest rate corresponds with the equilibrium rate in the medium term (Jordan, 2016).

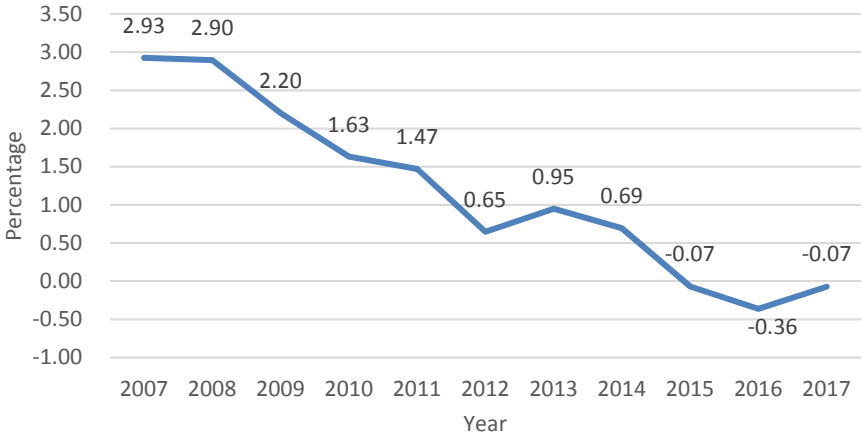

Figure 1. Long-term interest rates
Source: OECD (2018) Long-term interest rates (indicator).

It is possible that the real equilibrium interest rate in Switzerland is lower today than it was in the past. Real interest rates have been falling globally for a considerable time. According to Blanchard (2014), national real interest rates are determined in the global market. This conclusion is based on the loanable funds theory (LFT) and the presumption is that the evolution of real interest rates reflects changes in underlying saving-investment determinants (Borio *et al.*, 2017). The modern theory of international macroeconomics by Obstfeld and Rogoff (1996) and Mankiw (2013) is also based on this theory.

On this basis, Blanchard (2014) describes four factors that determine the global real interest rate. The first factor is the supply schedule for loanable funds, namely global saving. The second factor is the demand schedule for loanable funds, namely global investment. The third factor is the relative demand for safe versus risky assets. According to the LFT, these three factors determine the natural rate of interest. The fourth factor, monetary policy, results in temporary deviations from this rate. In the long-run, monetary policy is neutral. The next section starts with a narrative approach regarding the first three factors.

Determinants of Real Interest Rates

Global Saving

A higher propensity to save can be induced by many reasons. One of the reasons is the demographic challenge of ageing population, especially in advanced economies but also in China and other emerging ones. If economies are financially integrated, these global variables matter as well. According to Bernanke's saving glut hypothesis (2005), desired saving in emerging economies has put downward pressure on real rates globally.

The population in Switzerland is ageing rapidly and the country has one of the highest proportions of older people in the world. In 2015, 23.6% of the population was 60 years or

older. This percentage will continue to increase to 30.6% in 2030 and 34.5% in 2050. Growth rates will be particularly high in the population age group 80 years and older (Bonk, 2016).

People at retirement age will need to accumulate a larger stock of savings in order to finance their retirement spending. Additionally, if interest rates stay persistently low, households may be concerned about future household incomes. They may increase savings and reduce consumption to compensate for the shortfall. A possible argument against this conclusion could be that this effect is independent of the level of interest rates. But it may become much more visible and prominent when interest rates are unusually and persistently low (Borio *et al*., 2017). In Switzerland, there is a high level of gross savings in percentage of GDP, compared to other advanced economies like Germany and the USA. Gross savings are defined as gross national income minus total consumption, plus net transfers. China's high propensity to save is outstanding and is one main reason for driving down global interest rates. There are several causes for the high propensity to save in China: a mix of demographic change because of the 'one-child-policy', the lack of household safety nets and underdeveloped financial markets (Borio *et al*., 2017). Otherwise, according to Carvalho *et al*. (2016), demographic dynamics has an offsetting effect on interest rates through the increasing capital-labour ratio.

Bean *et al*. (2015) point out that another possible driver of a higher propensity to save comes from shifts in the distribution of income. In many countries, the distribution of income has become more unequal over the past three decades. The cause of this rise in inequality is still a matter of debate. Partly, it is because of increased competition from labour-rich developing countries, such as China, which weakened the bargaining power of unskilled workers in advanced economies. But a greater effect may be due to technological developments, particularly in information and communication technology, which led to the automation of jobs of unskilled workers. Irrespective of the cause, if high-income individuals have a higher propensity to save, then the aggregate propensity to save will increase. It must be observed, however, that the rise in income inequality started two decades before the long-term real interest rate began to decrease. This suggests that it may be less of a driver of the decline in the long-term of real interest rates (Bean *et al*., 2015).

Global Investment

Shifts in investment can be induced by several factors. These factors are the relative supply of labour and capital, population growth, investment profitability, productivity growth and the relative price of capital to that of output. If capital becomes cheaper, for example, due to technological advances, this means that less investment is needed to maintain the same level of production (Borio *et al.,* 2017). Productivity growth has been weak in advanced economies over the past few years and yet there is no consensus about the future development of productivity. According to Gordon (2014), advanced economies may have entered a period of 'secular stagnation'. He argues that the fundamental advances of the Industrial Revolution were unique and cannot be repeated. Mandel and Swanson (2017) point out that the Information Age has just begun and that the 10-year productivity draft is almost over. Hence, Borio *et al*. (2017) place little weight on the argument that the rate of innovation has slowed permanently.

As there has been a steady fall in the rate of the growth of the working-age population since the mid-1980s, labour force growth has consequently fallen back. The impact

of this development on investment is potentially complex. It translates into a lower required rate of growth of the capital stock, which would reduce capital demand. In contrast, however, a relative scarcity of labour will tend to substitute capital for labour, thus raising investment. The net impact on the demand for capital is therefore unclear. As the fall in population growth rates seems to predate the fall in real interest rates by a decade or more, it seems unlikely to be a major contributor to the decline in the world real interest rate (Bean *et al*., 2015).

Moreover, the argument about falling relative prices of capital goods and the impact on long-term interest rates fails the timing test. The relative price of investment goods has been falling since the 1970s and the downward trend of real interest rates started in the 1990s (Bean *et al*., 2015). Additionally, Reinhart and Rogoff (2009) verified that after severe crises, it takes a long time to recover and business remains reluctant to undertake investment.

Demand for Safe Versus Risky Assets

A shift in preferences towards safe assets or a reduction in their supply can be expected to lead to an upward pressure on the price of safe assets and a fall in their yields. In fact, as a consequence of the financial crisis, the demand for safe assets has increased. One cause for this behaviour could be an increase in risk (Blanchard, 2014). Bean *et al*. (2015) argue that it is more the increase in likelihood or size of bad outcomes. Broadbent (2016) analysed the behaviour of investors in Great Britain between 2002 and 2016. The outcome of his analysis is the outperformance of safe assets. He argues that the gap between the yields on equities and bonds depends positively on risk premium and negatively on expected growth. If investors revise down their central expectation of future growth, or if they see more risks, it benefits bonds and penalises equities.

In addition, during the years preceding the crisis, banks had run down their holding of liquid assets to extraordinary low levels. New regulations for the banking system increased the demand for safe assets and will continue to do so in the coming years. Finally, central bank asset purchases also led to higher asset prices and lower corresponding yields (Bean, 2015).

Does empirical evidence support the hypothesis that saving-investment imbalances have driven real interest rates to such a low level? The narrative about real interest rates and the relationship to the determinants is vast, including Eichengreen (2015), Bean *et al*. (2015), Bernanke (2015), and the Council of Economic Advisors (2015), to name but a few.

The other possibility is calibration – it uses theory to identify factors behind shifts in real interest rate trends and data to calibrate the corresponding structural models (Borio *et al*., 2017). Relevant literature exists by Gangnon, Johannsen and Lopez-Salido (2016), Carvalho *et al*. (2016), Thwaites (2015), and Vlieghe (2017). In these papers, theory dictates the relationship and the data are used to gauge their quantitative importance conditional on the theory being true (Borio *et al*., 2017). Another approach is filtering: equilibrium real interest rates are anchored to some economic relationship, as suggested by Holston *et al*. (2017), Laubach and Williams (2015), Justiniano and Primiceri (2010), and Johannsen and Mertens (2016).

According to Borio *et al*. (2017), these studies have provided estimates of the extent to which saving-investment determinants can explain real interest rate movements conditional on the theory, but there is no convincing evidence supporting the underlying the-

ory itself. It is important to confront the hypothesis more directly with the data, by systematically examining the relationship between real interest rates and observable variables. There are few studies covering the recent phase of declining rates. One of these is a study by Lunsford and West (2017) who focused on the United States for the period between 1890 and 2015 and evaluated the correlation between real interest rate in the United States and over 20 variables that have been hypothesised to influence real rates. They discovered that real interest rates are correlated with demographic measures, similar to the correlation with labour force hours growth that is positive. In many other variables they found weak evidence overall, especially GDP growth, consumption and total factor productivity. Hamilton *et al.* (2016) also examined the behaviour, determinants and implications of the equilibrium level of the real federal funds rate. The authors find weak evidence overall, though they do find some support for demographic variables.

Saving-Investment Imbalances: A Critical Approach

The Role of Real Factors

Borio *et al*. (2017) examined the direct link between real interest rates and the determinants postulated by the saving-investment framework, based on data starting in the 19th century for 19 economies. The key determinants in the analysis of Borio *et al*. (2017) that had a positive expected relationship with real rates are: marginal product of capital, output growth, productivity growth, dependency ratio, and relative price of capital. Determinants with a negative expected relationship are: life expectancy, inequality and risk premium. As a determinant, population growth has positive and negative impacts on real rates. Any cross-border effects (à la global saving glut) are captured to the extent that shifts in saving and investment can be traced back to the set of explanatory variables and countries considered. Owing to the lack of measures suitable for a long-horizon analysis, the safe-asset-shortage channel of (modern-day) emerging markets is not included in the analysis.

The outcome of the analysis is that there is only a tenuous link between real interest rates and observable proxies or the main saving-investment determinants. Some variables, notably demographics, show some of the expected relationship with real interest rates in some subsamples. The subsamples are the gold standard, the inter-war period, the post-war period, the pre-Volcker period and the post-Volcker period. Especially in the post-Volcker period, the results appear consistent with the standard narrative, but they clearly fail to survive once the sample is extended. If global factors are included in the analysis, they represent more improvement compared to the domestic ones, but the instability generally persists. The dependency ratio is significant and correctly designed in the sub-samples prior to the most recent one, but it is not significant over the full sample. Additionally, inequality performs well in the full sample and in the post-war sub-samples. However, in all other cases, the common trends in real interest rates and the saving-investment variables are highly unstable (Borio *et al*., 2017). As a result, no single real factor, or combination of such factors, can consistently explain the long-term evolution of real interest rates. This holds at both the domestic and global levels.

The Role of Monetary Factors

If the first three factors of Blanchard's (2014) analysis – global saving, global investment and demand for safe versus risky assets – fail to stay in a stable relationship with the real interest rate, the discussion has to consider the fourth factor, monetary policy. After the

global financial crisis (GFC), monetary policy drove down nominal interest rates and, with stable inflation rates, also real interest rates. The saving-imbalances theory implies that monetary policy is not relevant for the determination of the real interest rate. Monetary policy is 'neutral' in the long run (Patinkin, 1956).

Going beyond the standard factors, Borio *et al*. (2017) examine the question whether monetary policy plays a more important role than typically believed. Central banks set the nominal long-term interest rates through signals of future policy rates and asset purchases. On the other hand, market participants adjust their portfolios based on the expectations of monetary policy. Hence, interest rates reflect the interplay between the central bank's reaction function and private sector beliefs and behaviour. Saving-investment imbalances influence market rates indirectly through the interaction between the central bank and private sector agent's decisions. As a consequence, over the intervening period, real interest rates would reflect monetary determinants rather than saving-investment determinants.

A persistent influence on real interest rates through monetary policy may occur through two channels: the first is the inflation process and the second consists of the interaction between the central bank and the financial cycle.

Forbes *et al.* (2017) verified that the UK inflation dynamics is less responsive to economic slack and hence monetary policy than originally thought. If the inflation rate is below target and there is no second-round-effect while wages drive prices up, this could be the result of the global loss in labour's pricing power. In this case, there would be a one-off impact on the price level, but only a temporary effect on inflation. If monetary policy goes on to push up inflation, nominal and also real interest rates tend to decrease.

The second channel could be expressed through the broad agreement that price stability is not sufficient for financial stability. With the background of price stability, the central bank will react with expansionary policy after a bust, while not reacting to financial imbalances. This will also drive down nominal and real interest rates. With the combination of increasing debt after the bust, it would become harder to raise interest rates (Borio *et al*., 2014). Based on the standard framework, this would look like an exogenous decline in the natural rate. In fact, it would simply reflect the interaction of monetary policy with the economy (Borio *et al.,* 2017).

The recent experience with the effective lower bound stresses that monetary policy was largely unresponsive to economic developments and yet, there was no inflation spiral. Similarly, the unexpected easing of financial conditions failed to bring inflation back to target.

Borio *et al*. (2017) investigate the link between real interest rates and monetary factors in two ways. The first one examines the different monetary regimes and their relationship to real interest rates. The second takes a global perspective and explores the relative importance of global saving-investment determinants and global monetary factors.

One important outcome is that monetary regimes are significantly associated with shifts in the level of real interest rates. One possible explanation is that changes in monetary policy regimes may be associated with changes in risk premia, in particular in inflation risk premia. Monetary policy regimes, such as the gold standard, Bretton Woods and inflation targeting, go hand-in-hand with significant shifts in real interest rates. At a global level, the influence of external factors on countries' real interest rates reflects the importance of the financially dominant countries' role as global monetary anchors rather than common variations in global saving-investment determinants. This suggests that co-

movements in real interest rates across countries are more closely related to the monetary policy of global anchor countries than to the global saving glut (Borio *et al.,* 2017). The result of Borio *et al*. (2017) can be summarised as follows: the saving-investment framework may not serve as a reliable guide to understand real interest rate developments. And inflation may not be a sufficient reliable signal of where real interest rates are relative to some unobserved natural level. Monetary policy and financial factors may have an important bearing on persistent movements in real interest rates.

The monetary policy of the Swiss National Bank (SNB) is discussed in this section in the context of low real interest rates as a global trend. As a central bank of a small open economy (SOE), the SNB implements its policy by steering the interest rate level on the money market.

As described in the previous sections, these are real rates that have been negative in a number of countries over time. However, these are is negative nominal rates that are new. The goal of the negative interest rate policy (NIRP) in Switzerland has been hybrid: NIRPs were introduced to support growth and inflation by reducing the attractiveness of Swiss-franc denominated assets, thereby stemming appreciation pressures (IMF, 2017). Most SOEs have interest rates that are higher than the rates in major advanced economies. This is not the case in Switzerland, with a safe haven currency and hence a risk premium that is negative. According to Danthine (2017), since the advent of the Euro, and until the end of 2007, the safe haven premium took the form of an interest rate difference of minus 1.7 percentage points on average (measured by the difference between the rate of 3-month Libor in CHF and in Euro). Table 1 displays a short chronology of monetary events in the aftermath of the financial crisis.

Table 1. Chronology of the events established by the SNB's unconventional monetary policy

Date	Programme	Description
August 2007	The SNB lowers key interest rates and expands the liquidity supply to the interbank markets.	Tension on the money market becomes evident.
Beginning of 2009	The SNB lowers the target range for the three-month Libor to between 0.0% and 0.75%. The SNB starts an unconventional policy: long-term repos and purchase of Swiss franc-denominated bonds issued by domestic, private-sector borrowers.	Increasing demand for safe investment in Swiss francs.
March 2009	The short-term interest rate is reduced to near zero. The SNB starts to purchase foreign exchange.	More upward pressure against the Swiss franc. Monetary conditions are tightening.
Spring 2010	The SNB conducts extensive foreign currency purchases.	First escalation in the Euro area debt crisis.
First half of 2011	The SNB conducts further extensive foreign currency purchases.	Different Euro area countries are being dragged into the crisis. Deterioration of the global economic outlook. Uncertainty in the financial markets.
August 2011	The SNB narrows the target range for the Libor between 0.0% and 0.25%. The SNB expands banks' sight deposits significantly.	The upward pressure on the Swiss Franc remains high.

Date	Programme	Description
6 September 2011	Introduction of the minimum exchange rate for the Franc against Euro. Announcement of the SNB that it would no longer tolerate a EUR/CHF exchange rate below CHF 1.20.	The upward trend of the Swiss franc becomes more intensive. Risk of a deflationary trend emanating from the overvaluation of the Swiss franc.
5 January 2015	Discontinuation of the minimum exchange rate. Introduction of a negative interest rate on commercial banks' deposits at the SNB of minus 75bp.	The ECB decides about further monetary easing in the Euro area from mid-year onwards. The Euro depreciates sharply, with high pressure on the Swiss Franc.

Source: own elaboration based on Zurbrügg (2015).

The introduction of a minus 75 basis points (bp) interest rate on commercial banks deposits at the SNB in January 2015 reinstated a (moderate) negative differential. But it remained smaller than in the period before the crisis. Hence, the SNB announced that the policy would be complemented with discretionary foreign exchange interventions (Danthine, 2017). Consequently, the SNB is already the central bank with the largest balance sheet in relation to the GDP. In the discussion about the current low interest rates in Switzerland, the SNB also refers to the global trend of globally falling interest rates in the last decades. According to the SNB, this trend is based upon the saving-investment imbalances. Jordan (2016) argues that the propensity to save is increasing due to population ageing and the integration of China into global financial markets. The willingness to invest may also have fallen because of heightened uncertainty over future economic conditions, expectations of lower productivity growth and the transformation of industrial economies into service economies.

Channels of Monetary Policy Transmission

In a modern financial system, monetary policy affects the real economy through several channels. Mishkin (1996) provides an overview of the transmission mechanisms of monetary policy. He discusses the traditional interest rate channel, exchange rate channels and other asset price channels.

Interest Rate Channel

According to Mishkin (1996), the interest rate channel is the key monetary transmission mechanism in the basic Keynesian IS-LM textbook model. Expansionary monetary policy leads to falling real interest rates, which lowers the cost of capital and hence increases investment spending. Consequently, aggregate demand and output increase. Later research recognized that not only businesses' decisions are affected but also consumers' decisions about housing and consumer durable expenditure. In this framework, consumer and business decisions are based on the real rather than the nominal interest rate. But monetary policy is conducted through nominal interest rates. Therefore, how can changes in the short-term nominal interest rate result in a corresponding change in the real interest rate in both short-term and long-term bonds? The answer lies in sticky prices. In this case, lower short-term nominal interest rates also lower short-term real interest rates. But how can the change in the long-term interest rate be explained? The expectations hypothesis

of the term structure, which states that the long-term interest rate is an average of expected future short-term interest rates, suggests that the lower short-term real interest rates lead to a fall in the long-term interest rates. Thus, lower real interest rates lead to rises in business fixed investment, residential housing investment, consumer durables expenditure and inventory investment, all of which produces the rise in aggregate output (Mishkin, 1996). This transmission channel was also described by Friedman (1957), Ando and Modigliani (1963), Mundell (1963) and Fleming (1962). Blanchard (2017) refers to this effect as the direct effect of the interest rate on investment. Similarly, Mankiw (2017), as well as Samuelson *et al*. (2009) explain the demand side behaviour in open economies through the interest rate channel. The consensus that emerged from the empirical literature about DSGE models by Sims (1986), Bernanke and Blinder (1992), Christiano *et al*. (1996, 1999) was that an expansionary monetary policy shock corresponding to a decline in the U.S. federal funds rate led to expansions in consumption, employment, investment, output and capital utilisation, as well as relatively small rises in inflation and real wages (Christiano, Eichenbaum, & Trabandt, 2017).

Monetary policy can still be effective even when the nominal interest rates have already been driven down to zero. With nominal interest rate at zero, if an expansion in the money supply raises the expected inflation, the real interest rate will decrease, stimulating spending through the interest rate channel.

The interest rate of -0.75% charged by the SNB on sight deposits has ensured the traditional interest rate differential between Switzerland and foreign countries will be maintained. The relevant money market rates remained close to the interest rate on sight deposits. At the end of 2017, both the interest rate for secured overnight money – the Swiss Average Rate Overnight (SARON) – and the three-month Swiss Franc Libor stood at -0.75% (SNB, 2017).

Long-term capital market interest rates have again risen since December 2017. The yields on ten-year Swiss government bonds have been back in positive territory since mid-January 2017. In mid-March they stood at 0.1% compared to -0.1% in December 2017. Yields on Swiss government bonds with maturities under 9 years remained in negative territory. The real interest rate estimation – based on the development of ten-year yields of Swiss government bonds and inflation expectations for the same time horizon – shows a low, but positive level (SNB, 2018).

According to the Swiss Bankers Association, at the end of 2016, bank deposits totalling CHF 234 billion were subject to negative interest rates in Switzerland. Negative interest rates had an industry-wide dampening effect on banks' interest rate margins. As a result, the deposit business has little room for manoeuvre (Swiss Bankers Association, 2017). Domestic mortgage loans continued to rise, amounting to CHF 949.3 billion (up 2.7% or CHF 24.6 billion) in 2016. Thus, they comprised over 30% of the aggregate balance sheet total. Apart from the big banks category (down 0.3% to CHF 260.6 billion), all bank categories registered an increase in domestic mortgage claims. Other forms of credit, which are reported in the balance sheet under amounts due from customers, receded by CHF 21 billion to CHF 573.3 billion. They account for approximately one fifth of the aggregate balance sheet total. The main reason for the decrease was the decline in amounts due from foreign customers. Amounts due from domestic customers, by contrast, rose by CHF 6.5 billion to CHF 158.2 billion (SNB, 2016).

In 2016, the aggregate operating net income of banks in Switzerland fell by 3.2% to CHF 62.5 billion. Compared to the previous year, net income from the interest-earning business declined by 2.7%. One reason for this were the negative interest rates. However, as in the previous year, net income from the interest-earning business made the largest contribution to aggregate operating net income despite this decline. Due to customers' high sensitivity to prices, the banks' ability to pass negative interest rates on to customers through higher commissions was limited. As a result, net income from the commission and service business fell by 6.7% in 2016 (Swiss Bankers Association, 2017).

Exchange Rate Channel

The growing internationalisation of economies brought more attention to monetary policy transmissions through exchange rate effects. This channel also involves interest rate effects. Mishkin (1996) describes the exchange rate channel as follows: a falling domestic real interest rate makes domestic currency deposits less attractive compared to deposits denominated in foreign currencies, leading to a fall in the value of the domestic currency. This makes domestic goods cheaper than foreign goods, causing a rise in net exports and hence in aggregate output (Mishkin, 1996). Krugman *et al*. (2014), Blanchard (2017) and Mankiw (2017) also discuss the exchange rate effect of a change in the interest rate. Taylor (1993) and Smets (1995) discuss the fact that smaller, more open economies tend to have larger effects through this channel.

In Switzerland, a small open economy managing the exchange rate, the SNB, is fighting a heroic battle based on two elements: the negative interest rate of -0.75% on banks' sight deposits held at the SNB and the willingness to intervene in foreign exchange market. As described above, lower interest rates make investments in Swiss francs less attractive. The Franc depreciates and makes Swiss goods cheaper abroad and increases net exports. Historically, Switzerland always had lower interest rates than most other countries, especially in Europe. According to the SNB, the interest rate differential reflects the lower average inflation compared to other countries, as well as the political stability and credible monetary policy. Investors are prepared to hold Swiss franc investments at lower yields. Since the outbreak of the GFC, the interest rate differential has become ever narrower. With the introduction of the negative interest rate in June 2014 in the Euro area, it even turned negative. The rate cut in Switzerland in January 2015 restored the original interest rate differential and helped reduce pressure on the Swiss franc (Jordan, 2016).

Figure 2 shows the real broad effective exchange rate. It is now back at roughly the same level as before the discontinuation of the minimum-exchange rate (January 2015), although it remains above its long-term average. Together with the willingness of the SNB to intervene in the foreign exchange markets, it has helped to ensure that the Swiss franc has not strengthened further uncertainty, for example, in the wake of the British EU referendum (Jordan, 2016).

Switzerland is a small open economy with a large trading sector, in which exports contribute around 50% to GDP and imports account for about 40%. Movements in the exchange rate have a certain impact on domestic economic development. Thorbecke and Kato (2017) investigated how exchange rate changes affect Swiss exports and the profitability of Swiss firms. According to their findings, in the past Switzerland had the most advanced export structure in the world. Watches and pharmaceutical products rank first and third, in terms

of product sophistication, and 41% of Swiss exports in 2014 was in these categories. According to OECD measures, 53% of Swiss manufacturing exports in 2014 were classified as high technology goods. This was two-to-five times higher than the corresponding values for the G7 countries. According to Thorbecke and Kato (2017), there is no evidence that an appreciation of the Swiss franc would reduce exports of the most sophisticated products, watches and pharmaceutical products. But, on the other hand, exports of specialised machinery, precision instruments, machine tools, and other goods produced using Swiss engineering are vulnerable to appreciations. Regarding the profitability of Swiss firms, exchange rate appreciations cannot only reduce export volume but also compress the profit margins of exporters by forcing them to reduce Swiss franc export prices. Their regression results indicate that a 10% appreciation of the Swiss nominal effective exchange rate caused Swiss franc export prices for capital goods to fall by 4% while for precision instruments the decline is more than 4%. On the other hand, Swiss franc prices do not fall because of an appreciation of the Swiss nominal effective exchange rate. Thus, profit margins of companies producing medium-high-technology products were squeezed, but not for companies producing high-technology-products (Thorbecke & Kato, 2017).

Figure 2. Real Broad Effective Exchange Rate for Switzerland
Source: Bank for International Settlements, Real Broad Effective Exchange Rate for Switzerland (RBCHBIS), retrieved from FRED, Federal Reserve Bank of St. Louis, 24 January 2018.

Another finding by Thorbecke and Kato (2017) is that GDP increases in import countries cause large increases in Swiss exports. There is a tight relationship between Swiss exports and global GDP. This led Thorbecke and Kato to the conclusion that Switzerland should have a strong interest not only in the movements of the exchange rate but also in the economic welfare of its trading partners. It should foster this by maintaining free trade and scientific exchanges with developed countries and by sharing its expertise in areas such as healthcare and education with developing countries. According to Straubhaar (2015), the Swiss economy has proven that it is able to compensate for the external appreciation of the Swiss franc in the medium and long term through internal (cost) devaluations. The key asset of the Swiss economy is the high flexibility of small and medium-sized

businesses and their workforces. They adapt quickly and effectively with a mix of cost savings, productivity improvements and innovations of all kinds to changing macroeconomic conditions. Why should this ability continue to be also the case in the future? Straubhaar offers some arguments. Firstly, the strong Swiss franc reduces costs for imports, which finally reduces costs of production for goods and services. Secondly, the strong Swiss franc leads to low interest rates. This allows more capital-intensive production, which increases productivity and international competitiveness. Thirdly, falling consumer prices increase the real purchasing power of wages and therefore increase flexibility for wage adjustments. Moreover, labour-intensive activities might be shifted abroad. This would provoke incentives for new and higher added-value activities. Finally, a strong recovery in the Eurozone will stimulate the Swiss economy since almost half of Swiss exports are sold in this area. To summarise: in the past, currency appreciations have strengthened Swiss companies. In theory, within a flexible system, central banks should leave the process of determining appropriate exchange rates to the currency markets (Straubhaar, 2015).

Monetary Policy, Asset Prices and Financial Stability

For decades, the relationship between monetary policy and asset prices has been of great interest for central banks and academics as asset price bubbles pose a threat to economic and financial stability. In this context, two interrelated questions arise. Firstly, what is the impact of monetary policy on asset prices and financial stability? Secondly, how (if at all) should monetary policy-makers respond to asset price bubbles?

It is vital for monetary policy-makers to understand the influence of monetary policy on the economy and inflation. One way to describe the impact of monetary policy on the economy is the monetary transmission mechanism. This is one of the most thoroughly researched fields of monetary economics. Boivin *et al*. (2010) claim that interest rates affect asset prices and real economic activity through various transmission channels, such as the interest rate channel, the exchange rate channel, or the wealth effect channel. Lately, many central banks (including the Swiss National Bank) reduced their policy rates almost to zero or even below zero. Arteta *et al*. (2016) argue that cutting interest rates to a level slightly below zero should cause the same effects as a rate reduction in a positive interest rate environment. Brunnermeier and Schnabel (2015) pointed out that interest rates that are set too low for a prolonged period of time increase the risk of financial market imbalances substantially and could plant the seeds for new asset price bubbles.

Asset prices also play an important role in the wealth effect channel of monetary transmission. Boivin *et al*. (2010) claim that expansionary monetary policy normally drives up prices of assets like bonds, stocks and real estate. The resulting increase in the households' total wealth could then stimulate consumption and real economic activity. The influence of monetary policy on financial markets was also described by Rigobon and Sack (2002). In conformity with this point of view, Assenmacher-Wesche and Gerlach (2008) found that monetary policy has a significant impact on asset prices, particularly in comparison to its effect on inflation and aggregate output. Thus, asset prices should be included in inflation and growth forecasts of central banks, which was already suggested by Issing (2009). Hott and Jakipii (2012), Assenmacher-Wesche and Gerlach (2008), as well as Bordo and Landon-Lane (2013) could all empirically prove the significance of the relationship between interest rates and financial assets such as stocks and real estate.

In a state of expansionary monetary policy, asset prices are not only driven by increasing money supply and improved economic conditions but also by the positive influence of lower discount rates on asset valuations (asset valuation channel). Valuations of many financial assets (including bonds, stocks and real estate) are based on present value calculations, which are highly sensitive to changes of the underlying discount rates. Hannoun (2015) argues that low or negative interest rates reduce discount rates. Thus, applying these lower discount rates to future cash flows, such as dividends and rents, increases the values of the respective assets. Moreover, expansionary monetary policy may improve the economic outlook and thus lead to higher expected cash flows. Under the regime of negative interest rates, not only does the valuation of financial assets become economically meaningless, but also the valuation of financial derivatives (e.g. interest rate swaps) is affected and hence distorted. Apart from causing surging asset values, decreasing discount rates lead to rising liability values. This is particularly challenging for pension funds as increased pension liabilities amplify the risk of facing a shortfall.

Boivin *et al.* (2010) claim that whenever short-term policy rates are cut long-term interest rates decline too as they are linked to future short-term rates. Asset purchasing programmes (quantitative easing) pursue the same aim of lowering long-term interest rates and yields of government bonds to stimulate the economy. Because of the implementation of a negative interest rate policy in Switzerland, the yields on Swiss government bonds have also fallen below zero, as Hannoun (2015) describes. Due to the persistently low or even negative yielding Swiss government bonds, institutional investors (including insurance companies, asset managers, and pension funds) struggle to generate adequate returns. Hannoun mentions that particularly pension funds, which are legally constrained to both hold a certain amount of low-risk assets and to guarantee contractually promised minimum yields, are under considerable pressure.

Bini Smaghi (2009) argues that another consequence of low or negative yields on government bonds is that many investors search for higher yields while shifting their portfolio toward riskier or less liquid assets (risk-taking channel). This may lead to a convergence between the expected returns of risky and low-risk assets and hence reduces credit spreads. Excessive risk-taking may cause asset bubbles in financial markets and expose the economy to a greater risk of financial instability (Issing, 2009; Stiglitz, 2016).

Hannoun (2015) contends that negative policy rates impact the profitability of banks by narrowing net interest margins. In Switzerland, many banks passed on negative interest rates to their commercial and institutional clients. However, only few Swiss banks imposed negative interest rates on private clients. Negative interest rates essentially penalise savers for their deposits and reward borrowers for raising debt capital. Even though some banks in Switzerland passed on negative interest rates on their commercial and institutional clients, the interest rates charged on loans and mortgages never went below zero. Bini Smaghi (2009) remarks that low interest rates on debt capital combined with a state of increased values of collaterals (associated with higher asset valuations) drive up demand for credit. He claims that the greater availability of debt capital and the increased willingness to take risk boosts asset prices like stocks as well as real estate and sets a dangerous self-sustaining vicious cycle in motion. Turner (2017) points out that even current macroprudential policies fail to mitigate increased interest rate and liquidity risk exposures of financial intermediaries. Given the scale of the interest rate

and liquidity risks in the books of financial firms, the impact of increasing interest rates becomes more severe and unpredictable.

Brunnermeier and Schnabel (2015) argue that the historical emergence of asset bubbles is often preceded or accompanied by expansionary monetary policy, lending booms, capital inflows or financial innovations. They emphasize that crises are most severe when accompanied by a lending boom and high leverage of market participants, and when financial institutions participate in the buying frenzy. Turner (2017) adds that the radical expansionary monetary policies since the latest financial crisis could create difficulties for future monetary policy. He fears far-reaching economic consequences once the extraordinary monetary stimulus is removed. One should keep in mind, as he says, that the recessions in the aftermath of the tech bubble in 2000 and the financial crisis in 2007-09 were both caused by asset price collapses rather than inflation. He suggests that policy-makers need to be forward-looking and pay attention to potential risks and imbalances; including those created by their own monetary policies. Jordan (2013) mentions that the Swiss National Bank cannot address the emerging imbalances in the Swiss equity and real estate market by raising interest rates given the accommodative monetary policies of other advanced economies, exchange rate concerns and the modest current and expected inflation.

Whenever increasing asset prices degenerate into a bubble, the question about the role of central banks in dealing with asset price misalignments experiences a revival. There is a long-lasting debate between proponents of the 'leaning against the wind' policy requesting central banks to deflate asset price bubbles, and proponents of the 'cleaning up' policy demanding that policy-makers wait until the asset price bubble collapses and then implementing an accommodative monetary policy. The next section elaborates these contradictory stances.

Monetary Policy and Asset Price Bubbles

According to Rigobon and Sack (2004), a bubble reflects a significant value deviation of an asset from its fundamental value. Asset price bubbles are problematic for numerous reasons. Firstly, asset price bubbles may lead to an undesirable misallocation of capital. Secondly, they pose a threat to the macroeconomic and financial stability. Thirdly, the collapse of asset price bubbles could lead to a recession in the aftermath. Finally, the credibility as well as effectiveness of monetary policy might be impaired if central banks are unable to confront asset price bubbles (Blot *et al*., 2017).

It is widely accepted among policy-makers that central banks should set policy rates in response to inflation and output gap. In fact, Bernanke and Gertler (2001), Bordo and Wheelock (2004), Kohn (2007, 2009), and Christiano *et al*. (2008) argue that central banks should ignore asset price movements unless they pose a threat to price stability and real economic activity. This consensus view relies on the following three arguments: (i) Asset price misalignments are usually associated with strong inflationary pressure. Thus, central banks that focus on inflation automatically reduce the risk of asset price bubbles. (ii) Central banks are not able to identify asset price bubbles in the early stage with an appropriate degree of confidence as they do not have better information than the financial markets. Additionally, not all fundamental factors driving asset prices are directly observable. (iii) Moderate interest rate increases may not be sufficient to contain asset price bubbles. On the other hand, strong policy-rate hikes are not a viable option as they would pose serious risks to the economy. Moreover, Kohn (2009) points out that the detection of a bubble

and subsequent policy reactions (interest rate increase) might occur at a time when the bubble bursts on its own. This could amplify the negative effect of the bubble's collapse. Hence, Bini Smaghi (2009) and Issing (2009) claim that central banks should be ready to intervene aggressively by cutting policy rates after the crash of asset prices to support the economy and to minimise the probability of deflation ('cleaning up' policy).

However, many economists take a different view, such as Cecchetti *et al*. (2000), Borio and Lowe (2002), Bordo and Jeanne (2002), Platen and Semmler (2009), and Smets (2014). They argue that low and stable inflation is not a guarantee of financial stability. Therefore, central banks should systematically incorporate asset prices into their policy-making processes to improve the effectiveness of monetary policy. As the collapse of an asset price bubble may lead to a financial and economic crisis, they urge central banks to intervene pre-emptively by raising interest rates and hence preventing the build-up of an asset price bubble ('leaning against the wind' policy). The authors point out that the associated deviations from the Taylor rule should prevent episodes of deflation and recession which may occur after the bursting of an asset price bubble. Juselius *et al*. (2016) presented an augmented Taylor rule by adding a financial cycle variable. This enables to take financial developments systematically into account. However, the alleged unavailability of timely warning indicators is not per se a hindrance to implementing a 'leaning against the wind' policy as Alessi and Detken (2009) found well performing early warning indicators. By contrast, Bernanke and Gertler (2001) argue that the 'leaning against the wind' policy only performs well if central banks know that the boom is driven by 'irrational exuberance' and a collapse of asset prices is imminent. These are both highly unlikely assumptions. Additionally, Blot *et al*. (2017) suggest that movements in asset prices driven by fundamentals should be disentangled from movements resulting from the speculative component. Furthermore, Galí (2014) claims that increasing interest rates as a response to asset price bubbles cause opposing effects on fundamental and non-fundamental components of asset bubbles. Thus, when it comes to rational asset price bubbles, the 'leaning against the wind policy' may be counterproductive and might cause higher bubble fluctuations as well as adverse effects on the economy. Berlemann and Freese (2013) mention that tightening of the monetary policy could deflate house and flat prices while increasing rental prices and thus inflation.

Assenmacher-Wesche and Gerlach (2009) found that, for different countries and periods, interest rate shocks generally have a significant influence on both stock and housing markets. However, they discovered that the stock market in Switzerland is not influenced by monetary policy, whereas the real estate market significantly reacts to interest rate movements. Borio and Lowe (2002) claim that closer cooperation between monetary and prudential authorities is important, not only during the crisis, but also to prevent their emergence. In accordance with this point of view, Brunnermeier and Schnabel (2015) suggest that macroprudential measures can be successful in mitigating crises. They argue that the main advantage of macroprudential interventions is that such measures are much more targeted than policy rates adjustments. The reason for this is the possibility to directly influence sectors where asset price misalignments emerge. In line with this argument, Kuttner (2011) states that macroprudential regulation is more appropriate than interest rates interventions to warrant financial stability. Ozkan and Unsal (2014) as well as Arteta *et al*. (2016) propose using a policy mix of monetary and macroprudential policies to ensure monetary and financial stability. Consequently, the Swiss National Bank activated a 1% countercyclical buffer on

risk-weighted mortgage loans as of September 2013 which was then increased to 2% as of June 2014. This buffer should force financial institutions to accumulate additional equity and ultimately prevent a potential overheating of the Swiss housing market. The future will tell whether this policy mix in Switzerland will prevent upcoming crises.

CONCLUSIONS

Real interest rates have been on a downward trend throughout much of the past 30 years. There are different analytical strands to explain the determinants of these falling interest rates. Prevailing explanations refer to saving-investment imbalances. However, recent studies indicate that persistent shifts in real interest rates coincide with changes in monetary regimes. As a result, monetary policy should be evaluated in this context. The negative interest rate policy (NIRP) of the SNB implemented in 2015 is explained using different transmission channels. Although the time period between the implementation of the negative interest rate policy in Switzerland and the actual analysis is very short, in summary it can be said that the market rates (short-term and long-term) remained close to the policy rate. As a consequence, interest rate margins of the Swiss banks fell industry-wide. All bank categories registered an increase in domestic mortgage claims. Other forms of credits decreased, especially the amounts due from foreign customers. In 2016, aggregate operating net income for banks in Switzerland fell by 3.2%.

As Switzerland is a small and open economy, the exchange rate plays an important role in international trade relations. Monetarists support interventions by the SNB with respect to the exchange rate of the Swiss Franc. However, there are also economists who argue that, in the past, currency appreciations strengthened Swiss companies and hence the Swiss National Bank should leave the Swiss Franc to float freely, especially given the flexible exchange rate system.

In addition to the interest rate and exchange rate channels, monetary policy has a significant impact on asset prices, which affects the aggregated output through the wealth effect channel. The negative interest rates in Switzerland incentivised investors to allocate their capital into riskier and higher yielding assets to generate appropriate returns. Consequently, the stock and real estate markets were fuelled and are showing indications of overheating. The impact of monetary policy on asset prices is manifold and could even lead to asset price bubbles. The long-lasting debate about the role of central banks in dealing with asset price bubbles remains unsolved and hence will be continued in the future. The ability of the Swiss National Bank to increase interest rates to avoid the build-up of asset price bubbles is limited as a restrictive policy would put upward pressure on the Swiss Franc, leading to a conflict of interest. The Swiss National Bank does not only rely on conventional and unconventional monetary policies but also on macroprudential interventions which should reduce the misalignment of real estate prices in Switzerland. The future will show whether this policy mix will be successful.

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A Dynamic Correlation Analysis of Financial Contagion: Evidence from the Eurozone Stock Markets

Mohamed Ali Trabelsi, Salma Hmida

ABSTRACT

Objective: In this article, we try to determine whether there are contagion effects across the Greek stock market and the Belgian, French, Portuguese, Irish, Italian and Spanish stock markets during both crises periods.

Research Design & Methods: To reach our aim, we used a bivariate Dynamic Conditional Correlation-Generalized Autoregressive Conditional Heteroscedasticity (DCC-GARCH) model to measure the extent of dynamic correlations between stock returns of our sample.

Findings: Our results point to the presence of a contagion effect between all market pairs during the subprime crisis and between the Greek and Portuguese stock markets during the European sovereign debt crisis.

Implications & Recommendations: The obtained results are useful for investors, in particular for their portfolio diversification strategies. They are also useful for the monetary and financial authorities in their efforts to absorb shocks resulting from crises.

Contribution & Value Added: The originality of this work lies in studying contagion effect across the Eurozone stock markets through the bivariate DCC-GARCH model which is an original dynamic estimation of conditional correlations in Multivariate GARCH models. The measures of contagion effects following the valuation of countries induced by the massive negative sovereign rating signals during the crisis period would also be interesting to study. The methods might also be applicable to this kind of contagion type and for contagions effects across European stock market returns.

Article type:	research paper
Keywords:	Eurozone; Financial contagion; European debt crisis; Sovereign risk; Dynamic conditional correlations; interdependence
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INTRODUCTION

The turmoil that has characterised capital markets since the summer of 2007 and its intensification since mid-September 2008 have had a serious impact on the global economy. Although the US high-risk mortgage market is considered to be the immediate cause of this turmoil, in recent years the Eurozone capital markets and financial institutions have taken their share of the extended credit cycle and have been hit hard by capital markets tensions (Trabelsi, 2012).

The euro sovereign debt crisis finds its origin in Greece (Papavassiliou, 2014; Ray, 2015; Smeets, 2016). After disclosing the Greek deficit, leading to an increase in sovereign risk perception, the Greek crisis has spread to the most fragile Eurozone member countries (Ehrmann & Fratzscher, 2016). As a result, uncertainties about the Eurozone markets and the unpredictable nature of the European debt crisis have seriously undermined investor sentiment.

On the other hand, the successive and massive credit rating downgrading of several Eurozone countries, in particular the most fragile ones, led to markets over-reacting to the bad news (Arezki *et al.,* 2011). In the wake of the crisis, the Eurozone stock markets experienced massive depreciations coupled with high stock market volatility. Taking into account these turbulences, it seems therefore necessary to determine the extent of interdependence between the Eurozone stock markets and to examine whether there is a contagion relationship between these markets during the crises periods. Studying financial contagion effects across the Eurozone stock markets is very interesting because these markets are strongly integrated as suggested by several authors (Fratzscher, 2002, Bartram *et al.,* 2007). Indeed, due to the factors relating countries through trade and the banking sector, we should expect higher interdependence and contagion levels, both between and within the Eurozone markets and other countries' markets. Moreover, several authors like Savva (2009) and Connor and Suurlaht (2013) have pointed to an increasing correlation between European stock markets after introducing the Euro.

In this regard, in order to gather evidence about any contagion phenomenon across the Eurozone stock markets, we refer to the non-contingent crises theory where contagion is but a continuation of the interdependence process between markets (Forbes & Rigobon, 2002). We therefore examine the co-movements between the Greek stock market, as the market generating the debt crisis, and six Eurozone stock markets. For that, we will use the DCC-GARCH model proposed by Engle and Sheppard (2001), Engle (2002) and Tse and Tsui (2002). This model is an original dynamic estimation of conditional correlations in Multivariate GARCH models. The innovation of multivariate GARCH models allows to produce time-varying correlation coefficients and energised interest in financial contagion studies.

This article is then structured as follows. Section 1 reviews relevant theoretical and empirical literature. Section 2 presents our research methodology. Section 3 presents our econometric model and the main results. The final section discusses our findings.

LITERATURE REVIEW

Several theoretical and empirical studies have focused on contagion (Bekaert, Ehrmann, Fratzscher, & Mehl, 2014). However, research on contagion during the European sovereign debt crisis using correlation analyses shows mixed results. Indeed, some studies

found a significant increase in the correlation coefficients between the different financial markets returns during the European debt crisis (Claeys & Vasicek, 2014; Kalbaska & Gatkowski, 2012; Metiu, 2012; Missio & Watzka, 2011; Andenmatten & Brill, 2011). Other researchers believe that correlations between financial markets did not show an upward trend during the same period, suggesting the presence of a simple interdependence rather than contagion (Caporin, Pelizzon, Ravazzolo, & Rigobon, 2013; Briere, Chapelle, & Szafarz, 2012). Samitas and Tsakalos (2013) examined the relationship between the Greek stock market and seven European stock markets using an asymmetric DCC model and copula functions to measure financial contagion. Their results point to the presence of a contagion phenomenon during the subprime crisis and reject the presence of this phenomenon during the European sovereign debt crisis. In his paper on financial contagion during the sovereign crisis, Horta (2012) suggests that the stock markets of the NYSE Euronext group, whose sovereign debt is not under market pressure, do not show contagion signs unlike at-risk countries, which showed the most serious debt problems with contagion signs. This result is similar to that reported by Kizys and Pierdzioch (2011).

Examining asymmetric conditional correlations between the US and European stock markets during the US subprime crisis and the European debt crisis, Kenourgios (2014) found contagion across these markets during both crises. Papavassiliou (2014) examined correlation between Greek sovereign stocks and bonds in order to study contagion of the Greek crisis. Using a DCC model, the author concluded that correlation between sovereign stocks and bonds returns increased significantly during the Greek debt crisis, pointing to the presence of a contagion effect cross the two markets. Similarly, Missio and Watzka (2011) used a DCC model to examine the dynamics of correlations between Greek sovereign returns and sovereign returns of the Eurozone countries. The authors found financial contagion across the Belgian, Italian, Portuguese and Spanish sovereign debt markets. Afonso *et al.* (2012) examined whether sovereign returns and credit default swaps (CDS) spreads in a given country react to the sovereign ratings of other countries. They point out to a contagion phenomenon, in particular from the lowest-rated countries to the highest-rated countries.

These mixed results reported by contagion literature are typical, as they are not unique to the Eurozone debt crisis. Indeed, such controversies stem from the different definitions given to contagion, the used measurement methods and the choice of the crisis periods.

MATERIAL AND METHODS

Methodology

In order to overcome the shortcomings of the Constant Conditional Correlation-Generalized Autoregressive Conditional Heteroscedasticity (CCC-GARCH) model, Engle and Sheppard (2001), Engle (2002) and Tse and Tsui (2002) proposed the DCC-GARCH model, which is an original dynamic estimation of conditional correlations in Multivariate GARCH models. Their specification allows for a time varying matrix because the DCC-GARCH introduces equations describing the evolution of correlation coefficients in time.

Therefore, in order to measure dynamic conditional correlations, we apply the DCC-GARCH model proposed by Engle (2002). The multivariate model is defined as follows:

$$X_t = \mu_t + \epsilon_t \quad (1)$$

where:

X_t = (X_{1t} , X_{2t} ,……., X_{Nt}) - is the vector of past observations;

μ_t = (μ_{1t} ,…,μ_{Nt}) - is the vector of conditional returns

ϵ_t = (ϵ_{1t} , ϵ_{2t} , ……., ϵ_{Nt}) - is the vector of standardised residuals.

The parameters of the DCC model are estimated using the maximum likelihood method introduced by Bollerslev and Wooldridge (1992). This allows to obtain for each variable, variance and conditional covariance.

Data and Descriptive Statistics

In this study, we examine 7 Eurozone stock indices: Belgium (BEL20), Spain (IBEX35), France (CAC40), Greece (Athex Composite Index), Ireland (ISEQ overall price), Italy (FTSE MIB) and Portugal (PSI20). The study period stretches between 01/01/2004 and 12/31/2012 and includes 2.348 daily observations for each index. Stock indices series are divided into 3 segments, representing 3 distinct sub-periods. The first period is denoted the stable period, which spreads from 01/01/2004 to 07/31/2007, totaling 934 observations. The second period is the subprime crisis period, which begins with the explosion of the real estate bubble on 08/01//2007, ends on 12/07/2009, and includes 614 observations. The third sub-period is the European debt crisis period, which starts on 12/08/2009 (date of downgrading the Greek debt to the speculative category by Fitch) and ends on 12/31/2012 and includes 800 observations. Since the period preceding the European debt crisis is also a crisis period, it was necessary to divide the total period of the study into three sub-periods. The aim is to obtain a clear stable period to be compared to the European sovereign debt crisis period. Conventionally and in order to eliminate the unit root present in all indices series, we calculate stock returns as the first difference of the natural log of each stock-price index and the returns are expressed in percentage.

Table 1 reports the descriptive statistics of the daily stock returns series across the total period and the three sub-periods. The standard deviations reported in Panel A present a measure of risk during the total study period. They indicate that the Greek market is the riskiest stock market of all the markets of the sample. Skewness is different from 0, indicating asymmetry for all the series. Moreover, all returns distributions show a statistically significant Kurtosis greater than 3, indicating that these distributions dispose of thicker tails than the normal distribution and that they are leptokurtic.

The normality hypothesis of stock returns series is also rejected by the Jarque-Bera test, whose coefficients exceed the critical values, rejecting thus the null hypothesis of normality for the returns series. The ADF (Augmented Dickey-Fuller) and PP (Phillip-Peron) tests, applied to the returns series, are significant at the 1% level, allowing us to reject the null hypothesis of the presence of a unit root, against the alternative hypothesis of stationarity of all returns series. All Ljung-Box test statistics for the returns series and the squared returns series are significant at the 1% level. Such statistics indicate the presence of first and second order serial auto-correlation. The existence of the latter implies the presence of a linear dependence and a nonlinear dependence (heteroscedasticity) between returns. This reflects the imperfection of the studied stock markets and attests for the presence of a clustering volatility phenomenon.

The descriptive statistics of the stock returns series during the three sub-periods are presented in Panels B, C and D. First, we notice that the means of stock market returns have considerably dropped during the two crises periods compared to the stable period. These means are negative for all series during the subprime crisis period. With the exception of the Irish stock returns, the negative means persisted for all returns during the European debt crisis sub-period. The standard deviations of stock returns series are higher during the two crises periods, reflecting thus an increase in stock market volatility during these periods. It is important to note that increase in volatility is greater during the subprime crisis for all returns series, with the exception of the Greek market index.

Table 1. Descriptive statistics of the returns series for the full period (1/1/2004 – 12/31/2012)

Panel A: The full period: 1/1/2004 – 12/31/2012							
Statistics	**ATHEX**	**BEL20**	**CAC40**	**FTSEMIB**	**IBEX35**	**ISEQ**	**PSI20**
Mean	-0.038908	0.004183	0.000984	-0.021243	0.002045	-0.015786	-0.007107
Maximum	13.43108	9.221261	10.59459	10.87425	13.48364	9.733092	10.19592
Minimum	-10.21404	-8.319283	-9.471537	-8.599092	-9.585865	-13.96357	-10.37918
Std. Dev.	1.802965	1.299611	1.457688	1.538879	1.517968	1.564369	1.185156
Skewness	0.004875	-0.182445	0.050558	-0.031786	0.141330	-0.595134	-0.132319
Kurtosis	7.445010	9.735571	10.11370	9.173992	10.54170	10.77158	13.20373
Jarque-Bera	1933.011*	4451.520*	4951.825*	3729.624*	5572.309*	6047.482*	10192.89*
LB Q (24)	53.5*	49.2*	60.1*	66.76*	54.3*	82.1*	48.7*
LB Q^2 (24)	1227.5*	3016.9*	2142.9*	2266*	1418*	2888.5*	1534.4*
ADF	-43.500***	-46.512***	-31.320***	-47.397***	-46.936***	-45.238***	-45.139***
PP	-43.450*	-46.474*	-50.475*	-47.398*	-47.034*	-45.147*	-45.116*
Panel B: Pre-crisis period: 1/1/2004 – 7/31/2007							
Mean	0.079399	0.079854	0.060669	0.050785	0.078408	0.062043	0.076728
Std. Dev.	1.004818	0.738437	0.841369	0.739597	0.798476	0.862265	0.597401
Panel C: Period of Subprime-crisis: 8/1/2007 – 12/7//2009							
Mean	-0.125504	-0.076845	-0.050020	-0.075709	-0.011922	-0.137992	-0.062304
Std. Dev.	2.139260	1.876056	2.037556	2.048038	1.977444	2.486660	1.610522
Panel D: Period of European sovereign debt crisis: 12/8/2009 – 12/31/2012							
Mean	-0.114487	-0.001274	-0.005182	-0.043312	-0.051653	0.011970	-0.042578
Std. Dev.	2.340983	1.294269	1.520884	1.807983	1.774582	1.357814	1.350111

Notes: ***and * denote statistical significance at the 1% and 10% respectively; LB shows Ljung-Box statistics
Source: own study.

RESULTS AND DISCUSSION

The DCC Model and Estimation Results

The results reported in Table 2 show that the GARCH conditional variances are positive and significant at the 1% level during the full period, as well as during the three sub-study periods. These results indicate that the use of the GARCH process is adequate, meaning that market volatility varies over time and confirms the presence of conditional heteroscedasticity in the returns series.

This shows that conditional variances of the returns series depend on their past observations as well as on past shocks highlighting the volatility of the market. However, the results point to some differences in the in short- and long-term persistence of the ARCH and GARCH effects. Indeed, unlike the long-term persistence β, the short-term persistence measured by α is low in most conditional variance equations.

Table 2. Bivariate DCC-GARCH model estimates

Panel A: Full Period						
Par.	**ATHEX-BEL20**	**ATHEX-CAC40**	**ATHEX-FTSEMIB**	**ATHEX-IBEX35**	**ATHEX-ISEQ**	**ATHEX-PSI20**
$\alpha(1)$	0.097***	0.097***	0.097***	0.097***	0.097***	0.097***
$\alpha(2)$	0.124***	0.107***	0.110***	0.127***	0.114***	0.143***
$\beta(1)$	0.904***	0.904***	0.904***	0.904***	0.904***	0.904***
$\beta(2)$	0.864***	0.882***	0.886***	0.866***	0.880***	0.855***
θ_1	0.015***	0.019***	0.015***	0.014***	0.034***	0.020***
θ_2	0.978***	0.973***	0.980***	0.980***	0.927***	0.971***
Panel B: pre-crisis period						
$\alpha(1)$	0.098***	0.098***	0.098***	0.098***	0.098***	0.098***
$\alpha(2)$	0.151***	0.081***	0.116***	0.150**	0.156***	0.130***
$\beta(1)$	0.837***	0.837***	0.837***	0.837***	0.837***	0.837***
$\beta(2)$	0.747***	0.841***	0.779***	0.715***	0.745***	0.774***
θ_1	0.030	0.030**	0.026**	0.017	0.072***	0.014
θ_2	0.884***	0.920***	0.919***	0.940***	0.830***	0.943***
Panel C: Subprime Crisis period						
$\alpha(1)$	0.146***	0.146***	0.146***	0.146***	0.146***	0.146***
$\alpha(2)$	0.143***	0.113***	0.123***	0.128***	0.106***	0.183***
$\beta(1)$	0.849***	0.849***	0.849***	0.849***	0.849***	0.849***
$\beta(2)$	0.815***	0.867***	0.861***	0.844***	0.863***	0.792***
θ_1	0.048*	0.023	0.067*	0.015*	0.061	0.082**
θ_2	0.809***	0.824***	0.740***	0.971***	0.806***	0.467**
Panel D: European sovereign debt crisis period						
$\alpha(1)$	0.073***	0.073***	0.073***	0.073***	0.073***	0.073***
$\alpha(2)$	0.101***	0.124***	0.104***	0.118***	0.117***	0.152***
$\beta(1)$	0.877***	0.877***	0.877***	0.877***	0.877***	0.877***
$\beta(2)$	0.863**	0.847***	0.876***	0.863***	0.846***	0.809***
θ_1	0.010*	0.016*	0.011**	0.013**	0.013	0.025**
θ_2	0.982***	0.970***	0.986***	0.981***	0.971***	0.962***

Notes: ***, **,* denote statistical significance at the 1%, 5% et 10% respectively
Source: own study.

Our results show that α (the error parameter of the GARCH model, which measures reaction of conditional volatility to market shocks), of the Belgian, Italian and Portuguese stock market returns, is higher during the subprime crisis. Its relatively high value during the first crisis period indicates that volatility of these indices is more sensitive to market events during the subprime crisis than during the sovereign debt crisis period or during the stable period. However, conditional volatility of the two Spanish and Irish indices reacts more to market shocks during the stable period than during the two crises periods. On the other hand, we notice that the short-term persistence of the French and Irish stock

market volatility during the debt crisis sub-period is higher than that during the subprime crisis sub-period. Furthermore, the results of the autoregressive coefficients of volatility β, which measures persistence of conditional volatility to different market events, are higher during the two crises periods than those during the stable period. In this regard, Alexander and Lazar (2009) argue that when β is relatively high, volatility takes longer to disappear. θ_1 and θ_2 of the bivariate DCC-GARCH model during the full period are significant at the 1% level, indicating that the impact of lagged shocks and the impact of lagged dynamic correlations on dynamic conditional correlations are highly significant. These results support the dynamic conditional correlations model and allow us to reject the hypothesis of constant correlation between returns series.

Figure 1 shows the dynamic conditional correlations of the Greek stock index and the six stock indices of our sample. Noticeably, correlation trends alternate between bull and bear phases, indicating their dynamic nature.

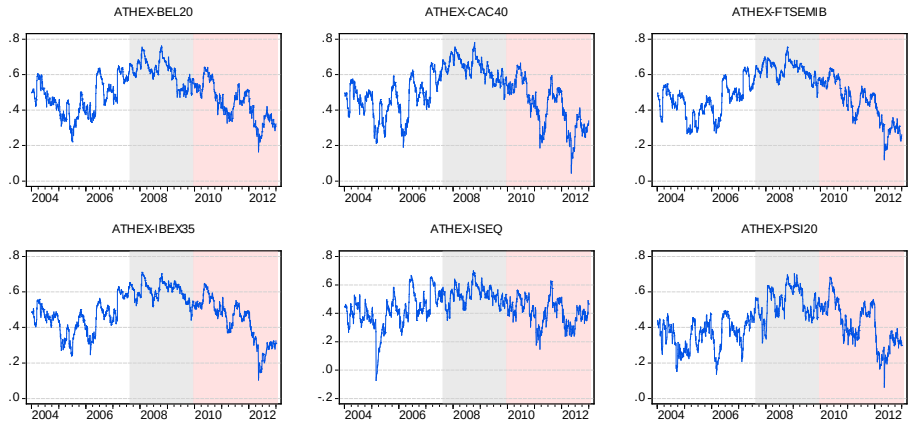

Figure 1. Dynamic conditional correlations during the full period
Source: own study.

Although there was a slight increase in correlation beginning in the second quarter of 2006, the latter varied between 3 and 4.7% on average during the stable period. However, following the outbreak of the subprime crisis, we notice an upward trend of all correlation pairs. The latter rose to an average of 6.5% and peaked in the third quarter of 2008. These peaks are higher after the collapse of Lehman Brothers in September 2008, triggering the crisis. During the European sovereign debt crisis period, dynamic correlations reached an average of 4%. We can distinguish two upward phases during this period: the first took place following the Greek crisis at the end of 2009 and the second following the worsening of the debt crisis in the summer of 2011. However, although there are upward trends, average correlations are lower than those during the subprime crisis period.

Contagion Test

In order to determine the presence of contagion effects generated by the subprime crisis and the European sovereign debt crisis, we follow Forbes and Rigobon (2002) who define contagion as a significant increase in the relationships between markets after a country shock. Moreover, in the absence of a significant trend of co-movements during

crisis periods, the term interdependence is used to describe dynamics between markets. We test the presence of contagion across the Eurozone stock markets by examining the adjusted dynamic conditional correlations in order to test for the presence of a shift contagion in the sense of Forbes and Rigobon (2002).

Let X_t and Y_t be two stock returns series such that:

$$Y_t = \alpha + \beta X_t + \epsilon_t \quad (2)$$

Where α and β are constants and ϵ_t represents the error terms.

According to Forbes and Rigobon (2002), the correlation coefficient ρ between X_t and Y_t is adjusted by the following:

$$\rho^* = \frac{\rho}{\sqrt{1+\delta[1-\rho^2]}} \quad (3)$$

With $\delta = \sigma_x^c/\sigma_x^t - 1$, where δ measures the relative increase in the volatility of x_t cross the two crises and stable periods and σ_x^c and σ_x^t are the conditional variances of the stochastic variable X_t respectively during the crisis period and the stable period.

In our study, the variable X_t represents the daily returns of the Greek stock index and the variable $Y_t$represents the daily returns of the other stock indexes of our sample. We use the following two alternative hypotheses to test the significance of the increase in the adjusted and unadjusted correlation coefficients:

$$\begin{cases} H_0: \ {\rho^*}_c = {\rho^*}_t \\ H_1: \ {\rho^*}_c > {\rho^*}_t \end{cases} \quad (4)$$

Accepting the null hypothesis H_0 means that correlation between the two markets does not increase significantly across the two sub-periods. In this case, we conclude to a simple interdependence between markets and not a shift contagion.

Accepting the alternative hypothesis H_1 means that correlation between the two markets increased significantly across the two sub-periods, proving the presence of a shift contagion.

We use the t-Student test presented by Collins and Biekpe (2003) to examine these hypotheses. The test is given by:

$$t = \left({\rho^*}_c - {\rho^*}_t \right) \sqrt{\frac{n_c+n_t-4}{1-({\rho^*}_c-{\rho^*}_t)^2}} \quad (5)$$

t is distributed with $(n_1 + n_2 - 4)$ degrees of freedom, $n_c \ and \ n_t$ are respectively the number of observations during the crises periods and the stable period.

The results of the contagion tests on the subprime crisis and the European sovereign debt crisis are presented in Table 3 below. First, we notice that the dynamic conditional correlations of the Greek stock market and the Eurozone stock markets increased during the subprime crisis period compared to the stable period. Indeed, the t-statistic is significant for all market pairs at the 1% level, hence we reject the null hypothesis.

Like in Boyer *et al.* (1999), stock returns' dynamic correlations show upward trends during crises events. This increase comes along an increase in the conditional variances of all European stock markets of our sample. These results are consistent with the literature indicating that conditional correlations tend to increase as conditional variance increases (Martens & Poon, 2001). This upward trend is confirmed both for unadjusted and adjusted dynamic conditional correlations. Thus, we can conclude to the presence of a contagion

Table 3. Contagion test results

Indices	Unadjusted conditional correlations					Adjusted conditional correlations				
	Pre-crisis	Subprime crisis	t-student	Change of mean correlation coefficients	Contagion	Pre-crisis	Subprime crisis	t-student	Change of mean correlation coefficients	Contagion
	ρ_{ij}^{t}	ρ_{ij}^{c}				ρ_{ij}^{*t}	ρ_{ij}^{*c}			
BEL20	0.465	0.642	7.07***	38.06%	Yes	0.229	0.351	4.843***	53.28%	Yes
CAC40	0.458	0.668	8.45***	45.85%	Yes	0.225	0.373	5.901***	65.78%	Yes
FTSEMIB	0.444	0.654	8.46***	47.30%	Yes	0.216	0.361	5.748***	67.13%	Yes
IBEX35	0.449	0.629	7.19***	40.09%	Yes	0.219	0.341	4.800***	55.71%	Yes
ISEQ	0.401	0.581	7.16***	44.89%	Yes	0.192	0.304	4.417***	58.33%	Yes
PSI20	0.331	0.589	10.50***	77.95%	Yes	0.155	0.310	6.17***	100.00%	Yes

Indices	Unadjusted conditional correlations					Adjusted conditional correlations				
	Pre-crisis	Sovereign debt crisis	t-student	Change of mean correlation coefficients	Contagion	Pre-crisis	Sovereign debt crisis	t-student	Change of mean correlation coefficients	Contagion
	ρ_{ij}^{t}	ρ_{ij}^{c}				ρ_{ij}^{*t}	ρ_{ij}^{*c}			
BEL20	0.465	0.413	-2.186	-11.18%	No	0.211	0.183	-1.167	-13.27%	No
CAC40	0.458	0.397	-2.552	-13.32%	No	0.207	0.175	-1.342	-15.46%	No
FTSEMIB	0.444	0.418	-1.052	-5.86%	No	0.199	0.186	-0.555	-6.53%	No
IBEX35	0.449	0.414	-1.488	-7.80%	No	0.202	0.183	-0.786	-9.41%	No
ISEQ	0.401	0.392	-0.377	-2.24%	No	0.177	0.172	-0.191	-2.82%	No
PSI20	0.331	0.415	3.533***	25.38%	Yes	0.142	0.184	1.743**	29.58%	Yes

Note: t-student's critical values are (2.326), (1.645) and (1.282) at the 1%, 5% and 10% levels respectively;
*** and ** denote statistical significance at the 1% and 5% levels respectively.
Source: own study.

effect generated by the subprime crisis across the Greek stock market and the other markets of our sample. This contagion can be described as shift contagion in the sense of Forbes and Rigobon (2002).

Our results are consistent with those of Hwang *et al*. (2010) who point to the significant impact of the subprime crisis on most international stock markets. However, examining the contagion effects generated by the European sovereign debt crisis shows that only the dynamic conditional correlations of the Greek stock market and the Portuguese stock market have increased during the European debt crisis period compared to the stable period. This increase is reflected by a t-statistic statistically significant at the 1% level. These results are in line with those reported by Horta (2012) and Kizys and Pierdzioch (2011). The fundamental trade and financial relationships between Greece and Portugal, the effect of market participants' herding behaviour explained by financial panic after the Greek debt crisis, may explain shift contagion across Greece and Portugal, as estimated by the DCC model. Indeed, a few months after the Greek crisis, downgrading the Portuguese debt by Standard & Poor's in April 2010 raised concerns about the long-existing fundamental problems of the country. Portugal was then closely monitored by investors, leading to a sudden drop in financing packages and the worsening of the country's real problems. This context of widespread mistrust was reflected in an increased volatility of the Portuguese stock market and a collapse of stock prices. However, the results for the other market pairs are insignificant. Therefore, we fail to reject the null hypothesis assuming that dynamic correlations did not increase during the European sovereign debt crisis period compared to the stable period. With these results, we can conclude that the debt crisis generated a contagion effect from the Greek stock market to the Portuguese stock market. A contagion that can be described as shift contagion in the sense of Forbes and Rigobon (2002). However, the relationship which defines the Greek stock market and the other markets of the sample cannot be described as contagion but only interdependence.

CONCLUSIONS

Contagion across the Eurozone stock markets is attracting the growing interest of analysts and researchers. Our study examined the relationship between the Greek stock market and six Eurozone stock markets. We applied the bivariate DCC-GARCH model to test this relationship over the 2004-2012 period, divided into two crises periods: the subprime crisis and the European debt crisis. Our results indicate that the subprime crisis generated a contagion effect on all market pairs. On the other hand, during the European debt crisis period, the relationship between the Greek market and the Eurozone stock markets is described as a simple interdependence, an exception is the Portuguese market. However, our results indicate that the dynamic correlations of the Greek and Portuguese markets changed during the second crisis period, suggesting the presence of a contagion effect between these two markets. Indeed, weakened by its public debt, as well as by a decrease of its rating, Portugal was considered the second 'weak link' in the Eurozone. Since then, the country went through a wave of fear that Portugal was increasingly being contaminated by the Greek crisis. Portugal then underwent a speculation transfer phenomenon in its market (Costa *et al*., 2016). However, our results point to a shift contagion across the Greek and the Portuguese stock markets during this period.

The obtained results are useful for investors, in particular for their portfolio diversification strategies. They are also useful for the monetary and financial authorities in their efforts to absorb shocks resulting from crises. Indeed, good understanding of contagion effects is an important step towards designing portfolios trading, hedging and optimisation strategies. Moreover, authorities' efforts during a financial crisis in a given country will only be effective if the relationships between the two countries are significantly different before and after the crisis. If, however, no contagion is detected, the efforts will have very limited effects since financing problems in this case result mainly from the country's fundamental economic and budgetary problems.

Finally, we believe that the measures of contagion effects following the valuation of countries induced by the massive negative sovereign rating signals during the crisis period would also be interesting to study. Our proposed methods might also be applicable to this kind of contagion type and for contagions effects across European stock market returns.

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Exploring the Nexus between Crude Oil Price and Stock Prices in Sub-Saharan Africa: A Case Study of Nigeria

Ditimi Amassoma, Matthew Ogbuagu

ABSTRACT

Objective: The objective of this article is to investigate the connection between unrefined oil price and stock prices in Sub-Saharan Africa with particular accentuation on the Nigerian economy.

Research Design & Methods: Based on the time series data used, we applied co-integration test and a restricted Vector Autoregressive Approach to verify the existence of each short and long-term relationship among the variables of interest.

Findings: The results revealed that there is very little correlation between crude oil price and stock indices, thereby implying that such an impact cannot be completely expected in the short run. Moreover, the study showed causality relation running from crude oil price and real rate of exchange to stock indices.

Implications & Recommendations: Since the study disclosed that petroleum price and rate of exchange values have far more impact on stock market indices in the long run than in the short run in Nigeria with rate of exchange contributing more to the general changes in available market indices throughout the study period, thereby suggesting that stock exchange indices are insensitive to crude oil price variations in the short run and thus resulting in loss of confidence by the investors. Consequently, the study recommends that the sitting government ought to utilise the revenue generated on the sales of petroleum to diversify the economy.

Contribution & Value Added: In this study, we tried to point out the responses of crude price shocks to stock prices, particularly throughout the previous and current administration in Nigeria. The study was able to discover that changes in unrefined oil do not impact the stock indices.

Article type: research paper

Keywords: crude oil price; VECM; stock market; causality; Sub-Saharan; Nigeria

JEL codes: G10, B41, O55, Q43

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INTRODUCTION

Undoubtedly, many studies have been carried out to examine the nexus between shock in macroeconomic fundamentals and crude oil price changes across the globe. This is owing to the fact that crude oil tends to be the largest commodity market in the world and that changes in its price could be projected to exert an inverse effect on economies of the world with implication on international stability and changes in the behaviour of investors and stock prices, to mention a few. Particularly in Nigeria crude oil has over the years been regarded as the key determinant of economic growth, this is because it has been the top-most product that has preoccupied the country's export in the past forty years as revealed by (National Bureau of Statistics, 2006).

As a matter of fact, these studies have one way or the other proven that shocks accrued to oil price has the potential to impact inflation, interest rate, unemployment, gross domestic product (GDP), exchange rate, to mention a few, depending on whether the country in question imports or exports the commodity as put by (Evangelia, 2001; Sadorsky, 2001). Some other studies focused on the impact of a particular individual macroeconomic factor and oil price changes. For instance, a study by Vipin and Matthew (2012) has revealed that oil price upset responds speedily to short and long term U.S. and international real interest rate.

Similar but more recently, a study by Beckmann, Czudaj and Arora (2017) established a direct link between exchange rates and oil prices in the long run and that they are strong predictors of each other in the short run although with strong time varying effect. This assertion was also backed by the study by Osuji (2015). It is equally worthwhile to note that in an oil importing country there is the tendency that shocks in oil price can results in inflation, thereby pressurising the policy makers to raise interest rates, which in turn makes the stock market be less attention-grabbing with implication for its returns.

Markedly, an increase in oil price has the demerit of decreasing the money flows of corporations in addition to the chance of a high rate that depresses the value of stocks traded. This successively shows oil boom as a more major risk issue to the securities market of any economy than the innumerable edges which will be derived from it in the long or short run, particularly in the emerging and developing economies as opined by Fatima and Bashir (2014).

Particularly in oil importing countries like the UK, the USA, Japan, and Germany, to mention a few, lots of research has been carried out on stock returns – crude oil prices nexus. Consequent upon the above, and the fact that not too many studies (Akinlo, 2014; Afeez & Kazeem, 2017) have been done on the interaction between changes in oil price and stock market price, there is therefore a need to undertake this study also in the oil exporting economies, with particular emphasis to developing countries: a case study of Nigeria especially because it is described as one of the largest oil exporting countries in Africa. In essence, the objective of this study is to investigate whether changes in crude oil price are capable of influencing the stock market indices in an African country using Nigeria as a case study. To achieve the aforementioned aim, the study intends to employ a restricted Vector autoregressive approach.

LITERATURE REVIEW

Despite the different studies that explored the oil price-macroeconomic variables in emerging and developed economies, only few have been done on the relationship between stock market and oil prices in underdeveloped countries like Nigeria, while most of investigations are in developed ones. Therefore, in order to contribute to the body of literature, this current study seeks to explore the relationship between crude oil price and stock prices in Nigeria. Notably, the foremost study in this regard is the one carried out by Chen, Roll and Ross (1986) who explored the effect of macroeconomic variables on stock returns. Their study pinpointed that macroeconomic factors, including interest rate, bond yields spread and inflation rate, stimulate stock prices strongly.

Disappointingly, despite their salient result, they were unable to pinpoint the effect of oil price on stock return. In consonance to the aforementioned, the study by Hamilton (1983) found that oil prices shock exerts some remarkable impact on the US economy. In addition, the study identified that there is an inverse relationship between oil price shock on financial markets and the economy to a great extent, especially during periods of recession.

Similarly, the study by Sadorsky (1999) explored the volatility of oil prices and its effect on stock returns utilising a VAR model in monthly series between the period of 1947 to 1996 in the U.S. Evidently, the results showed that oil price shock exerted a significant and negative effect on the U.S. stock market, which is consistent with the study by Hamilton (1983). In the same vein, Sadorsky went further to investigate the asymmetric relationship of oil price within the study period. The result particularly found that a rise in oil prices has a greater effect on the financial market and economy than the otherwise. Furthermore, Sadorsky (2001) extended his study to inquire the impact of oil price changes on the Canadian stock market. His result found that the Canadian stock market tends to be more sensitive to oil price and interest rate risk when compared to other macroeconomic factors by utilising a multifaceted arbitrage pricing theory approach.

Surprisingly, a more recent study by Killian and Park (2009) investigated the effect of oil price change on stock market both from the demand and supply side. Their results categorically point that oil price shocks, whether evaluated from the demand or supply side or jointly, affect the stock market in the long run. In contrast, the study by Huang and Masulis (1996) examined the link between daily oil future returns and daily U.S returns employing the VAR approach. The results revealed that oil price returns do foster some individual oil company's return but do not impact the general stock market much.

There are various studies from other developed economies aside from the U.S. and Canada which investigated the relationship between oil price shock and stock market returns/prices. For instance, the study by Mehmet, Renee, Josine and Rangan (2014) proved that oil price shocks are significant avenues that trigger economic fluctuations in Spain. The above was further refuted by the study by Kaul and Seyhun (1990) where it was noted that oil price volatility has a negative significant relation with real stock returns in the NYSE. Similarly, the study by Jones and Gautam (1996) utilised the valuation model on the U.S, Canada, Japan and England stock markets. The results indicated that fluctuations in oil prices impacts stock market performance in those countries. In the same vein, Ciner (2001) concludes that there is a non-linear relationship between stock return and oil prices. In Norway, the study by Bjornland (2008) showed that there is a positive relationship between

oil price shock and stock return; with implication that wealth and economic growth couple with a robust linear and non-linear measure of oil prices. The study also pinpointed the role of monetary policy shocks in the short run with respect to variation in stock prices.

This was followed by a study carried out in Greece by Pappetrou (2001), which considered the interaction amongst the price of oil, economic growth, real stock prices and employment using a VAR model. The results of the study showed that shock in oil price affects real economic activity and employment in Greece. More importantly, oil prices were found to exert a significant movement in stock price in Greece as well. The studies by O'Neil, Penm and Terrell (2008) and Park and Ratti (2008) revealed clearly that oil price shocks exert a significant influence on stock returns of markets in developed economies. Moreover, the study by Lescaroux and Mignon (2008) showed that there exists a strong unidirectional causality which runs from oil prices to share prices. To corroborate the above, the UK study by Irene and Sadorsky (2008) pinpointed a negative association between oil prices and the stock market. In addition, a long run association was also established between oil prices and stock market performance. This standpoint was equally supported by the study carried out by Panagiotis and Katrakilidis (2014). Furthermore, Faffa and Brailsford (1999) investigated the impact of oil price on the Australian stock market with results indicating that oil price exerts a positive impact on oil companies.

On the relationship between crude oil price and stock price in the emerging and developing economies, a bulk of studies have been done, although the results evoke mixed feelings. For example, Basher and Sadrosky (2006) explored this relationship on 21 emerging stock markets, including Pakistan and India, using CAPM multifactor model. Evidently, the results proved that oil prices impact stock markets of the emerging economies. Aside from the above mentioned, the asymmetric effects were also proven. In line with the aforementioned, Lin, Fang, and Cheng (2011) pinpointed the assertion that oil price shock impact on China's market is with mixed outcome. Bhar and Nikolova (2010), which is an earlier study, also discovered that global oil price returns have effect on Russian equity returns and volatility. A little different from the findings of the above is the study by Ciner (2001) which opined that there was a non-linear statistical significant relationship between stock returns and oil price futures. More recently, a study by Khalid and Mohammad (2017) investigated the relationship between oil prices and Kuwait stock exchange (KSE) prices at the sector level using a NARDL model. The evidence from the findings showed that asymmetric long run effect exists between oil prices and some Kuwait sectoral stock prices. Nonetheless, Jouini and Harrathi (2014) examined Chinese and Russian stock markets with respect to the oil price effect. The study found out that oil price volatility strongly influences the risk profile of trading strategy in both countries.

In Africa, studies like that by Koranchelian (2005) in Algeria adopted a vector error correction model (VECM). The study concluded that the movements in the real exchange rate were time varying and in turn impacted stock returns. A recent study by Grakolet and Pierre (2016) explored oil prices and African stock market co-movement using a time frequency analysis. Shockingly, the results revealed that the co-movement between financial markets and stock markets and oil price is very low with the exception of some emerging stock markets, such as Egypt and South Africa, which recorded a large scale impact on their stock markets. Furthermore, they opined that African stock markets at a small scale are possibilities of diversification benefit for oil market active investors.

There are studies in Sub Saharan Africa, for example, Gyasi (2016) examined the link between Ghana stock exchange market and crude oil prices. The results revealed a bi-directional causality between the Ghana equity market and crude oil prices with respect to both returns and volatility. Thereby, making results stand to be beneficial to both investors and policy makers. In the same vein, Aliyu (2012) investigated the aforementioned relationship by employing GARCH model on time series data of Nigeria and Ghana. The results showed that in Nigeria bad news negatively affects stock return as compared to good news, while in Ghana it is the opposite case.

In Nigeria, some empirical studies have investigated this relationship, too. For instance, Nsisong and Ebong (2016) modelled the dynamic relationship that exists between crude oil prices, stock market indicators and economic growth using vector autoregressive (VAR) and co-integration technique. The results revealed that there is a viable long run and sustainable relationship among the series. The above study was followed by the studies by Adaramola (2012) and Ogiri, Amadi, Uddin and Dubon (2013), which investigated the long-run and short-run dynamic effects of oil price volatility on the Nigerian stock market behaviour from 1985 to 2009 using quarterly data within the period in question. Interestingly, the results revealed that the stock market has a significant positive impact on oil price. Furthermore, the result of the Granger causality test indicated a strong evidence that causality runs from oil price shock to stock returns, meaning that variations in the Nigerian stock market performance are explained by oil price movements. Similarly, the study by Babatunde *et al.* (2013) investigated the interactive relationship between oil price shocks and the behaviour of the Nigerian stock market. Their results suggested that the Nigerian stock market returns have a positive but insignificant impact on oil price shocks but they revert to negative effects after a period of time depending on the type of the oil price shocks.

The above literature revealed that the bond between oil prices and stock market performances has been carried out in several developed and few developing economies although the outcome had a mixed outcome. It is based on the aforementioned that this current study seeks to focus on these relationships in Sub-Saharan Africa with Nigeria as a case study. The essence is to explore the impact of fluctuations in oil price on stock prices in Nigeria.

MATERIAL AND METHODS

This article employs annual data on crude oil prices, stock market all share index and interest rate. In particular, the oil price adopted is the US dollar per barrel price and financial development which is proxied by the ALL share index. Exchange rate is used to proxy monetary policy. The study aims to adopt Vector Autoregressive (VAR) technique. In a simplistic manner, the study hopes to employ the below model as expressed in equation (1).

$$\mathrm{ASPI}_t = \propto_0 + \propto_1 \mathrm{COIP}_t + \propto_2 \mathrm{EXR}_t + \mu_t \quad (1)$$

where:

ASPI_t - is the ALL share Index;
COIP_t - is the crude oil price;
EXR_t - is the naira /U.S dollar exchange rate.

The data were obtained from the Central Bank of Nigeria, the statistical bulletin and the US Energy Information Administration (2017). As a pre-requisite for time series analysis, the study tested for stationarity by using both Augmented Dickey-Fuller (ADF) and Phillip-Perron (PP) unit root method. After the above mentioned test, if the variables under consideration are found to be integrated in the same order, then there may be the evidence of co-integration. This in turn will make the co-integration test to be useful in the analysis. In this wise, the co-integration test is carried out via the Johansen co-integration approach as suggested by Johansen and Juselius (1990). For instance, if co-integration tends to exist between the series under consideration, then there is a need for an additional error correction term i.e. to the Error correction model (ECM). To do this, the Johansen co-integration procedure in a vector autoregressive (VAR) environment is employed, that is, the unrestricted VAR. Here, the null hypothesis i.e. H_0 is that there is a different number of co-integration relationships as against the H_1, that all series in the VAR are stationary. More particularly, the VECM model to be utilised in this research is adopted from Akinlo (2014) with modification, and it is specified as below.

$$\Delta\mathrm{ASPI_t} = \ell_1 + \sum_{i=1}^{k-1} \delta 1i\ \Delta\mathrm{ASPI_{t-i}} + \sum_{i=1}^{k-1} \theta 1i\ \Delta\mathrm{COIP_{t-i}} + \sum_{i=1}^{k-1} \psi 1i\ \Delta\mathrm{EXR_{t-i}} + \\ + \mu 1\ \mathrm{ECT_{t-i}} + \varepsilon_t \quad (2)$$

$$\Delta\mathrm{ASPI_t} = \ell_2 + \sum_{i=1}^{k-1} \delta 2i\ \Delta\mathrm{ASPI_{t-i}} + \sum_{i=1}^{k-1} \theta 2i\ \Delta\mathrm{COIP_{t-i}} + \sum_{i=1}^{k-1} \psi 2i\ \Delta\mathrm{EXR_{t-i}} + \\ + \mu 2\ \mathrm{ECT_{t-i}} + \varepsilon_t \quad (3)$$

$$\Delta\mathrm{ASPI_t} = \ell_3 + \sum_{i=1}^{k-1} \delta 3i\ \Delta\mathrm{ASPI_{t-i}} + \sum_{i=1}^{k-1} \theta 3i\ \Delta\mathrm{COIP_{t-i}} + \sum_{i=1}^{k-1} \psi 3i\ \Delta\mathrm{EXR_{t-i}} + \\ + \mu 3\ \mathrm{ECT_{t-i}} + \varepsilon_t \quad (4)$$

From equation (2), (3) and (4) above, the ECT_{t-1} term describes the long run causality. In the same vein, the joint f-test of the considered coefficients of the first differenced explanatory variables signifies the short run causality. To ascertain causality, the Wald joint significant test would be used. In order to ascertain further the interrelationship among the variables of interest, variance decomposition (VDF) and impulse response function (IRF) are utilised.

RESULTS AND DISCUSSION

This section involves the presentation of data and interpretation of the results analysed regarding this research work. The descriptive statistics (Table 1) show that the average of ASPI is 12812.05 with S.D of 1620.769; similarly, the mean of COIP is 37.179 with S.D of 28.0 and expected value of the exchange rate is 74.372 with S.D of 87.664. ASPI, COIP and RER were considered to be positively skewed. Again, the kurtosis statistic of the data showed that all the variables used are leptokurtic. And finally, the J-B statistic shows that the residuals follow a normal distribution.

As a follow up of the outcome of the descriptive statistics of the variables, the researcher deemed it necessary to check for the time series properties of the variables utilised. To check for these properties, the Augmented Dickey-Fuller (ADF) and the Phillip Perron test were used and the result presented in Table 2 below. The result of the unit root test showed that all the variables were not stationary at a level but later became stationary after first differencing.

Table 1. Result of Descriptive Statistics

Statistics	ASPI	COIP	RER
Mean	12812.05	37.18	74.37
Median	5266.40	28.00	21.89
Maximum	57990.20	109.00	363.00
Minimum	32.90	10.60	0.55
Std. Dev.	16207.69	28.32	87.66
Skewness	1.22	1.46	1.26
Kurtosis	3.67	3.976	4.466
Jarque-Bera	11.527	16.959	15.26
Probability	0.313	0.24	0.15
Sum	550918.00	1598.70	3197.99
Sum Sq. Dev.	1.10E+10	33690.31	322766.60
Observations	43	43	43

Source: own study adopted from E-views 7.

Table 2. Result of Unit Root Test

Variable	AT LEVEL				AT FIRST DIFFERENCED			
	ADF-t stat	PP-t stat	CV at 5%	Decision	ADF-t stat	PP-t stat	CV at 5%	Decision
ASPI	-0.366	0.422	-2.933	NS	-6.145	-5.825	-2.935	*S*
COIP	-1.977	-1.901	-2.933	NS	-7.471	-7.560	-2.935	*S*
EXR	3.12	2.637	-2.933	NS	-3.519	-3.519	-2.935	*S*

Source: own calculations adopted from E-views 7.

Prior to the co-integration test, we find it necessary to construct an initial VAR model to determine the lag order/length of the co-integration test. This is because it is important and also a prerequisite to conduct the co-integration test. The outcome of the estimation of the lag structure of a system of VAR in levels indicates that the optimal lag length based on the Schwartz information criteria (AIC) is 1 as shown in Table 3.

Table 3. Lag order selection

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-848.75	NA	2.22e+14	41.55	41.674	41.594
1	-753.77	171.41	3.36e+12	37.355	37.856*	37.5375*
2	-743.19	17.552*	3.14e+12*	37.277*	38.155	37.597

Source: own calculation adopted from E-views 7.

We defined the lag order as the 1st order using AIC. As a matter of fact, one of the advantages of VAR specification is that it allows for the computations of Impulse Response Function (IRF), that is, functions of the response of any dependent variables to one standard deviation shock in any other endogenous variable in the system as emphasized by Rad (2014).

The result of the co-integration test is shown in Table 4 below. From the table it can be observed that the null hypothesis of no co-integration, for r=0, r≤1 and r≤2 was rejected by both the trace and the maximum Eigen-value statistic. The reason for this is because their critical values were found to be lesser than their corresponding statistical values. This

in turn depicts that there is a long-run linear relationship among the variables of interest with 3 co-integrating equations at 5% level of significance.

Table 4. Co-integration test

Trace Test				Maximum Eigen Value Test			
Null	**Alternative**	**Statistics**	**95% Critical Values**	**Null**	**Alternative**	**Statistics**	**95% Critical Values**
r = 0	r ≥ 1	50.52	29.797	r = 0	r = 1	29.265	21.132
r ≤ 1	r ≥ 2	21.257	15.495	r ≤ 1	r = 2	15.177	14.265
r ≤ 2	r ≥ 3	6.08	3.84	r ≤ 2	r = 3	6.08	3.841

Source: own calculation adopted from E-views 7.

As a matter of fact, the implication of vector error correction mechanism (VECM) as presented in this research is that it offers the opportunity to ascertain two things. The first one is the long run causality and the nature of the error correction term. The other one is to ascertain whether there is short run causality or not. Furthermore, the VECM result will also entail the Granger causality outcome. This result will be presented in Table 5.

Table 5. Result of Granger causality test and Error correction term

Chi Square statistics				ECT_{t-1}
Variables	**$\Delta(ASPI)_t$**	**$(COIP)_t$**	**$(RER)_t$**	**t- statistics**
ΔASPI	–	0.092 (0.76)***	0.569 (0.45)***	-0.312** (-3.66)
ΔCOIP	16.59 (0.00)**	–	0.009 (0.92)***	-0.145 (0.00)**
ΔRER	3.120 (0.08)***	2.097 (0.15)***	–	-0.104 (0.53)

NB: ** and *** represent 1% & 5% respectively
Source: own calculations adopted from Eviews 7.

From the Granger causality result it was discovered that long run causality existed between COIP and RER to ASPI, as presented in the table above, which emanated from a one period lagged error correction term. The implication of the above is that there is long run causality among the variables of interest. This is explained by the fact that the error correction term showcased a negative sign which is statistically significant at 1% level given ASPI as the response variables. Evidence shown from the Granger causality test is that a unidirectional causal relationship runs from COIP to ASPI. This corroborates the study of Lescaroux and Mignon (2008). It was also discovered that there is no causality running from RER to COIP and from RER to ASPI, respectively. Furthermore, the study went ahead to ascertain if the crude oil price can cause ALL share index or not in the short run. To do this, we state the null hypothesis that H_0: c(3) = 0 by employing the Wald significance test. Evidently, the results of the Wald significance test as seen from the probability value of the chi-square p (0.2155>0.05) is equal to zero and should hence be accepted. Meaning that there is no short run causality running from COIP to ASPI. Similarly, the study went further to check for the second variable i.e. RER. The results revealed that there is no short run causality running from RER to ASPI respectively. In the overall, the researchers went ahead to ascertain if RER and COIP joint cause ASPI in the short run.

The null hypothesis H_0: c (3) = c(4) = 0. The results of the chi-square probability (p = 0.4604>0.05) revealed that the null hypothesis of no causality can be accepted. The implication is that there is no short run causality between RER and ASPI.

To validate the appropriateness of the above evaluated model, we set out to do some diagnostic tests. We started by examining the probability of the chi-square (p = 0.9829>0.05) which tends to be greater than 5%. The implication is that we accept the null hypothesis of no serial correlation, meaning that there is no serial correlation in the model. Also, we went further to check for heteroskedasticity in the model. The chi-square results (p = 0.2561>0.05) revealed that the null hypothesis of no heteroskedasticity is accepted. In addition, we also checked to know whether the series is normally distributed or not. Surprisingly, the results of the Jarque-Bera test revealed that the null hypothesis of the series normally distributed is accepted based on the fact that the probability value (0.4558) is greater than 5%. The results suggest that there are no lagged forecast variances in the conditional variance equation. In essence, it stipulates that the errors are conditionally and normally distributed, thereby making it useful for inference as buttressed by Nwachukwu and Odigie (2009). In the same vein, evidence from the CUSUM test (Table 6, Figures 1-2) that uncovered the VECM model is stable, thereby implying that the model was reasonably specified based on its statistical significance and fitness.

Table 6. Results of the CUSUM test

Variables	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.312	0.085	-3.663	0.0008
C(2)	0.317	0.138	2.303	0.027
C(3)	-0.145	0.117	-1.239	0.224
C(4)	-0.105	0.166	-0.633	0.530
C(5)	0.145	0.0482	2.999	0.005
Statistics				
R-squared	0.391	Mean dependent var		0.177
Adjusted R-squared	0.324	S.D. dependent var		0.28
S.E. of regression	0.23	Akaike info criterion		0.012
Sum squared resid	1.903	Schwarz criterion		0.22
Log likelihood	4.76	Hannan-Quinn criter.		0.088
F-statistic	5.791	Durbin-Watson stat		1.978
Prob(F-statistic)	0.001	–		

Note: Dependent Variable: D(LASPI); Method: Least Squares; Date: 03/15/18 Time: 07:42; Sample (adjusted): 1977 2017; Included observations: 41 after adjustments; D(LASPI) = C(1)*(LASPI(-1) + 0.00587339841049*LCOIP(-1)-1.15064609978*LRER(-1) - 4.35761708759) + C(2)*D(LASPI(-1)) + C(3)*D(LCOIP(-1)) + C(4)*D(LRER(-1)) + C(5)

F-statistic	1.323	Prob. F(6,34)	0.274
Obs*R-squared	7.762	Prob. Chi-Square(6)	0.256
Scaled explained SS	8.465	Prob. Chi-Square(6)	0.206

Note: Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.000393	Prob. F(1,35)	0.984
Obs*R-squared	0.000460	Prob. Chi-Square(1)	0.983

Note: Breusch-Godfrey Serial Correlation LM Test

Source: own calculations adopted from Eviews 7.

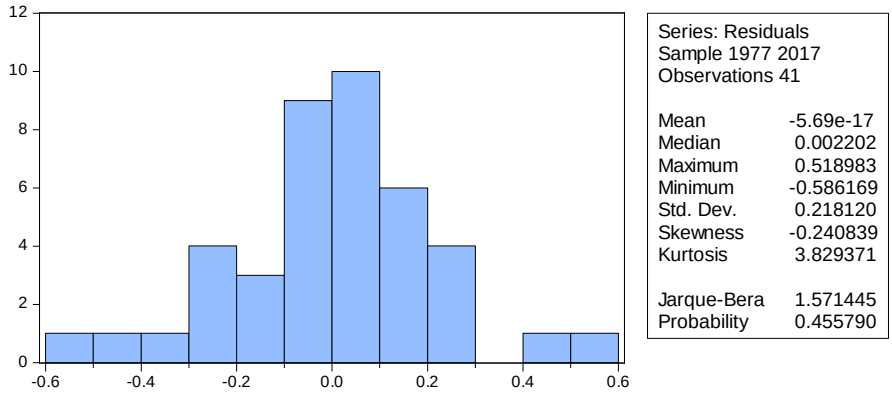

Figure 1. Jarque-Bera Normality Test
Source: own study based on statistical calculations from Eviews 7.

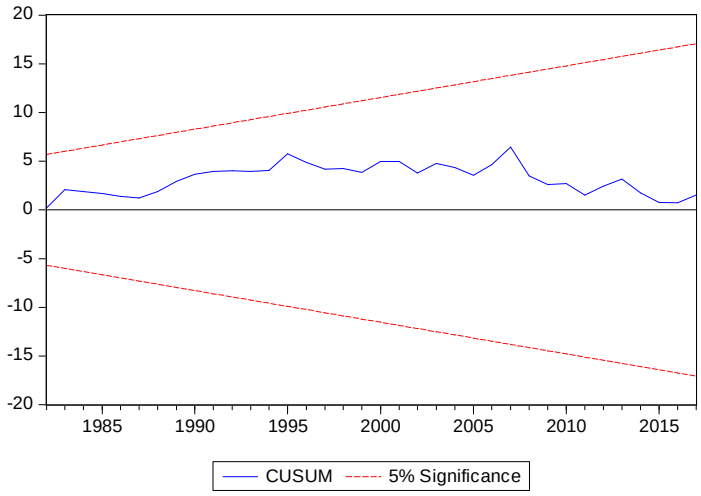

Figure 2. CUSUM Test for Stability
Source: own study based on statistical calculations from Eviews 7.

In order to give further consideration to the short-run dynamic properties of the stock market index with respect to the variables in the system, we employ the variance decomposition function. As a matter of fact, VDF indicates the amount of information each variable contributes to the other variables in a vector auto regression (VAR) models. The results are reported in Table 7.

Findings from VDF results presented in Table 6 showed that the dynamic behaviour of the stock market index reports 100% variation of the fluctuation in the first year when innovation by a standard deviation (SD) of 0.23 is the variable itself. In the short run, that is period 3, shock to ALL share index accounts for 71.68% variation of the fluctuation in ALL share index (own shock), whereas an impulse to crude oil price plus exchange rate caused 14.32% and 13.99% fluctuation in the stock market development, respectively, but as a whole, total fluctuation

becomes 100 percent, while in the long run, that is period 10, the shock to ALL share index contributes to 28.04% of stock market index (own innovation), however; shock to crude oil price and exchange rate can cause 28.50% and 43.46% to the variance of the stock market development, respectively. From the analysis, we find that in the short run, the ALL share index contributed more to own shock, but in the long run such contribution declined significantly. But in the case of both crude oil price and exchange rate, the analysis is reversed with more contributions from the exchange rate. Noticeably, from the result it can be seen that the contribution of the exchange rate is more consequential to stock market development. This may be attributed to the fact that the Central Bank of Nigeria has recently initiated a formal intervention to control the exchange rate and the forex market which in turn encourages more foreign investors to participate in the Nigerian Stock Exchange (NSE) market.

Table 7. Results of the Variance Decomposition function (VDF)

Period	S.E.	ASPI	COIP	RER
1	0.229	100.00	0.00	0.00
2	0.345	90.087	6.548	3.366
3	0.435	71.676	14.325	13.999
4	0.525	54.24	20.26	25.499
5	0.607	43.048	23.698	33.254
6	0.678	36.688	25.616	37.696
7	0.737	33.07	26.756	40.174
8	0.79	30.85	27.50	41.65
9	0.839	29.29	28.053	42.657
10	0.886	28.043	28.497	43.459

Source: own calculations adopted from Eviews 7.

Here, IRF refers to a shock that is accrued to the VAR system. Impulse response typically identifies the responsiveness of the dependent variable to a one positive shock in the exogenous variable in the VAR when the shock is put to the error term.

Particularly, in this study the IRF is utilised to ascertain the effect of a one standard deviation generalised innovation in crude oil price and exchange rate on the market index of Nigeria. The result of the impulse response is shown in Figure 3. Here, we started with the response of ALL share index to ALL share index (own innovation). That is, to ascertain how one positive standard deviation (SD) shock of ASPI reacts to its own shock. In the graph we discover that initially ASPI reacts positively, it turns negative between period 3 to 7 and afterwards positive, and then drops to zero at period 10. Similarly, it was discovered that one positive SD shock of COIP generated positive responses to the ASPI both in the long and short run. Meanwhile, one positive SD shock of RER caused a positive response on the ALL share index of Nigeria from period 1 to 10, accordingly.

On the other hand, one positive SD shock of COIP initially generated positive and later negative reactions to the value of ASPI between periods 1 to 10 in the future. On the contrary, it was discovered that the response of one positive SD shock of COIP to own innovation was found to be positive. The same applied to the response of RER to COIP, as well. The implication is perhaps that crude oil price and exchange rate react both positively and negatively to stock market development in Nigeria and this outcome buttressed the findings of Babatunde *et al.* (2013) and Ojikutu, Onolemhemhen and Isehunwa (2014), respectively.

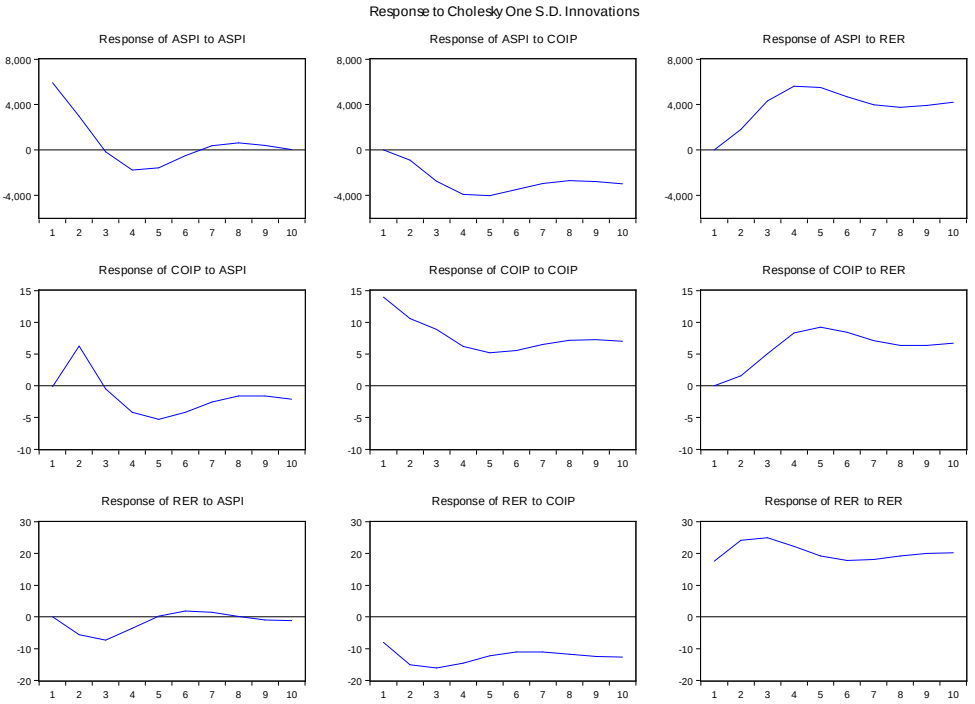

Figure 3. Impulse Response Function (IRF) of the link between crude oil price and stock market indices
Source: own study.

CONCLUSIONS

The stock market is often described as a stimulus to macroeconomic fundamentals, and having its inherent effect on the welfare of any economy, Most policy makers, investors and economists are apprehensive with these nexus, especially the relationship between changes in crude oil price and stock market performance, with particular reference to oil exporting countries like Nigeria where some nonchalant attitude towards the above has its economy into the immediate pasted recession. It is in line with the above that this current study investigated the link between crude oil price and stock market performance using a restricted VAR approach. The results revealed that all variables utilised were stationary after first differencing, and evidence of a long run linear relationship was also found based on the unit root and co-integration test, respectively.

The VECM model showed that there is long run causality from crude oil price and exchange rate to ALL share indexes (stock indices). This is because the error correction term (-0. 312) was negative and statistically significant at 5% level. The coefficient of the ECT_{t-1} indicated that the errors in the model can be corrected for about 31.2% yearly. Furthermore, unidirectional causal relationship was noted to run from the crude oil price to ALL share indexes. However, no causality was established between RER to COIP and RER to ASPI, respectively. Evidence from the variance decomposition function VDF showed that crude

oil price and exchange rate contributed minimally to stock market development in the short run, while the contribution of same variables was prominent in the long run. However, exchange rate was found to contribute more to stock market development in Nigeria than the crude oil price. The outcome of the VDF was equally validated by the IRF result in Figure 3. Based on the above findings, the study recommends that the government should diversify the national economy with the revenue generated on crude oil in order to avert the likely economic conditions that could emanate from the shocks of decline in the price of crude oil in future. especially on the financial sector and the like. The government should also deepen its intervention in the exchange rate in order to encourage more foreign investors into the market. Despite the above salient result obtained from this study, there is availability of data limitation which made the study to be country specific, thereby minimising the generalisability of the result to other Sub-Saharan African countries.

Despite the above salient result, the study still has data limitations which have portrayed it to be more of country specific analysis, thereby minimising the generalisability of its result to alternative Sub-Saharan African countries. This was because data of different Sub-Saharan African countries were not readily out there as at the time this research was undertaken. Therefore, the authors suggest that additional cross-country studies should be undertaken on the link between changes in crude oil value and stock exchange indices in Africa to a great extent for future research in order to ensure a sturdy outcome and for the purpose of comparison, among others.

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The Evolving Potential of Talent Management in Poland

Marianna Waters-Sobkowiak, Tadeusz Kowalski, Stanley J. Smits

ABSTRACT

Objective: The objective of this article is to identify and assess recent progress in talent management (TM) among Poland's MNEs. This article focuses on establishing a better understanding of TM practices in Poland at a time when its economy is becoming increasingly global and its young workforce is ready to move beyond the cultural constraints of its Communist past.

Research Design & Methods: The authors used a quantitative research design through an on-line survey. It was supplemented by post-survey interviews designed to help interpret the survey findings. A total of 83 MNEs in Poland responded to the survey.

Findings: The analysis presented here contrasted the 31 MNEs that rated TM as 'high' in strategic importance vs. the 22 companies that rated it 'low' in strategic importance. Six variables differentiated the 'high' vs. 'low' TM importance companies at the 0.05 level of confidence or beyond.

Implications & Recommendations: The discussion focuses on the continued need to improve TM/HRM practices among MNEs in Poland, the need to develop a Polish approach to TM, and reasons for optimism regarding TM in Poland in the decades ahead. The paper concludes with a recommendation to adopt learning organization practices to improve TM and to provide an enhanced competitive advantage for Polish MNEs in the global economy.

Contribution & Value Added: The paper offers insights into the national policies, research agendas, and workplace practices needed to move Poland forward in its quest to meet the talent requirements of its emergent global economy.

Article type:	research paper
Keywords:	talent management; the global economy; the global value chain; competitive advantage; the learning organization
JEL codes:	J50, R23, O15, M51, M54

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INTRODUCTION

This research addressed major components of an earlier survey study of talent management in Poland by Skuza, Scullion and McDonnell (2013), retaining its applied focus and conceptual framework, in order to assess progress in this important component of national competitiveness for MNEs. Competitive strategies can be complex but at their basic level they involve competent personnel to execute the plans in place to reach national and organizational objectives. Competency is not a random or chance occurrence; rather it involves identifying, enhancing, and utilizing the talent of the workforce available to perform the organization's primary functions. Talent management (TM) is defined simply as 'the need to identify, select, and develop the right people' (Scullion, Collings, & Caligiuri, 2010, p. 106) and more completely in a global context as 'the systematic utilization of HRM activities on a global scale to identify, attract, develop, and retain high-potential strategic employees who are consistent with the strategic directions of the multinational enterprise in a dynamic, highly competitive global environment' (Ruel & Lake, 2014, p. 157). TM is a strategic intervention that, in turn, requires a sound strategy for its implementation.

The objective of this article is to identify and assess recent progress in talent management (TM) among Poland's MNEs. This article focuses on establishing a better understanding of TM practices in Poland at a time when its economy is becoming increasingly global and its young workforce is ready to move beyond the cultural constraints of its Communist past.

LITERATURE REVIEW ON TALENT MANAGEMENT IN POLAND

As background for the report of our survey results presented later in this paper, we briefly review the connection between TM and strategy in the context of closely related areas of inquiry: The learning organization and knowledge management. Next we present information about Poland's evolving economy and its increasing globalization; and finally, we conclude with a summary of theory and research relevant to TM in Poland.

Talent Management and Competitive Advantage

Today, talent management is not just a source of competitive advantage for organizations; it is a strategic imperative. With globalization and its effect on the labor market, the 21st century is set to have the toughest employment market in history, not for employees, but for employers (Fernandez-Araoz, 2014). There is rising demand for talent, an intensifying shortage of talent available, and recruiting and retaining talent is increasingly difficult (Ashton & Morton, 2005; Collings, McDonnel, & Scullion, 2009; Nilsson & Ellström, 2012; Ruel & Lake, 2014; Scullion & Collings, 2011; Stahl *et al*., 2012; Zupan, Dziewanowska, & Pearce, 2017). Furthermore, due to globalization and lower barriers to immigration, workers are more mobile than ever before (Nilsson & Ellström, 2012; Scullion & Collings, 2006, 2011; Somaya & Williamson, 2011; Vaiman, Scullion, & Collings, 2012). This is especially true among high-skilled workers and professionals who are in high demand and showing increasingly little loyalty to their native country as they often move between countries for work (Vaiman, Scullion, & Collings, 2012). Organizational structures are also changing at a rapid pace, shifting from traditional hierarchical to more horizontal or matrix structures.

Combining all this with the major shift in workforce characteristics and preferences associated with managing millenials, organizations have no choice but to adjust and adapt their methods for attracting, developing and retaining top talent. In short, organizations need to implement talent management successfully and strategically to stay competitive, and emerging economies need to ensure TM is socioeconomically embraced and adopted if they want to become a global player in today's economy.

For competitive advantage, talent management must be viewed with a global perspective. Global talent management has become a top priority for MNEs as participating in a global economy means facing a competitive global labor market and the need for international leadership talent that can manage increasingly diverse staffs. Today's labor market is now composed of international employees and cosmopolitans who are comfortable crossing borders, working in various countries, and feel few ties to their native country (Vaiman, Scullion, & Collings, 2012). Such employees often have a multi-cultural awareness and international experience that is increasingly valuable today. This phenomenon has created a global workforce and brought the competition for labor to a global level rather than country level (Scullion & Collings, 2011).

Today, TM benefits from advances in theory and research in two closely related areas of inquiry: The learning organization and knowledge management. As Edmondson (2008, p. 62) noted: 'With the rise of knowledge-based organizations in the information age, the old model no longer works...'. In her words, learning is a *competitive imperative*. When organization members acquire unique tacit knowledge that enhances their performance, they achieve a competitive advantage that competitors find difficult to replicate (Nonaka, 1994; Raelin, 1997).

The learning organization focuses on 'execution-as-learning' rather than 'execution-as-efficiency'. This shift in focus from the manufacturing-dominated era to today's knowledge-based organizations starts with leaders setting direction and articulating mission and with employees, usually in teams, discovering answers and solving problems rather than the hierarchical, top-down management practices of the past (Edmonson, 2008). Earlier, Rowden (2001, p. 15) described the learning organization as actively engaged in identifying and solving problems by increasing its capacity to 'grow, learn, and achieve its purpose.' The success of the learning organization relies not only on a new approach to leading and managing people but also on increased sophistication in knowledge generation and application (Grant, 2002).

In brief, TM today finds itself as an important resource to help develop competitive advantage, and it has become more pertinent than ever for organizations to promote learning, to acquire, analyze, and apply knowledge to help the organization perform more effectively. As the organization experiments and problem-solves, its members acquire strategically-relevant expertise in the form of tacit knowledge not easily co-opted by competitors (Hatch & Dyer, 2004). While informed leadership promotes the learning organization, knowledge management, and talent management, these activities in themselves help identify the talented organization members who will help lead the organization forward. As Ashby and Miles (2002, p. 213) pointed out, the key attribute in spotting leadership talent to be developed is *continuous learning*. 'One of the most important attributes of all leaders is their ability to learn continuously throughout their careers'.

With the various definitions and approaches to talent management, there is more than one way for organizations to introduce talent management into their business. Implementing effective talent management requires choosing the right type of activities and practices for the company and its employees. However, some basic requirements and key guidelines have emerged in the literature that can help ensure organizations put in place a successful talent management system. For example, integrating talent management with corporate strategy ensures that an organization will gain great returns on its investment in talent management, as the system will then be able to provide the organization with the right talent in the right positions at the right time, fully integrating itself with the business planning process (Ashton & Morton, 2005; Powell & Lubitsh, 2007; Stahl *et al*., 2012). Having the full support of senior management, establishing the importance and relevance of talent management, ensures that TM is committed to, rather than simply complied with, thereby generating long term results. Differentiating between high and low impact employees and positions, rather than applying talent management practices equally to all allows the organization to make the most efficient use of its resources and better meet the needs of pivotal employees (Ashton & Morton, 2005; Collings, McDonnell, & Scullion, 2009). And lastly, by allowing for flexibility and creativity in how an organization engages its employees, an organization will be able to retain its key employees, can adjust to evolving demands, and can build a strong and competitive reputation as an employer.

Poland's Evolving Economy

Poland, a member of the centrally planned European Emerging Market Economies (EEMEs), has experienced tremendous economic, social, and political change since 1990. Its transformation was both difficult and painful due to the lack of, or underdeveloped, market institutions (Acemoglu & Johnson, 2005; Campos & Coricelli, 2002). The market reforms implemented in Poland in 1990 resulted in a liberalization of foreign trade opening its economy to flows of goods, services, and capital. Blessed with natural resources, an adequate supply of affordable labor, and compatible commodity and geographic structures, Poland attracted foreign direct investment (FDI) and experienced an unprecedented rate of globalization. Table 1 shows the pace of change from 1990-2015 as the business sector in Poland, and thus the whole economy, became interconnected with foreign partners.

Table 1. Foreign direct investment, exports and GDP in Poland in 1990-2015

Category	1990	1995	2000	2005	2010	2015
FDI net inflows as % of GDP	0.14	2.62	5.43	3.63	3.84	1.55
Inward FDI stock as % of GDP	0.17	5.52	19.48	28.36	39.15	45.46
Total exports of goods and services as % of GDP	26.31	23.30	27.21	34.92	40.03	49.36
GDP per capita (constant *2010 USD)*	5.953	6.543	8.595	9.973	12.597	14.581

Source: The World Bank (2016).

For countries such as Poland, the global environment was both a threat and an opportunity. For the business community, globalization, along with privatization, brought the challenge of hyper competition as well as the opportunity to join the emerging global value chains (GVCs). As Poland deepened its trade integration within the GVC, it step-by-step reduced the role of its domestic conditions for trade (natural resources, inexpensive labor, geography) and called for reallocating its human capital to more productive use.

Its European Union (EU) membership furthered its involvement in the global economy and facilitated the flow of foreign capital needed to modernize old industries and pave the way for new exports. With more workers involved in the competitive environment of the GVC, greater attention is being focused on the cost and value of labor. The more the business sector and individual companies become integrated by trade and capital links, the more the entire system becomes reliant on state-of-the-art HRM and TM as they directly impact the cost and value of labor today.

The Challenge of TM in Poland

Situated at the heart of Europe and currently considered one of the top outsourcing hubs in the world (Tholons, 2014), Poland is a prime example of a country whose economic future is intertwined with its ability to embrace and implement TM effectively. There are a number of factors that place Poland in a uniquely challenging situation with regards to its workforce. As a member of the European Union its borders are open, making its workforce extremely mobile with neighboring Germany offering wages that are up to four times higher than in Poland (Orenstein, 2014). Poland's workforce is also known for being well educated, knowledgeable and skilled (Zupan, Dziewanowska, & Pearce, 2017, p. 68). Unfortunately, Poland also faces a demographic decline as it has one of the lowest birth rates in Europe with the fertility rate set at 1.32 in 2015, while the EU average was 1.58 (Eurostat, 2015) If the fertility rate were to stay at this rate, combined with emigration, Poland's population would shrink by 13.5 percent by 2060 (Strzelecki & Sladkowska, 2016). Simultaneously, Poland has become one of the top outsourcing hubs in the world, which has made the demand for leadership talent, and more specifically international leadership talent, even greater. These combined factors of a highly educated and mobile workforce that is also shrinking while facing growing demand for leadership talent, makes effective talent management critical for Poland. However, the talent management landscape in Poland is especially challenging due to Poland's complex cultural, geopolitical and institutional features (Vaiman & Holden, 2011, p. 180). This significant importance of talent management in Poland, combined with its unique challenges in implementing effective TM, make Poland an interesting case.

The low labor wages in Poland are what drove Poland into becoming such a major hub for outsourcing and subcontracting in Europe. With wages that are approximately three to four times cheaper than in Poland's neighboring western countries along with its quality workforce, Poland has become one of the top outsourcing destinations in the world (Orenstein, 2014; Tholons, 2014). While this provides Poland with a great competitive advantage, the advantage is unfortunately short-term as wages are eventually bound to rise and will then be less attractive to investors. Therefore, in order for Poland to avoid falling into the 'middle-income trap', organizations must work to create strong leadership talent that can drive innovation and success that will make the Polish subsidiaries invaluable, even after wages rise. If Polish employees can become the top talent and highly skilled international managers that are so desperately sought after, taking on international assignments and leading virtual teams, then the current influx in FDI will have a long term positive effect on making Poland internationally competitive. Of course, to develop such talent, there needs to be effective talent management.

As of now, there has only been one comprehensive study on talent management specifically in Poland, conducted by Agnieszka Skuza, Hugh Scullion and Anthony McDonnell, published in 2013. Their study gathered data from 58 organizations across Poland in 2009

and 2010 and ultimately found that management practices in Poland are still far from converging with Western models and that talent management faces many challenges in Poland (Skuza, Scullion, & McDonnell, 2013). Poland began its transition to a free-market economy in 1989 after the fall of communism. However, it was an arduous, painful and unjust one for many and some even argue that Poland and the CEE region still have not completed the transition to a market economy when considering the management systems still present in this region (Vaiman & Holden, 2011, p.179). Prior to 1989, under communism, managers had to adopt a very bureaucratic and authoritarian management style. There was a lack of transparency so employees often had to blindly follow rules and regulations, and creativity, original thinking, innovation and taking initiative were not valued (Skuza, Scullion, & McDonnell, 2013, p. 456). Unfortunately, all of these behaviors are truly the exact opposite of what is sought after and expected of employees and managers today, especially when taking into consideration talent management.

The fall of communism brought freedom in the decision-making process and allowed managers to influence the direction of their organization's development. However, due to the harsh circumstances of those times, the skills necessary in a free-market economy, such as willingness to participate in changes, to engage in strategic thinking and long-term planning and to manage teams, were rare and often rejected among Polish managers (Skuza, Scullion, & McDonnell, 2013, p. 456). Unfortunately this behavior and mentality, shaped by Poland's history, still exist in parts of Polish society today, and most visibly in the workplace, making communication and management especially challenging and difficult to change (Skuza, Scullion, & McDonnell, 2013; Vaiman & Holden, 2011; Zupan, Dziewanowska, & Pearce, 2017). The idea of leadership in Poland is largely about 'exercise of power and little to do with delegation or coaching and team-building' (Vaiman & Holden, 2011, p. 182). As a result, the power differential between managers and employees is high and there is an absence of attention to soft-skills in management. Therefore, implementing western management concepts, such as talent management, is a significantly challenging task in Poland.

Another especially unique characteristic among Poles, which creates a significant challenge to talent management programs, is their aversion to the success of an individual. In the words of one of the low level managers surveyed by Skuza, Scullion and McDonnell, 'Poles try to diminish their own successes, because they are afraid of disapproval of others. People do not like those who are successful' (Skuza, Scullion, & McDonnell, 2013, p. 461). Naturally, this makes the process of identifying, engaging and developing top talent within the workplace, much more complicated, as it requires having to avoid such negative reactions and implications.

The findings from Skuza, Scullion and McDonnell's study show just how different the Polish context is for implementing talent management, and the necessity for talent management in Poland to take on more innovative, sensitive, and customized practices in order to be effective and to meet such an increasing demand for talent. Considering just how rapidly the world is changing, especially with the effects of globalization, the authors conducted a follow-up study of talent management in Poland to determine how much Poland has changed, or potentially even improved, in its approach to talent management since Skuza, Scullion and McDonnell's original study. The hypothesis being,

that while talent management continues to be uniquely challenging in the Polish context, the increase in foreign exposure and investment will have advanced the adoption of talent management among MNEs in Poland today.

MATERIAL AND METHODS

To determine the state of talent management in Poland today, an online survey was created using surveymonkey.com which was distributed to managers at MNEs throughout Poland. The survey was anonymous and consisted of 27 questions designed to assemble a comprehensive understanding of the extent to which TM is embraced among MNEs in Poland today, how effectively it is practiced and any challenges that may be inhibiting the effectiveness of TM. The survey data was collected in two phases. The initial survey in 2014 received forty-three responses from MNEs in Poland and was followed by three focused interviews in 2015 to better understand the statistical findings. However, in this first phase there was a serious under-representation of Polish-owned companies. Therefore, in an attempt to improve their representation, the second survey in 2016 targeted more predominantly Polish-owned MNEs thereby creating a more-balanced total respondent group on the ownership variable. This was considered essential to the planned analyses given Skuza *et al.'s* (2013) findings that Polish-owned MNEs approached TM differently. The analysis presented here is based upon the total respondent group, 83 companies; 43 from the Phase 1 data collection and 40 from Phase 2.

From the authors' perspective, the first step in improving talent management is for the organization to see it as having strategic importance. Absent that perception, there is no reason to allocate the resources needed to develop employees to improve their capacity to add value to the GVC thereby improving the organization's competitive advantage in the global market place. Using the survey data collected, we explored the differences between Polish MNEs ascribing 'high' strategic importance to TM versus those perceiving it as having 'low' strategic importance. The methods involved in our analysis are described here along with the results.

Defining the Comparison Groups

The survey instrument contained two items pertaining to the strategic importance ascribed to TM by the respondent company:

- Item 19. 'Talent management' focuses on `identifying top talent (the best employees) within a company and developing them. Have you observed a talent management strategy at your company? Yes ( ) No ( )
- Item 20. What role does talent management play in your company?
  - o 'Talent management' is part of the company's strategy.
  - o 'Talent management' has been discussed but there is not much focus on it.
  - o 'Talent management' has not been discussed directly.

To group our respondents for purposes of this analysis, we defined 'High' vs. 'Low' TM Importance as follows:

– **'High' TM importance:** A 'Yes' response to Item 19 plus a response indicating 'Talent management' is part of the company's strategy on Item 20.
– **'Low' TM importance:** A 'No' response to Item 19 plus a response to Item 20 indicating 'Discussed but not much focus on it' or 'not discussed directly'.

Using this method to define TM importance, we obtained the following comparison groups for our analysis of the survey data:

– 'High' TM importance: N = 31 companies.
– 'Low' TM importance: N = 22 companies.

The 30 responding companies with mixed responses to Items 19 and 20 were not included in the present analysis.

Use of Survey Items

Not all of the 32 survey items were relevant to our analysis and not all of the relevant items were amenable to statistical analyses designed to determine whether or not differences between the 'high' vs. 'low' TM importance groups of organizations were significant with Alpha set at the 0.05 level of confidence. The use of the survey items is described in Table 2.

Table 2. Use of Survey Items

General Purpose	Number Relevant to Present Study	Number Analyzed Statistically
Describe person responding to the survey:	8	4
- No differences between 'high' vs. 'low' respondent groups in terms of gender, age, position level, or number of subordinates - What nationality? Polish: 52/53 (98.1%)		
Describe the organization:	6	6
- Two items used to form 'High' vs. 'Low' TM Importance groups for analyses		
Describe HRM practices:	12	8
Other (N=4):	0	0

* Three narrative items could not be analyzed statistically. Example: 'What 3-5 words describe your company culture?'
** Others were not relevant to the present analyses. Example: 'Yes/No' response to: 'I understand that the responses to this survey are strictly confidential and...'
Source: own study.

As shown in Table 2, there were no meaningful differences among the persons responding to the survey thereby suggesting that the differences reported in our next section are not due to the responding individuals but rather to the companies themselves as classified for our comparison.

RESULTS AND DISCUSSION

Empirical Findings

The results are presented here in three ways: First, we review the survey items that differentiated the 'high' vs. 'low' TM importance respondents statistically at or beyond the 0.05

level of confidence. Next we explore items that had similar responses from both comparison groups; and finally we add to our analyses by presenting relevant interview data.

As shown in Table 3, six survey items, out of 14 statistical comparisons, differentiated the companies in the 'High' vs. 'Low' TM Importance comparison groups. Similar to the earlier findings by Skuza *et al*. (2013), Polish-owned and headquartered companies appeared more frequently in the 'low' TM importance group.

Table 3. Survey Variables Differentiating 'High' vs. 'Low' TM Importance Organizations

Survey Item	'High' Importance	'Low' Importance	Degrees of Freedom	Chi Square	p Value
	N = 31	N = 22			
Headquarters located in:					
- Poland	10 (32.3%)	14 (63.6%)	2	8.01	0.018
- Europe (not Poland)	14 (45.2%)	8 (36.4%)	–	–	–
- Overseas	7 (22.5%)	0 (0.00%)	–	–	–
Company ownership:					
- Fully controlled by foreign entities	18 (58.1%)	5 (22.7%)	2	10.21	0.006
- Partly controlled by foreign entities	9 (29.0%)	5 (22.7%)	–	–	–
- Solely a Polish company	4 (12.9%)	11 (50.0%)*	–	–	–
Organizational structure:					
- Hierarchical	22 (71.0%)	9 (41.0%)	1	4.79	0.029
- Flat	9 (29.0%)	13 (59.1%)	–	–	–
Typical career path:					
- Yes	18 (58.1%)	3 (13.6%)	1	10.62	0.001
- No	13 (41.9%)	19 (86.4%)	–	–	–
Leadership/management positions:					
- Most filled internally	27 (87.1%)	12 (54.5%)	1	4.96	0.026
- Most filled externally	4 (12.9%)	8 (36.4%)*	–	–	–
Development opportunities for employees:					
- Yes, formal/organized	24 (77.4%)	11 (50.0%)	2	13.28	0.001
- Yes, informal	7 (22.6%)	3 (13.6%)	–	–	–
- No	0 (0.0%)	8 (36.4%)	–	–	–

* Missing response(s)
Source: own study.

The next finding presents an interesting dilemma. Hierarchically-structured organizations were more prominent in the 'high' TM importance group with flat organizations disproportionately in the 'low' group. It is true that hierarchical structure needs more leaders and managers due to its top-down communication and command-and-control systems so developing talent to fit those positions makes sense. However, leadership development approaches often see flat organizations as the preferred environment for the experiences needed to develop such skills.

The last three differentiating variables in Table 3 have to do with specific HRM practices germane to talent management: Career paths, promotion from within, and providing formal/organized development opportunities. These three significant variables present a useful road map for companies that decide to pursue an active TM strategy.

Several survey items present useful information even though there were no significant differences between the 'High' vs. 'Low' TM Importance organizations:

- Both groups of organizations operated in similar business sectors. Only three organizations (6.8%) were in the agriculture sector. The other 50 respondent organizations in our analysis were in the services (36.4%) and manufacturing (27.3%) sectors or both (29.5%).
- Thirty-four of the responding organizations (64.2%) had 250 or more employees; only 6 (11.3%) had 49 or fewer. These larger organizations typically structure themselves in a more hierarchical manner.
- Forty-three of the responding organizations (81.1%) had their employees working in virtual teams connected with colleagues in distant locations by e-mail and/or telephone: Frequently (56.6%); sometimes (24.5%). Such teamwork is commonplace and essential in the global business environment.
- Forty-eight responding organizations (92.3%) reported experiencing 'challenges to hiring, developing, or retaining employees.' Clearly showing that the vast majority of MNEs in Poland continue to have TM and HRM issues to address.
- Thirty-seven responding organizations (69.8%) reported that it was 'challenging to find leadership talent within the company.'

Insights from the Follow-up Interviews

After analyzing the survey results and identifying specific trends, perceptions and practices, the first author met face-to-face with three different managers from multinational companies that had not participated in the survey. The companies involved in the interviews were from different industries and areas of Poland. The interviews focused on the three major research questions with the relevant inputs/findings summarized after each topic.

1. The extent to which talent management is embraced in Poland.
   - Each manager reported that her/his company recognized talent management as necessary and important.
   - All three managers emphasized that their talent management initiatives were driven from abroad but well received. One manager explained this push from abroad saying that foreign capital dictates the policies and structure of the company. Therefore, accepting foreign capital means accepting western policies and flatter or matrix organizational structure.
   - The demand for leadership talent in Poland continues to grow and talent management is seen as necessary to identify and develop such talent.
2. The effectiveness of talent management in Poland.
   - Talent management in Poland among MNEs is not an initiative actively sought out by Polish employees. Rather, it is viewed as a foreign directive dutifully followed and fulfilled.
   - There is an opportunity/need for talent management leadership in Poland to actually create practices and policies to embrace and exploit the unique characteristics of the Polish workforce.
   - The talent management initiatives regress when local leadership has the authority to over-ride the foreign directive. Although TM is now generally recognized as

a critical success factor among MNEs in Poland, it seems to require a strong directive from abroad to be successful.
- Ultimately, foreign directives for TM are not only well received but seem to maintain an international standard that helps circumnavigate some of the more restrictive Polish HRM habits.

3. Challenges that inhibit talent management in Poland.
   - Two of the three managers interviewed said a clash of western talent management practices with Polish habits was a problem. An example given was that promotions are still based on who you know more than on merit, potential or leadership skills.
   - Millenials pose a special challenge: They are eager for development opportunities, are easily frustrated when their expectations are not met, and as they lack loyalty to the company, they often seek employment opportunities elsewhere.
   - Competition for talented employees is strong. Large, bureaucratic MNEs lack the flexibility to respond quickly when a key employee gets an attractive job offer from a competitor.

Perhaps the key observation from the interviews is just how influential foreign management and directive is in the embracement of talent management in Poland.

DISCUSSION

The results from the survey and interview data suggest that talent management is rapidly gaining popularity among MNEs in Poland. While Skuza, Scullion and McDonnell's study (2013) found that talent management was being adopted with an 'ad hoc' approach in Poland, five years later it is already beginning to be recognized as a corporate strategy by more than half of respondents. What is not apparent, however, is an awareness of how talent management can best be practiced in Poland considering its unique workplace culture. Socially embedded behaviors and a Polish mentality connected to its soviet legacy continue to thwart the effectiveness of talent management in Poland, even today. Specifically, hierarchical communication channels, lack of initiative and skepticism continue to haunt the Polish workplace if it is not countered by a dominant foreign influence. Corresponding with the findings of Skuza, Scullion and McDonnell (2013), foreign-owned enterprises continue to be 'more equipped to effectively implement talent management systems' (Skuza, Scullion, & McDonnell, 2013, p. 464). However, with the drive and ambition of millennials entering the workforce today, training and development opportunities are already being perceived as much more valuable than in 2010, and as the older members of the workplace retire and the newer members replace them, the workplace in Poland becomes more and more ready for serious talent management initiatives. Analysis of the data and the following observations lead us to recommend a proactive, multifaceted strategy to improve TM in Poland. Each is discussed briefly here.

The Need for Improved TM/HRM Practices

The findings from the survey analyses and follow-up interviews suggest that MNEs in Poland continue to struggle to hire, develop, and retain the talented personnel needed to continue the high level of involvement in the GVC activities associated with long-term success in the global business environment. Globalization has been a godsend to Poland

as it emerged from the centrally-planned economics imposed upon it for decades and transformed its economy and workforce post-1990. Geographic location, skilled but inexpensive labor, and natural resources were leveraged to begin its transformation but play a diminishing role in its present and future status in the global market place. Foreign direct investment, major market reforms, a liberalization of foreign trade, and membership in the European Union gave Poland a business connectedness that quickly shifted its domestic economy to the global marketplace.

To continue its participation in the global market place, Poland needs personnel practices that insure an adequate supply of talented workers. But as Skuza, Scullion and McDonnell (2013) found five years earlier, there are historical and cultural factors at play that make these seemingly commonplace personnel practices difficult. While it appears as though MNEs are increasingly acknowledging the need to invest in talent management, MNEs have done so more in compliance with foreign investors than in terms of motivated self-interest. In fact, a significantly larger percentage of Polish-owned MNEs seem to discount the importance of TM and the HRM practices that support it. Yet they too report staffing difficulties and a scarcity of leadership talent within their companies.

The Need for a Polish Approach to Talent Management

The mostly compliance behavior of foreign-owned MNEs in Poland to talent management and the continued passive resistance to TM by a substantial proportion of Polish-owned MNEs present a causal mystery. Skuza *et al.* (2013) attributed much of this compliance and resistance behavior to Polish culture and the lingering effects of recent Communist control. The complex cause(s) will likely never be known, but we do know that a Polish approach to TM would be preferable to the current situation. 'Preferable vs. possible?' may be the relevant question.

Let's start by looking at the values said to underpin the USA approach to strategic human resource management:

> …US/American HRM features are at least partly rooted in a unique combination of cultural values, including strong individualism, self-assertiveness, a strong achievement orientation, low power distance, and a high acceptance of openly discussed different interests between various actors (Festing, 2012, p. 40).

This seems to be quite different from Polish workplace culture as described by Skuza *et al*. (2013) and could very well be a cause of some of the resistance behaviour.

Can economic entities doing business in the global marketplace develop their own culture-specific strategic HRM practices? 'Yes', and Germany is offered as an example: Germany has developed 'a distinct German SHRM model in a European context' with the following underlying key features: 'Long-termism, management-employee cooperation, and developmental orientation' (Festing, 2012, p. 49). Among its typical HRM practices are two closely related to talent management:

- Intensive training with emphasis on general qualification.
- Sophisticated long-term career planning with focus on internal labor market, job security.

This distinctive German model is explained per Festing's research stating that 'long-termism' results from the German perspective that labor is a more fixed factor of produc-

tion and worthy of investment: 'In summary, German companies are characterized by extensive staff development and long-term career planning, and include technical competence and functional expertise as core values.' (2012, p. 45).

Returning to our question re. 'Preferable vs. Possible?': As we see it, developing a Polish culture SHRM model and talent management approach is a research challenge worthy of support by the business, educational, and government communities.

An Optimistic View of the TM in Poland in the Future

The older members of Poland's workforce, including those in management positions secondary to the tendency to use seniority as a basis for promotion, are the ones most likely to bear any residual scars from the communist past. This cadre of aging workers is retiring and being replaced by a younger workforce born after the reforms of 1990. These younger workers were described in our interview data as eager for development opportunities. They are likely to be quite different from the workers Skuza *et al*. (2013) described as success aversive: 'Poles try to diminish their own successes, because they are afraid of disapproval of others. People do not like those who are successful' (Skuza, Scullion, & McDonnell, 2013, p. 461). These success aversive workers are also likely among the ones who saw training as having low value, the development of skills as a waste of time, and new skills and knowledge as rarely of use in the workplace. These perceptions are clearly different from those of the young workers waiting to replace Poland's senior employees.

CONCLUSIONS AND PROACTIVE RECOMMENDATIONS FOR CHANGE

As indicated earlier, the government of Poland implemented substantive market reforms in the 1990s facilitating foreign direct investment that led to the rapid globalization of its industries. It is a responsibility of the government to continue refining its policies and leveraging its resources and political capital to advance the success of its MNEs, foreign-owned and domestic. And as indicated earlier, the younger individuals entering the workforce in Poland are seeking opportunities to learn and advance. So we will conclude this paper by focusing on the responsibility of the MNEs in Poland to improve their TM/HRM practices to help ensure a system that meets shareholder needs in the future.

We conclude this paper by recommending that MNEs in Poland get ahead of the competition by following the advice of Edmondson (2008) and others to become learning organizations: 'Today's central managerial challenge is to inspire and enable knowledge workers to solve, day in and day out, problems that cannot be anticipated' (p. 60). Learning organizations, not only improve competitive advantage through action learning, they do so by continually growing their human resources. Talent management becomes the essential strategy that keeps the learning organization in the 'constant state of readiness' needed to succeed (Rowden, 2001). Therefore, adjusting Talent Management practices in Poland so that they resonate and adapt to the unique characteristics of the country's culture and workplace mentality can provide MNEs with a competitive advantage, keeping Poland active in the global economy and creating global leadership talent.

Advancing talent management while acquiring knowledge that can be leveraged for competitive advantage is admittedly an ideal approach, but one that MNEs in Poland serious about the future should consider.

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The Types of Trust in the Development Process of the International Business Relationships: An Exploratory Study among Polish Companies

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ABSTRACT

Objective: To explore in a pilot study which types of trust may be particularly important at different stages of the development of international business relationships.

Research Design & Methods: The article presents results of qualitative research in the form of 27 interviews with representatives of top management of companies located in Poland and operating in foreign markets.

Findings: Based on the interviews, the authors identified three stages of international relationship development, which are important in the context of trust. The article suggests which types of trust that exist in business relationships are the most important at the identified stages and should be developed by a trustee. It also stresses the sources of trust from a trustor angle.

Implications & Recommendations: The article presents implications for companies trying to build trust in relationships with foreign counterparts. It stresses the types of trust which should be of a special interest at various stages of the relationship development, as well as gives some hints as to possible trust-building actions.

Contribution & Value Added: First of all, the research concentrates on the development of the international business relationships, which are proven to have a considerable impact on company's success in foreign markets, yet are more difficult to study and identify compared to domestic relationships. Secondly, it brings attention to specific types of trust which should be built at various stages of the international relationship development, if they should bring the expected results.

Article type:	research paper
Keywords:	trust; business relationships; international cooperation; relationship development
JEL codes:	D21, D22, D90, F 23, L20

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INTRODUCTION

At present, business relationships constitute an important research area in management sciences. Researchers point to numerous benefits gained by entities that develop close relationships forming extensive business networks (Wilkinson, 2008). In the context of company' internationalisation, it is assumed today that the development and maintenance of business relationships are essential for success in overseas markets (Hohenthal, Johanson, & Johanson, 2014; Fonfara, 2012). Business relationships contribute to the transfer of knowledge about the internationalisation process and overseas markets, as well as customer needs and wants (Jahanson & Vahlne, 2009; Soniewicki, 2015), they shape companies' behaviour and actions in the internationalisation process (Coviello & Munro, 1995; Ratajczak-Mrozek, Dymitrowski, & Małys, 2012), often initiating the internationalisation process (Deszczyński, Fonfara, & Dymitrowski, 2017). They facilitate access to resources essential for successful foreign market entry (Dunning, 2015; Blankenburg, 1995) and also limit the risk of failure in international new ventures (Capik & Brockerhoff, 2017). They also seem to influence the speed of innovations implemented in the internationalisation process (Dymitrowski, 2014).

Business relationships are a complex, second-order construct, composed of various characteristics (Hausmann, 2001). It is, therefore, suggested by many scholars that they should be analysed from the angle of selected positive phenomena – relational characteristics – caused by contacts between entities. One of the most important and most frequently applied characteristics is trust (see Morgan & Hunt, 1994; Weitz & Bradford, 1999; Sivadas & Dryer, 2000; Kale, Singh, & Perlmutter, 2000; Dyer & Chu, 2011). It seems that trust has a key impact on the quality of relationships that link independent entities, especially if we take into account the impact of trust on other characteristics of business relationships (e.g. the level of commitment to the maintenance and further development of existing business relationships). Yet, to our best knowledge, it is not sufficiently researched in the international context.

The article focuses on the importance of various types of trust occurring in international business relationships at different stages of their development. Building trust in relationships brings benefits to companies, but also generates specific costs and risks, and engages the company's resources (Håkansson & Ford, 2002, pp. 134-140). Effective activity on foreign markets requires focusing on necessary actions and omitting unnecessary ones. In the context of trust, this means focusing on the development of appropriate types of trust at different stages of their development. To our best knowledge, this issue has not got enough attention in research. Taking this into account, the aim of the study was to explore in a pilot study which types of trust may be particularly important at different stages of the development of international business relationships. To achieve the aim, the qualitative research was conducted in the form of 27 interviews with respondents from companies representing different industries, size and experience in international business. Such a sample allows to draw some conclusions which should be further investigated, as indicated in the article.

The structure of this article is as follows. In the theoretical background, the concept of business relationships is described, highlighting their various forms and intensity, as well

as entities that may be part of them. The most known models of the development of relationships are also presented. Trust as a key characteristic of business relationships is defined and its different types and sources are discussed. In the following part of the article the goal, scope and method of empirical studies are described. They concentrate on the identification of different stages of the development of international business relationships and their links with specific types of trust. The next part presents results of 27 interviews with top managers of companies located in Poland and operating in foreign markets. The results are presented after careful analysis.

LITERATURE REVIEW

The Nature of Business Relationships

Business relationships have been an object of intensive studies for many years (Håkansson, 1982; Håkansson & Snehota, 1995). The spectrum of possible forms of cooperation extends from single contacts to close cooperation, often adopting the form of strategic alliances (Hutt & Speh, 1998; Gőssling, Oerlemans, & Jansen, 2007). It is therefore particularly important to clarify what business relationships are. It also seems important to indicate what types of entities establish business relationships.

The literature distinguishes between interactions "business interaction"(episodes "business episode", "*See* business interaction", events "business event", "*See* business interaction" in business and business relationships (Håkansson, Ford, Gade, Snehota, & Waluszewski, 2009) "business relationship". The term 'interaction "business interaction"' refers to a single event or action undertaken by entities at a given time and place. It can involve a single transaction, negotiating terms of business, sending a quotation, etc. In contrast, a business relationship "business relationship" existing between two entities is a general, continuous phenomenon, by its very nature extending over a longer period. Relationships develop through interactions "business interaction" between entities, but they also affect interactions "business interaction" by determining roles of partners and ways of resolving conflicts, etc. (Easton, 1992, p. 4). The concepts correspond with transaction-based and relationship-based approach to exchange. In the first one, the focus of the company is on a unified product offered for a mass market. The sales take form of interactions and the marketing activities are concentrated on marketing mix, with the price being often the most important factor for the buyer. In the second one, i.e. the relationship-based approach, long-term relationships are established between companies, which typically include, beside exchange of the products (which are often co-created), technological cooperation, information and knowledge sharing, etc. (Håkansson & Snehota, 2017). The exchange often takes form of close partnerships (Fonfara, 2014).

Interaction can be the beginning of the process of developing long-term relationships. In the case of unfavourable results of interaction (or greater benefits from other, alternative interactions), however, it may not lead to further contacts (see Lambe, Wittmann, & Spekman, 2001). Thus, the relationship development process would be terminated.

For the purpose of the article it is also important to distinguish business relationships, social relationships (interpersonal relationships, informal contacts) and institutional relationships. Business relationships are among the most commonly analysed con-

nections between companies and other entities in the business environment (e.g. Hollensen, 2003, pp. 197-254; Golicic, 2007, pp. 719-739; Barry, Dion, & Johnson, 2008, pp. 114-135). In the analysis of business relationships emphasis is placed on links between customers and suppliers. Unlike business relationships, social relationships refer to connections developed between individual employees of companies involved in a business exchange. Institutional relationships connect companies with institutions other than their customers and suppliers. Two groups of such entities can be distinguished. The first one includes profit-driven actors, other than customers and suppliers, e.g. banks or consulting firms. The other group includes non-profit actors, such as, authorities, business associations, commerce chambers, etc. (Johanson & Kao, 2010).

In the presented article we concentrate on the most important entities in the international network and that is why business relationships are considered as any ties that exist between the supplier and the buyer. It is assumed that relationships may be strengthened (which includes trust-building) and by that may lead to the improvement of performance. The strengthening of relationships takes place as part of their development process.

Business Relationships Development Process

The literature identifies two sets of models describing the development of business relationships: linear models, based on the assumption that relationships go through particular stages, and nonlinear ones, which take into account their continuous development, disruptions and adaptations. The most frequently cited studies (see Wilkinson 2008, p. 96) on relationship development discussed from a linear perspective are publications by Ford (1980) and Dwyer, Schurr and Oh (1987). Both models describe the development of bilateral relationships between the seller and the buyer, and are similar in their underlying assumptions.

The authors of the models (Ford, 1980; Dwyer *et al*., 1987) assume that the starting point for a business relationship is to identify the other party as a potential cooperation partner. At this stage, the parties have no prior experience of mutual business. They may, however, be the subject of unilateral efforts aimed at creating an interest in the possibility of cooperation. This type of efforts may be targeted at a particular company (e.g., a potential supplier sending an offer) or may involve building an image of the company (in this case, the efforts are targeted at anonymous customers). It is indirectly suggested, therefore, that entities are active before the actual contact is established.

The next stage of relationship development involves negotiating contract terms and cooperation methods. At this point, it is possible to conclude a trial transaction. Further cooperation can be facilitated by common beliefs, shared values, complementary resources and skills, the status of a potential partner, etc.

Another stage in the development of a relationship is cooperation development. At this stage, the benefits gained encourage entities to open more to each other. In the phase of cooperation development, it is important to meet the commitments made in order to benefit the other side of the transaction, which in turn increases its satisfaction with the relationship.

The successive phases display the benefits and potential risks of long-term cooperation. Long-term cooperation helps trade partners to gain considerable experience in their cooperation, which enables them to develop trust, standards of conduct and relationship rules.

The following, more contemporary research on the relationship development process identified similar stages, even in specific contexts (e.g. Brouthers, Brouthers, & Harris, 1997; Das & Teng, 2002) or took specific relational characteristic, like trust, into consideration (Schilke & Cook, 2013).

However, business relationships do not have to evolve in stages, with steadily growing commitment, scope of cooperation and relational characteristics. Cooperation may be periodically restricted or even discontinued. It is stressed that cooperation should be continuously adapted and periodically revised, particularly in the case of mature relationships, which is reflected in non-linear concepts on relationship development (Wilkinson, 2008). The existing relational structure (which includes actors, resources, activities and bonds) constantly changes and evolves in the relationship process. The relationship process is affected not only by the analysed relationship, but also by relationships with other entities. The research suggest that trust may also evolve in a non-linear manner in business relationships (Huang & Wilkinson, 2013).

The research on business relationship development does not cover, to our best knowledge, the issue of specifics of the process in the international context enough. However, some scholars (see Johanson & Vahlne, 2009) assume that it is not very different from the domestic relationship development.

Trust in Business Relationships

The analysis of trust in business relationships requires identifying the types, sources and sides of the relationship, from a perspective of which the trust is analysed. Following Morgan and Hunt (1994), in the research trust was defined as 'willingness to rely on exchange partner in whom one has confidence'.

Two types of trust are identified in the context of business relationships. One is trust in the partner's reliability. It is interpreted as the conviction that the other party can satisfactorily fulfil the terms of a mutual agreement (deliver a product of an expected quality, on an agreed date, etc.). It is, therefore, about achieving the expected, positive results of cooperation (Anderson & Narus, 1990, p. 45; Morgan & Hunt 1994, p. 23; Hausman, 2001, pp. 600-616).

The other type is trust in the partner's benevolence or integrity (Morgan & Hunt, 1994; Małys, 2013). The definition emphasises one party's determination to conduct honest business activities and to avoid opportunistic behaviours that might have negative effects on the relationship. At the same time, the definitions stress the other party's certainty that its relationship partner will behave in such a way. This dimension of trust in benevolence is linked to the belief that a partner will not put at risk an existing relationship in order to gain short-term, opportunistic benefits. This is particularly important given the uncertainty that accompanies any transaction. Even the most detailed contract cannot predict all possible situations. In this perspective, trust in benevolence means the conviction that unexpected situations will be resolved in a way that guarantees a satisfactory outcome for both parties (Håkansson & Gadde, 2002, pp. 59-77).

The sources of trust may have contractual, cognitive and affective nature (Johnson & Grayson, 2005). Trust at the contractual level results from institutional relationships. Additionally, it has a broader political, legal, organisational, social and cultural context in which a company is embedded and which may have a significant impact on the way entities operate. Cognitive trust is based on rational assessment of the other party. It may be based on

past experiences, reputation or rational calculations. Affective trust refers most closely to emotions and a conviction about the partner's goodwill (Huang & Wilkinson, 2013).

In each business relationship one company can be analysed as a trustor, i.e. the entity which holds certain expectations and may decide to trust or not to the other side. The other company is viewed as a trustee, i.e. the party which reliability and benevolence is assessed by the trustor (Schilke & Cook 2013).

Building a sufficient level of trust (in both reliability and benevolence) in international business relationships is more difficult than in the case of relationships found in the local market. It is more difficult to assess a foreign partner's reliability, especially if the partner does not enjoy an established international reputation. Additionally, a starting point for international relationships is often distrust or reserve towards foreign entities, particularly those based in less developed markets. For this reason, companies that want to build trust in their own reliability should take carefully thought-out steps in this direction.

It also seems that trust in benevolence is more difficult to build, especially in the early stages of business relationship development. This is due to an increased suspicion against foreign entities, which is often aggravated by communication problems resulting from cultural differences. The issue of the importance of different types of trust at various stages of the development of international business relationships, to our best knowledge, has not got enough attention in the literature.

MATERIAL AND METHODS

The aim of the research was to explore in a pilot study which types of trust may be particularly important at different stages of the development of international business relationships. In the research it was assumed that the development of relationships with entities on foreign markets takes place within specific phases, however, these phases have not been predetermined. Both the number of phases and their character were identified during the empirical study. Similarly, the types of trust discussed in the previous section were not presented to the respondents. The intention of the researchers was to infer various types of trust as a result of the interpretation of the answers provided.

The qualitative research was carried out in the form of in-depth standardised interviews (Easterby-Smith & Lyles, 2011). The interviews were conducted with a group of 27 companies based in Poland and doing business abroad, representing different industries (including, for example, production of utility meters, audio equipment, operating room equipment & furnishing, agricultural machinery, software development, food and beverages, logistics, business services, pharmaceuticals, automotive), size (small, medium and large) and experience in the international business reflected by time advancement of the internationalisation process (the most experienced company started international expansion in 1983, the least experienced – in 2014). The respondents were representatives of top management in charge of international expansion. Such a sample allows to draw some conclusions. They should be, however, further investigated, especially in quantitative research and/or in research with more uniform sample selection.

The questions asked during the interviews were aimed at discussing the impact of trust and actions taken (or not) to build trust in business relationships, on the successful development of the international business relationships. It was the researchers' intention

to achieve the goal of the research as a result of an in-depth analysis of the answers received. It was deliberately decided not to put forward any research hypotheses.

Prior to the survey, potential respondents were contacted by telephone or e-mail to explain the aims and scope of the study. This was done to persuade them to take part in the interviews, as well as to prepare and collect all the necessary information. In the interview, the company's operations on one selected foreign market were discussed. The market was selected each time before the meeting as a result of the analysis of the company's foreign operations, telephone conversations or e-mail exchanges with the respondent.

The interviews were conducted personally between April and October 2016. They were recorded with the respondents' consent. Transcripts of the recordings were also prepared.

The standardised interview form contained open-ended questions, making it possible to explore and clarify the issues covered by the study. In the first place, respondents were asked to discuss the process of expansion for a selected foreign market. In particular, the questions concerned the mode of entry (and their changes in time), motives for entering the foreign market, the manner of making decisions regarding the entry (formal or spontaneous decision-making) and the use of previous experience and knowledge in the field of internationalisation. Next, the respondents were asked to indicate the entities with which they cooperated during the process of entering and developing the activity on the foreign market.

The last group of questions concerned strictly trust in business relationships with the identified entities on foreign markets. Researchers intentionally did not specify possible types of trust in business relationships. Instead, general questions were asked about the nature of trust with individual entities, the level of trust (high or low) and its changes over time, as well as the impact of trust on the successful development of the international business relationships. The interview form is presented in the appendix of the article.

RESULTS AND DISCUSSION

In the process of data analysis (transcripts of the recordings) the respondents' answers were divided into three groups. The respondents discussed:

1. The significance of trust in the respondent's company in overseas markets (discussed as part of 20 interviews), which corresponds to the trustee perspective.
2. The significance of trust in the selection of foreign partners of the respondent's company (discussed as part of three interviews), which corresponds to the trustor perspective.
3. Other considerations of trust in international business (discussed as part of 11 interviews).

Based on the answers the researchers were able to draw conclusions on stages of the development of international relationships, important from trust viewpoint, the nature of the stages identified (linear or non-linear development of relationships), as well as the importance of different types of trust at each stage and their impact on the company's success in overseas markets.

The largest group of respondents (20) described the issues of trust in international business relationships from a trustee perspective, i.e. commented on the types, importance and development of foreign entities' trust in their company. Based on their answers, the researchers were able to identify three stages of the international business relationship development from trust viewpoint: Stage 1 – before establishing cooperation;

Stage 2 – initial cooperation; and Stage 3 – continuation of cooperation. Not all the respondents commented on each of the stages; three of them only reached Stage 2 – initial cooperation in the relationships discussed. They also used different terms to describe the stages. However, taking all the interview data into consideration, it seems that respondents agree to the existence of the three identified stages.

At the same time, the respondents' answers suggested that the first two stages are normally characterised by gradual development of the business relationship and trust as its characteristic. In these stages, the development of trust is linear and characterised by continuous and gradual growth. The stage of continuation of cooperation takes the form of continuous adaptation processes, and the relationship may be disrupted by various incidents.

As already mentioned, not all the respondents commented on each of the stages of relationship development. The largest group of respondents (11) presented their views on trust in Stage 1, even prior to the establishment of a business relationship (in the respondents' interpretation, before the entities establish bilateral communication). With regard to this stage, the respondents pointed to the relatively greatest importance of trust for achieving success in overseas markets. All respondents expressed similar opinions, emphasising that building an adequate level of trust before establishing a relationship is a sine qua non for starting bilateral interactions in which both parties are active. The lack of a minimum level of trust makes it impossible to establish a relationship and, consequently, to enter an overseas market.

Developing trust in Stage 1 – before establishing cooperation – consists in creating an image of a reliable firm for an anonymous market, which is expected to produce positive results in the case of establishing relationships with a particular potential partner. Some respondents pointed to specific trust developing activities at this stage. Most often (in eight cases), they indicated references and/or a demonstration of cooperation with significant entities in overseas markets. One company emphasised the importance of international certificates. A respondent from a medical equipment company emphasised that his company had an extensive process of developing trust in reliability, a process that includes employees' active participation in international conferences, demonstration operating rooms presented in many key overseas markets, and a training operating room to which doctors are invited from all over the world.

Respondents' opinions suggest that in Stage 1 – before establishing cooperation – the only thing that is important is to develop trust in the company's reliability. As one of the respondents emphasised, the level of trust resulting from activities performed before the establishment of cooperation is usually low and needs to be deepened through direct contact.

The subject of trust in business relationships in Stage 2 – initial cooperation – was tackled by seven respondents. In their opinion, this stage involves negotiating and agreeing commercial terms, as well as making the first deliveries. Five respondents indicated that at this stage it is important to increase trust by allaying the other party's fears. It seems crucial, therefore, to develop trust in benevolence.

The remaining two respondents focused on the benefits of trust developing as the first deliveries are being made. The respondents pointed to reduced business formalities and lower additional costs resulting from an increased level of trust.

Respondents pointed to two types of activity undertaken during Stage 2 – initial cooperation – to raise the level of trust. The first one, formal in nature, involves internal

audits conducted by representatives of the other party or by independent organisations (sometimes by business intelligence agencies). The other type of activity consists of in-depth and open communication at various organisational levels. In each case, the scope and frequency of communication depend on the situation the entities are in.

Nine respondents presented their views on the importance of trust in long-term relationships characterised by continuous cooperation (Stage 3). Opinions on the importance of trust at this stage varied most. It seems that this is due to the respondents' different experiences (various events they had experienced that disrupted relationships) and to different approaches to international exchange – transactional or relational. Three respondents observed that reducing or losing trust in Stage 3 – continuation of cooperation – had resulted in a reduced or terminated business relationship with a foreign partner. Another respondent pointed out that an increase in trust at this stage had led to an increase in orders from foreign buyers. One of the respondents simply stated that in 'long-term relationships trust is the basis of business'. According to this group of respondents, trust is a crucial element of long-term relationships.

Two respondents were of a different opinion in this regard. According to their answers, in Stage 3 – continuation of cooperation – trust plays only a supporting role, whereas the main part in maintaining the relationship is played by the product offer and price level. Regardless of the level of trust in a business relationship, a competitor may end it by offering a better deal. These respondents seem to represent companies, which are characterised by a transactional approach to exchange.

With regard to Stage 3 – continuation of cooperation – two other respondents made comments of special significance in the context of international business. They highlighted the paramount importance of trust in Stage 3 – continuation of cooperation – in two overseas markets: Saudi Arabia in the case of one respondent and China in the case of the other. The respondents emphasised that the high level of trust developed with partners in those markets prevents the relationships from being disrupted by competing companies. In those markets, trust is a factor that not only promotes business but also guarantees uninterrupted orders. Nevertheless, the respondents pointed to the long time needed to develop trust in those markets (e.g., first orders from the Saudi market came several years after the relationship was established).

The importance of trust in the selection of foreign partners was addressed by three respondents. Their views are convergent with those given above. However, they are presented from the viewpoint of the other end of the relationship, that is from the trustor perspective (i.e. a company that assesses the extent to which it can trust its potential partners). Respondents pointed to similar stages in the development of business relationships, although they identified only the first two of those listed above (none of the three respondents referred to Stage 3 – continuation of cooperation). Respondents indicated that establishing a relationship with a potential partner is usually preceded by an analysis of references or a recommendation from another entity. They also emphasised that in Stage 2 – initial cooperation – they evaluate partners using a list of their own criteria. As part of interaction and in-depth communication, they try to verify the extent to which the partner meets the criteria. One of the respondents additionally admitted using business intelligence services to verify the credibility of potential business partners in Stage 1 – before establishing cooperation.

Nine respondents made additional comments on trust in business relationships without referring to the stages identified. One of them pointed to the significance of experience in international business for trust development in particular markets, emphasising that it is much easier for companies with experience in international business to build initial trust in successive overseas markets. This is particularly evident if a company has experience of operating in highly competitive, developed markets. Three other respondents emphasised the great importance of trust developed as part of internal, international organisational structures. In this context, they stressed the considerable significance of developing trust in a foreign branch at the headquarters of an international concern. Five remaining respondents made additional comments, which are, in a sense, a cross-section of those presented above. One of the respondents declared that trust is crucial in business, another that it is only of secondary importance. Two respondents pointed out that their business had been adversely affected by the lack of trust in their companies. On the other hand, another respondent indicated that he had achieved success in the Israeli market despite a notable lack of trust in his company.

Selected features of the identified three stages of the international business relationship development from trust viewpoint are presented in Table 1. According to respondents' opinions, a special role is played by Stage 1 – before establishing cooperation – and the parties' first interaction. It is extremely important at this stage for a trustee to achieve a certain level of trust in reliability, thanks to which the company will be seen as a potential business partner. Trust development consists in creating an image of a credible, reliable company, and can be treated as an intangible asset allowing it to establish relationships in overseas markets. The trust developed at this stage does not guarantee that cooperation with foreign entities will be established. It only helps to initiate interactions that may ultimately lead to business transactions.

In Stage 2 – initial cooperation – the entities – potential cooperation partners – contact each other directly. At this stage, it is important for a trustee to develop trust in its benevolence and business honesty. Entities should concentrate on developing an image of a company that seeks to achieve mutual benefit and avoids engaging in opportunistic behaviour. At this stage, especially important may be the establishment of personal relationships between representatives of particular entities. It is also crucial to ease the concerns accompanying the development of international cooperation. Whereas in Stage 1 – before establishing cooperation – potential trustees may aspire to belong to a wider group of potential, reliable business partners, in Stage 2 they should focus on proving that they are the best possible partners in a relationship. This may require that they develop other business relationship characteristics besides trust, in particular their commitment to the business relationship.

In Stage 3 – continuation of cooperation – business relationships have their own history. Trust in reliability and benevolence is usually at a level that is sufficient for further cooperation. It is crucial, therefore, to maintain this level by avoiding actions that could lower it. According to respondents' opinions, however, a high level of trust does not guarantee that cooperation will be continued. The relationship may be disrupted by competitors' actions if they manage to reach a sufficient level of trust in their reliability and to offer a competitive deal. The exceptions here are unique markets (China and Saudi Arabia were such markets in the present study) where a high level of trust prevents business

partners from interacting with competing companies. It seems, therefore, that trust-related actions taken by entities in Stage 3 – continuation of cooperation – should be preceded by a cultural analysis of the target expansion market. Additionally, in some industries or specific situations the exchange may be based on the relationship approach. In such cases the trust may play a similar role and should be continuously developed.

Table 1. Stages of the international business relationship development from trust viewpoint

Feature	Stage I – before establishing cooperation	Stage II – initial cooperation	Stage III – continuation of cooperation
Character of the development of relationship	Linear development of relationships and trust		Nonlinear changes and adjustments in relationships and trust
Type of trust a trustee should focus on	Focus on developing trust in reliability	Focus on developing trust in benevolence	Similar focus on developing trust in reliability and benevolence
Importance of trust	Existing trust helps to perform first interactions	Existing trust helps to allay potential partners' (trustor's) concern over cooperation	Importance dependent on the market: as a support or as a key element of business activity
Trustee's objectives	Achieving a minimum level of trust, which helps to develop an image of a reliable company in a given industry and/or overseas market	Developing a particular partner's trust indicative of business honesty, and relationship partners adequately adapting to each other	Maintaining a high level of trust (its loss may lead to business problems). A gradual increase in trust in selected markets.

Source: own study.

CONCLUSIONS

On the basis of qualitative research in the form of in-depth, standardised interviews, the three stages of the development of business relationships in overseas markets were identified. It was indicated which of the types of trust (in reliability or in benevolence) were particularly important and should be the object of trustees' interest at each stage.

The research allows to lists some of the activities that make the development of these types of trust possible (the potential spectrum of these activities, however, seems to be much wider than identified as a result of the study). The identified trust-building activities identified include for each stage:

1. Stage 1 – before establishing cooperation:
   - collecting references (in particular from overseas markets),
   - receiving recommendations from existing partners,
   - getting certificates,
   - taking industry-specific action (e.g., participating in trade fairs, conferences and product demonstrations).
2. Stage 2 – initial cooperation:
   - communication at various organisational levels,

– formalised audits and inspections.

3. Stage 3 – continuation of cooperation:
   – reliable and honest business activity.

Based on the research it was also possible to determine the sources of trust at each stage from a trustor perspective (Table 2).

In Stage 1 – before establishing cooperation – the sources of trust from a trustor perspective are cognitive- and contractual-based. Cognitive trust stems from trustee international reputation (which is typically restricted to well-known multinationals) or from deliberate actions taken by a potential trustee. Contractual trust, if exists, is enjoyed by companies located in countries with well-known and positive economic, legal, social and cultural reputation.

In Stage 2 – initial cooperation – the trustor's sources of cognitive trust, except for possible first deliveries may stem from formal audits which were mentioned by several respondents. The most important source of trust at this stage is, however, affective-based and is built in communication between the parties.

In Stage 3 – continuation of cooperation – sources of trust are mainly cognitive and are result of history of cooperation. However, in some markets, as indicated previously, the affective-based trust may be of special importance.

Table 2. Sources of trust from a trustor perspective

Feature	Stage I – before establishing cooperation	Stage II – initial cooperation	Stage III – continuation of cooperation
Sources of trust from a trustor perspective	Cognitive trust (company reputation and actions) and contractual trust (political, legal, organisational, social and cultural context).	Affective trust (in negotiation) and cognitive trust (first deliveries and/or formal audits)	Mainly cognitive trust. Affective trust important in specific markets and/or industries

Source: own study.

This article also stresses the need for a cultural analysis of the target expansion market with a view to determining the importance of trust in Stage 3 – continuation of cooperation. It may be also interesting to include 'country of origin effect' on trust-building activities.

The analysis has some limitations. First of all, the results presented here do not take into account companies' attitude to building business relationships, that is their preferred approach to exchange: a transactional or a relational one. It can be assumed that companies using a relational approach may find trust to be more important in Stage 3 – continuation of cooperation. A similar influence may be exerted by business practices found in the industry, which often take the form of institutionalisation, interpreted as using routine ways of cooperation. It may also be influenced by the types of entities with which the ties are developed.

Additionally, it seems that the significance of trust in Stage 3 – continuation of cooperation – requires some further in-depth research. Of special importance is the impact of cultural differences on the significance of various types of trust for the success of international transactions in the long run.

As an exploratory, qualitative research, the presented results should be verified in a quantitative research. Also, the sample of the research was not uniform. Obviously, more

rigid sample selection (e.g. similar size of companies, experience in international business, same industry) could bring some additional results.

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Appendix A: The interview form

I. Questions about the company.
   1. Please discuss the basic characteristics of the company (size, industry, products, etc.).
   2. Please discuss the history of your company's international sion (When did the foreign expansion process start? Which markets did the company enter and in what order? What modes of entry were used?)

II. Questions about expansion into one selected market – general questions.

Please describe the company expansion process for one specific foreign market that took place in the last 5 years.

   1. How did the process develop? What were the key events in the process? What form of expansion was used (indirect/direct export, sale of franchise/license, FDI)? What problems appeared?
   2. What were the motives for entering this market?
   3. How were the decisions made (spontaneous process or formalised/written strategy)?
   4. Did experience in operations on other foreign markets help (to what extent) in the process of entering a given foreign market?
   5. Was this expansion process successful? How did you define this success? How has this translated into the overall competitive advantage of the company?
   6. How did the company's activity develop on this market?
   7. Please indicate to what extent the process discussed was different from other market entries? Was it unique in any respect?

III. Questions about expansion into one selected market – detailed questions about entities.

With regard to the discussed process of expansion for one selected market, please indicate the entities that were particularly important for its course and success.

   1. What entities were involved at the stage of initiating and planning entry into a given foreign market? Who did you (or other employees of the company) cooperate with at that stage (internal entities – e.g. other employees of the company, board of directors, employees of other branches; external entities – e.g. clients, suppliers, competitors)? What did that cooperation involve? Was the cooperation significant for the success of the expansion into a given market? Did external entities have any influence on the initiation of the company's entry into a given foreign market?
   2. What entities were involved at the entry stage and operational stage after entering a given foreign market? Who did you (or other employees of the company) cooperate with at that stage? What did this cooperation involve? Was the cooperation significant for the success of expansion into a given market? With what entities was the cooperation at that stage limited (compared to the previous one), and with which was it developed? Why?
   3. Did previous experience in foreign activities help in the selection of external entities in the entry process and its planning for this particular market?
   4. Was the choice of the entry mode into this particular foreign market associated with the pursuit of developing optimal relations with external entities (the possibility of establishing closer contacts, durability of contacts with external entities, etc.)?

IV. Questions about expansion into one selected market – detailed questions about trust.

Returning to the entities listed in section III; please describe each of these relationships in terms of the importance of trust for the partner during the process:

   1. How high / low was the level of trust in a particular partner? How did it change? Did the level of trust in this particular relationship influence the success/failure in a given market? Why?
   2. What was the level of trust to the entites in your company? Did it change over time? Did you take any steps to develop the level of trust? How important was it for the company success in the market? Why?

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Towards a Collective-Values Framework of Ubuntu: Implications for Workplace Commitment

Thembisile Molose, Geoff Goldman, Peta Thomas

ABSTRACT

Objective: This research offers an extension of current research on commitment across cultures. It incorporates the concept of Ubuntu as an integrating model that can be paired up with other perspectives for directing employee workplace commitment.

Research Design & Methods: A literature review entailing concepts related to cross-cultures and their relationship to Ubuntu and commitment was considered. The review spanning 50 years covered online-databases of global and African research.

Findings: We argue here that the conceptualisation of Ubuntu is important in adapting currently accepted cultural frameworks as operationalised by individualism, collectivism and power distance dimensions for regional management application. Ubuntu collective values (compassion, survival, group solidarity, respect and dignity), which relate affirmatively with a sense of workplace collectivism, was identified as a unique element of cultural management philosophy for directing personal interactions, workplace commitment and performance management improvements.

Implications & Recommendations: Ubuntu should be facilitated by managers as a motivational force that facilitates workplace commitment ensuring organisational team performance. The implications of Ubuntu in the context of extending existing theories of individualism-collectivism and power distance cannot be overstated.

Contribution & Value Added: A model based on relationships between Ubuntu collective values and EWC, applicable with contextual managerial frameworks.

Article type: conceptual research article

Keywords: performance management; South Africa; workplace commitment

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INTRODUCTION

Over the last decade, research into organisational behaviour (OB) which encourages employee workplace commitment (EWC), organisational commitment (OC) and consequently organisational performance improvements, has gained attention (Dhar, 2015; Jaiswal & Dhar, 2016). Studies identified that workplace diversity derived from a region's culture has a profound effect on organisational performance potentials (Mangaliso, 2001; Stinglhamber & Vandenberghe, 2003; Meyer, Stanley, Jackson, McInnis, Maltin, & Sheppard, 2012).

Tett and Meyer (1993) stated that regional culture is a determinant of EWC and OB, yet it is overlooked as to the influence it has on management practice. The subjugation of African regional cultural influences, such as Ubuntu, is unfortunately rooted in colonialisation, industrialisation and their resulting life changes for African people (Msengana, 2006, p. iv). This article addresses the southern African indigenous knowledge of Ubuntu. For the purposes of this article, Ubuntu is defined by Khoza (2005, p. 269) as 'an African value system that is characterized by caring, sharing, compassion, communocracy and related predispositions'.

We argue here that the conceptualisation of Ubuntu is important in adapting currently accepted cultural frameworks as operationalised by individualism, collectivism and power distance dimensions for regional management application (Mbigi & Maree, 1995; Hofstede, 1980; House, Hanges, Javidan, Dorfman, & Gupta, 2004). The specific aims are to:

- Review the influence of culture differences associated with power distance and individualism-collectivism on EWC (e.g. supervisor, work team or co-workers);
- Identify which attributes of employee commitment in Ubuntu community should be developed to enhance service quality behaviour and competitiveness;
- Draw up practical implications for management and workplace organisations with a theoretical model of Ubuntu collective values, and;
- Encourage an extension of current research on commitment and increase our global understanding of geographic cultural influences such as Ubuntu.

LITERATURE REVIEW

The Development of Culture as an Influence in OB and OC

OC was viewed by Becker (1960, p. 33) as a resultant of an employee's tendency to 'engage in consistent lines of activity'. Building from this definition, studies identified EWC from various perspectives (Table 1).

Affective OC research by Mowday *et al*. (1979) is considered by LaMastro, (1999) as one of the most important approaches to OC. The latter pertains to EWC as defined in a specific referent (e.g. occupation, profession, staff-supervisor, teams). This was an important development as it explained to some extent EWC behaviour. Rousseau (1989) then argued that employees do demonstrate high levels of OC not only to career, but also to the organisation. Honeycutt (1989) then highlighted that this can translate into a sense of organisational belonging and corporate identity amongst one's peers. EWC was subsequently defined in terms of referent effects in its nature and origin as stabilising employee psychological mindset which, when managed, can give rise to a particular positive behav-

iour (Meyer & Maltin, 2010, p. 324). Research has since encouraged a more people-centred approach to articulating factors that positively influence OC understanding of the culturally-driven importance individuals attached to group membership (Meyer, Morin, & Vandenberghe, 2015; Li, Kim, & Zhao; 2017). Stinglhamber and Vandenberghe (2003) examined successful employee-supervisor linkage characteristics, moving away from the traditional focus of the employer OC. Perceived supervisor support (PSS) in supervisor-employee linkages was found to relate to how supervisor's views and values could lead to improved EWC. Mastrangelo, Eddy and Lorenzet (2004) suggested that 'negative workplace experiences of a supervisor seen as untrustworthy and uncaring by employees, makes them less committed to the work and to the organization' (p. 442).

Table 1. Various conceptual perspectives of commitment

Affective commitment	Continuance commitment	Normative commitment
'A desire to stay with the organisation associated with his/her willingness to exert effort on behalf of the organisation and his/her trust in and acceptance of the values and goals of that organisation' (Mowday, Porter, & Steers, 1979, p. 226).	Stebbins (1970, p. 527) defines calculative or continuance commitment as 'the awareness of the impossibility of choosing a different social entity… because of the immense penalties in making the switch'.	Wiener (1982, p. 471) defines it as the 'totality of internalized normative pressures to act in a way which meets organisational goals and interests which suggest that individuals exhibit behaviours solely because 'they believe it is the right and moral thing to do'.

Source: own elaboration based on literature.

Models of OC also began to identify numerous employee proxy variables, such as age, gender and number of years with the organisation, as having a role to play in OC (Meyer & Allen, 1991; Meyer, Stanley, Herscovitch, & Topolnytsky, 2002; Vveinhardt & Andriukaitiene, 2017). Multidimensional OC models incorporating these components and its influence on OB have become widely accepted (Mathieu & Zajac, 1990; Meyer, Stanley, Herscovitch, & Topolnytsky, 2002; Gellatly, Meyer, & Luchak, 2006). Various research now seek to understand EWC in terms of regional culture, perceived impact on leadership behaviours and its influence on OB as initiated by Hofstede (1980). Culture was defined by Hofstede (1980, p. 43) 'as the collective programming of the mind which distinguishes the members of one group of people from another'. The link of Ubuntu as a notion of collectivism within African cultures was espoused by Hofstede (1980) noting that in African culture the group has more importance than the individual so group success is more valued than individual success. Hofstede (1980) identified five cultural dimensions (individualism-collectivism, power distance, masculinity-feminism and uncertainty avoidance) as a common basis for measuring the influence of a regional culture in OC.

Dimensions from Hofstede's framework: individualism, collectivism and power distance, have particular relevance in this discussion and are now described as underpinning Ubuntu cultural principles:

1. Power distance: The extent to which less powerful members of a society accept and expect that power is distributed unequally (Hofstede, 1980, p. 52);
2. Individualism: The extent to which the identity of individuals in a society is based upon personal qualities (Hofstede, 1980, p. 52);

3. Collectivism: The extent which the identity of individuals or group memberships is based upon the community or organisation (Hofstede, 1980, p. 52).

'The Global Leadership, Organisational and Behavioural Effectiveness (GLOBE)' study by House *et al.* (2004) advanced arguments that individualism-collectivism and power distance were culturally and universally applicable. This fundamentally implied that, to succeed in a global business context, managers need the flexibility to respond positively and effectively by integrating different cultures to employee supervision, practices and values that may be dramatically different from what they are accustomed to (House *et al.* 2004).

These authors highlighted that management practice in the sub-Saharan African context is known for embracing humanness and interdependency as embedded in Ubuntu characterised by upholding group norms of reciprocity and suppression of personal interest for the good of the group. House *et al*. (2004) acknowledged culturally-endorsed leadership noting it as a distinctive philosophical concept that sub-Saharan Africa organisational managers should focus on when elevating EWC. Indeed, considerable research in the OB discipline has truly begun to review the influence of regions and associated cultures on management (Gellatly *et al*., 2006; Fischer & Mansell, 2009; Meyer *et al.,* 2012, 2015; Astakhova, 2016; Li, Kim, & Zhao; 2017; Limpanitgul, Boonchoo, Kulviseachana, & Photiyarach, 2017; Valickas *et al.*, 2017). Ubuntu as a culture in management, centred in an African interpretation of humanness is now presented.

Ubuntu as a Dimension of African Culture and Humanness

As a culture, Ubuntu is attributed to the longings of African people for communal bonds that researchers aspire to explain. Christie, Lessem and Mbigi (1993) noted that Ubuntu in the community or workplace brings forth images of supportiveness, co-operation and solidarity. Ndaba (1994) and Battle (1996) proposed that the culture of Ubuntu reflects both an ontological and an epistemological stance in the African thought of Bantu-speaking people. In this context, the ideal upheld by Ubuntu is that it allows a person to grow and prosper in a relational setting by providing ongoing contact and interaction with others. These authors suggest that Ubuntu as a group culture does not however support oppressive communalism.

This is why Mangaliso (2001) argues that Ubuntu is a conventional wisdom that supports customs and practices that serve only the common good. Nussbaum (2003) added that Ubuntu cannot be considered synonymous with any existing paradigms applied in Western interpretations of individualism or collectivism, noting it expresses a unique African view of the world anchored in its very own person, culture and society which is difficult to define by current empirical Western contexts.

The defining of Ubuntu has not been restricted to academic writers. South African public figures like Archbishop Desmond Tutu and former South African president Nelson Mandela used Ubuntu characteristics in public speeches to encompass a perspective that a person with Ubuntu as a culture sees others as fellow human beings. Tutu (1995, p.15) described Ubuntu as the essence of practising a culture of being human and a gift that Africa gives to the world. A more practical example of Ubuntu was provided by Mandela during a television interview with South African journalist, Modise (2006). Mandela described Ubuntu with a story, 'A traveler through a country would stop at a village and he

didn't have to ask for food or for water; once he stops, the people give him food and entertain him'. Mandela added that this was only one aspect of Ubuntu, as the concept can have various meanings as interpreted by each individual.

Mandela's sentiments with African traditions of hospitality are supported in academic treatise where Brotherton and Wood (2008) draw attention to African hosts who open his/her home to total strangers giving them a place to stay and a meal to eat although he/she knew nothing about them. This kind of hospitality exists as unlimited and is not guided by the parameters of laws and concepts (Westmoreland, 2008). From these famous orators to the academic writers, the denominators of Ubuntu seems to promote actions that are welcoming, concerned principally with sharing and sustaining human relations. It is argued here that Ubuntu is derived from efforts that explicate how peoples' actions interrelate to maintaining togetherness in a community.

As regards describing the meaning of African humanness in terms of individualism, collectivism and power distance, sub-Saharan connotations are described by phrases such as the Zulu, 'Umuntu-ngumu-ntu ngabantu', which means 'a person is a person through others' (Battle, 1996, p. 99). Mbigi (1997) and Metz (2007) support this suggesting that among South Africa Zulu and Xhosa people the notion that a person can only be a person through others is widely accepted. Many Zulu and Xhosa people also use terms like 'Sawubona' when they greet, which means, 'I see you (as human)' and 'Simunye' meaning 'we are one' as pre-proposed by Ubuntu.

This article posits then that Ubuntu characteristics are in management terms:

- Describing humanness-that may well be unique to an African management context and specifically Sub-Saharan contexts requiring the organisation to capture the essence of what it means to be 'we are one', resonating with employees in supporting their deeply held regional beliefs and cultural systems;
- Workplace commitment-ensuring burdens of the community of employees are shared so that no one is prejudiced;
- OC through OB as instigated by manager behaviour-which ensures the interest of the community of employees ahead of the interests of any individual.

Ubuntu as a Management Philosophy

As a management philosophy, Ubuntu has been gaining rapid prominence recognizing the role of humanness that focuses on selflessness and commitment of an individual to one's community. In the domain of management, the community is that of one's daily work colleagues or team. An important articulation of the characteristics of Ubuntu as culture can be found in Mbigi and Maree's (1995) conceptual framework of Ubuntu, known as the Collective-Fingers' theory. Here, five values of Ubuntu are postulated as integral to its expression – survival, compassion, spirit of solidarity, respect, and dignity. This theory is analogous to describing the principles of community and togetherness of Ubuntu culture as a human hand. Accordingly, a hand perfectly represents the Ubuntu concept as it requires the collective co-operation of all fingers and the thumb to function optimally (Mbingi & Maree, 1995). These authors' draw on an African proverb in defining this model, noting that 'a thumb, although strong, cannot kill on its own', inferring it needs support from the rest of the hand.

Mbingi and Maree (1995) argue that this African proverb can be interpreted from

a managerial viewpoint, in two ways: firstly, the five fingers represent individual persons who act together in a collective manner in order to achieve a certain goal reflected by commitment to the organisation. Secondly, fingers represent key values that are necessary when forming and maintaining a collective culture (Mbigi, 1997). Ubuntu therefore can be seen as one of the indigenous knowledge mechanisms capable of promoting synergy and the creation of a whole that is larger than the sum of the individual parts (Mangaliso, 2001). Other studies (Poovan, du Toit, & Engelbrecht, 2006; Lutz, 2009) advocated that the five fingers can be compressed from five to four values combining respect and dignity as one. MacDonald *et al.* (2014) support this view suggesting that managers must lead their subordinates to build the solidarity and commitment required for strong workplace relationships, productive teamwork, and, strong loyalty to organisational goals.

Another trend distinguishable since the 1990s is the use of the term Ubuntu as the connection between a leadership style and management, increasingly becoming important as a factor in the realm of South African management and organisational re-imagination (Mangaliso, 2001; Nussbaum, 2003; Nyathi, 2008). A recent theory of Ubuntu proposed by Woermann and Engelbrecht (2017, p. 4), 'the relation-holder theory', contends that Ubuntu promotes collective decision making and in management terms they explain Ubuntu in reference to the aphorism 'a person is a person through others', suggesting that a manager is a successful manager because of his/her team.

We now propose a theoretical framework based on the four Ubuntu values (Figure 1) as concepts drawn from literature to guide managers in developing the leadership characteristics appropriate to supervising a collective team in a South African workplace.

Applying the collective-fingers theory to team management promotes what Tutu (2004) calls 'a family or an organization'. Tutu (2004) attributes Ubuntu to common understanding between the supervisor and work teams so that they help and care for each other as members of one family. Jackson (2004) remarks that Ubuntu's point of departure should be centred on the leader's actions (the thumb) as the driver of a cohesive force within the group promoting humanness and each team member's interpersonal role.

The Power Distance Mechanism of Ubuntu in Workplace Commitment

The power distance mechanism acting between employees and their supervisor under Ubuntu collective values, particularly that of compassion and of spirit of solidarity, and their associated influence on EWC and behaviour – are evident in very few studies. This suggests that empirical research examining Ubuntu in influencing EWC and work behaviour outcomes is still relatively unexplored in contemporary management literature. Ubuntu collective values and their influence on work behaviour, identified in the South African context, appear to be centred on managers who do not have an understanding of the implications for leading teams of various cultures and languages (Nicolaides, 2010). Mangaliso's (2001) research based on reviewing conceptions and reflections about experiences of Ubuntu found in South African private and state-owned enterprises stated that while Ubuntu might be difficult to prove by setting indicators, greater commitment to the goals of the organisation translating into measuring effectiveness and efficiency is indeed possible when Ubuntu is embraced. He highlights that this occurs because applying Ubuntu principles in leadership reinforce understanding among all employees, which results in group solidarity, teamwork and, collective pride in achieving organisational goals.

Figure 1. Collective-values of Ubuntu framework
Source: Molose (2017).

Mangaliso (2001) argues that helpfulness towards others in a work team creates a climate of collegiality based on sharing and caring because of an Ubuntu intrinsic understanding that all humans are interconnected. Poovan *et al.* (2006) provided empirical support, noting that Ubuntu allows for workplace personal understanding and caring, which enables team members to see themselves as belonging to a community even at work, and consequently they are more willing and committed to help each other and the organisation.

Browning (2006) found during interviews with frontline-employees of South African retail car companies and hospitality organisations that South African employees attach importance to building relationships, personal interaction and mutual respect as emphasized in Ubuntu culture. However, additional findings showed that managers failed to provide employees with the physical and emotional support needed when dealing with difficult guests. Browning (2006) concluded that managers who lead in a way that contradicts the expectations of their employees do not realize the positive influence they could have had through Ubuntu, which can influence employees positively when interacting with customers. The link between Ubuntu collective-values and EWC is evident in Batho Pele principles (people first) which are deliberately drawn on an Ubuntu model in South African government policy of 'serving people first' (Mangaliso, 2001; Yukl, 2002). Batho Pele is a government espoused, nation-wide initiative requiring public servants to be service-orientated, and to commit to continuous service delivery improvement (Batho Pele handbook, 2003).

Examples of companies and institutions that have adapted Ubuntu applying Batho Pele principles include: the Department of Education, American Express, First National Bank, Pick n Pay and South African Airways (Ngidi & Dorasamy, 2014). It is argued here that Ubuntu leadership style has the potential to overcome challenges that hinder multi-national team productivity and performance because it enables team members to tolerate each other's cultural differences that might otherwise result in low service delivery performance. We conclude that Ubuntu in management encourages team members to strive to enact the four values leading to a positive impact for EWC. We now propose the following propositions regarding management of the workplace in an Ubuntu culture centred community:

Proposition 1: Employee commitment to co-worker and supervisor which are positively related to Ubuntu collective-values lead to employee collective achievement of service quality performance goals.

Proposition 2: Employee's service quality behaviour and OC will be mediated by Ubuntu values, when facilitated by a management style that ensures the interest of the community of employees ahead of the interests of any individual.

MATERIAL AND METHODS

Identifying literature associated with and appropriate for the argument presented in this article entailed a search for published empirical findings. Consistent with Cohen (1992, p. 1142), lists of secondary literature sources were reviewed to source past research. This strategy perused online databases, both global and African, for academic research (1960 to 2017), using Google scholar sourced articles, the South African catalogues of PhD theses, including PSYCINFO, SABINET, EBSCOHOST, Elsevier Science Direct, SAGE, Emerald, and, Taylor & Francis.

Secondary literature sources identified preliminary studies on OC and related variables from 1990 to 2002. These were used to identify older seminal sources that referenced Becker (1960) and Mowday *et al.* (1979). The search applied the search terms: OC, OB, organisational management, cross-culture, Ubuntu. This yielded 300 empirical and conceptual articles which were reviewed to reduce and rationalise the appropriateness of the context as per the 'prescribed criteria' (Zhao, 2016, p. 2437):

1. Reviewing social citation indices for the most cited studies to identify pertinent explanations of OC and OB;
2. Selecting studies and drawing explanations (from selected service business contexts that considered culture in management practice-financial services, the banking sector, and tourism and hospitality) that measured specific variables, namely those addressing cultural values with culture dimension predictors in OC relationships;
3. Considering research on organisational outcomes, such as service delivery quality, that integrate cultural dimension perspectives to construct a unified theoretical basis for understanding the development process of EWC in terms of Ubuntu;
4. Limiting our focus to cross cultural influences and target referents that conceptualised EWC from a person-centred approach (Meyer *et al*., 2012). Reviewing EWC through the lens of Ubuntu proverbs creating value to an organisation's management by describing a particular set of African values to supplement more well-known cultural dimension frameworks.

Our review additionally highlights Ubuntu values from a sociolinguistic perspective, illustrated through a selection of African proverbs. Proverbs constitute one of the African mediums through which the virtues of Ubuntu are transferred from one generation to another (Kamwangalu, 1999). We followed Broodryk's (2002) recommendation suggesting the use of proverbs to articulate understanding of a community embracement of social values.

RESULTS AND DISCUSSION

In this article we address two contemporary research issues: firstly, the scarcity of research in contemporary management espousing an Ubuntu collective sense for management in developing supervisor-employee relationships. Secondly, the growing realisation that cultural dimensions viz.: individualism, collectivism and power distances that exist among employees of different cultures, such as in South Africa, are very important for managers to be aware of in attaining optimal workplace commitment. A simple way to effect the two propositions to encourage Ubuntu style of management is for a manager to demonstrate consistently the four Ubuntu values, by being present physically and emotionally when employees need to be one with their manager (Molose, 2017).

A manager stands to benefit when understanding it because of his/her team making him/her successful. This genuine authenticity/realness of their managers is postulated as improving EWC and OC. Ubuntu style leadership is argued here to help managers facilitate collective decision making by genuinely valuing the worth of each employee. This consequently creates organisational benefits through a shared will to succeed. We argue that adopting Ubuntu collective values provides a unique approach to managing teams, helping explain the importance of collective achievement of organisational goals. The challenge for managers is to take advantage of Ubuntu as a unique approach to be adopted in conjunction with established cultural dimension frameworks.

Theoretically, the collective values framework of Ubuntu has several potential advantages. It takes a multidimensional approach to avoid the cultural limitations of previous models. It also acknowledges that OC has different meanings to different people. Finally, the framework stresses the importance of Ubuntu motivational forces as mechanisms to

facilitate EWC, highlighting affective and normative mind-sets as the strongest components of OC in cultures that exhibit collectivist values.

CONCLUSIONS

We argue that this framework gives insight into the heart of individualism-collectivism and power distance operationalisation, making the principle of Ubuntu cultural group solidarity important to consider in future management research. The framework with related propositions captures the concepts for managers striving to understand employee group cohesion mechanisms like 'we are one' related to optimising OC and OB. Organisational productivity requirements of managers, such as assuring service excellence suggest that EWC is inseparable from the team and its manager. The implications of Ubuntu in the context of extending existing theories of individualism-collectivism and power distance cannot be overstated. Therefore, to contribute to global management knowledge by interpreting Ubuntu, we borrow from an eloquent message by African author Nyathi (2008, p. 13):

> 'Ubuntu is a well-developed system of knowledge that stands in contrast to the dominant Euro-American epistemology. Articulating this alternative epistemology in the white-western world of organizational studies is an extremely challenging task (in the ways it raises 'lost in translation' type issues), but for an African person this challenge is not entirely new. It is an extension of struggles to articulate the identity of Africa and the Africans dating back to the late eighteenth century'.

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- **EASE Guidelines for Authors of Scientific Articles to be Published in English** (version of November 2016) explaining in details how to compose a scientific article according to international standards.
- **APA Style Manual** (6th edition of June 2009) explaining in details how to use and cite references and how to apply linguistic rules while writing in English.

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- Guidelines for Authors (*.pdf),
- **Template for Articles** (*.docx, *.dotx, *.rtf, *.pdf),
- Internal Review Form – Checklist of the Article(*.docx),
- Copyright Transfer(*.docx).

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