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# Content



## 7 INFLATION DIFFERENTIALS ACROSS REGIONS IN TURKEY Hasan Engin Duran

## 18 FINANCING CONSTRAINTS AND FIRM GROWTH IN EMERGING EUROPE

Sandra M. Leitner



41 AN INVESTIGATION INTO THE IMPACT OF SERVICE QUALITY, FREQUENT FLIER PROGRAMS AND SAFETY PERCEPTION ON SATISFACTION AND CUSTOMER LOYALTY IN THE AIRLINE INDUSTRY IN SOUTHERN AFRICA

Maxwell Sandada, Bright Matibiri



## 54 ECONOMIC STRUCTURE AND REGIONAL ECONOMIC PERFORMANCE IN ADVANCED EU ECONOMIES

Nebojša Stojčić, Heri Bezić, Tomislav Galović

## 67 THE GRAVITY MODEL APPROACH: AN APPLICATION ON THE ECOWAS TRADING BLOC

Afolabi O. Luqman, Nor Aznin Abu Bakar, Azman Aziz Mukhriz Izraf

76 THE INFLUENCE OF MACROECONOMIC TRENDS ON THE REPAYMENT OF LOANS BY HOUSEHOLDS: EVIDENCE FROM THE FEDERATION OF BOSNIA AND HERZEGOVINA AND POLICY RECCOMENDATIONS

Sanela Pašić, Adisa Omerbegović-Arapović

# From the Editor

The South East European Journal of Economics and Business in its Volume 11, Issue 1, brings us six interesting and diverse empirical papers from the field of economics and business. This issue includes research in the areas of monetary economics, industrial economics, financial economics, marketing, international trade and banking. All of the papers are based on empirical research and applied methodologies, and in most cases including data covering the latest crisis and post-crisis periods. In that respect, these contributions are up-to date and as such interesting to a broader audience. A short introduction to these articles follows.

The first article by Duran investigates "Inflation differentials across regions in Turkey" over the period 2004-2015. Methodologically, the paper relies on sigma convergence and distribution dynamics approaches. The conducted empirical investigation implies that inflation disparities in Turkey tend to decline over time, and in particular during the latest post-crisis period, i.e. after 2010. Moreover, the investigated regions change their relative inflation rate positions guite often. The author concludes that that regional inflation behaviour is random and non-structural, as relatively high and low inflationary regions tend to change their guintiles frequently. The research implies that achieving inflation convergence is a harder task than was initially believed, as it seems to have random behaviour. Consequently, the authors argue that trade integration can be an option to foster regional price convergence.

Leitner brings us an interesting investigation focused on "Financing constraints and firm growth in emerging Europe." The paper focuses on the effects of different types of financing constraints on firm sales and employment growth in Emerging Europe before and after the onset of the financial crisis. The sample includes firm-level data from a group of emerging NMS-10 economies (plus Turkey) and the group of economically and financially backward Western Balkan countries. The paper demonstrates that financing constraints significantly obstruct firm growth, particularly in the Western Balkans, which calls for policy intervention to ensure swifter job-rich growth. In addition, the research emphasizes the importance of the state of the economy as well as the institutional environment in which the businesses operate.

"An investigation into the impact of service quality, frequent flier programs and safety perception on satisfaction and customer loyalty in the airline industry in Southern Africa" by Sandada and Matibiri identifies the factors that make passengers loyal to an airline in Southern Africa by investigating the impact of service guality and safety perception on customer satisfaction and how satisfaction and frequent flyer programs (FFP) subsequently influence customer loyalty. The obtained results imply that service quality positively relates to customer satisfaction, and that satisfaction was an important antecedent of customer loyalty. In addition, the authors note that safety perception and frequent flier programs positively influence customer loyalty. In the next stage of the analysis, the authors find that satisfied customers may still switch to other airlines.

"Economic structure and regional economic performance in advanced EU economies" by Stojčić, Bezić and Galović provides an interesting empirical investigation of the relationship between economic structure and regional growth in ten Western European EU member states in the post-crisis period. A spatial panel econometric technique is used in order to differentiate between the intra-regional and inter-regional effects of economic structure, yielding recommendations for policy makers. The authors conclude that the fastest growing regions across the analyzed countries are also those with the fastest growing share of manufacturing in their value added. The findings suggest repositioning by European industries towards sophisticated industries characterized by high value added, knowledge and technological intensity.

"The Gravity model approach: An application on the ECOWAS trading bloc" by Afolabi, Nor Aznin, Mukhriz Izraf focuses on bilateral trade flows across ECOWAS-15 nations for the period of 1981-2013. The methodology involves the use of various techniques of estimation for the gravity model, including both static and dynamic techniques. The authors conclude that ECOWAS members should design and implement a robust industrial policy in order to expand the industrial capacity of countries and improve competitiveness. In addition, a sound trade policy should be put in place in order for countries within ECOWAS to gain more from trade, which involves moving to another stage of integration. One of the implications of the research is that diversification of the economy within ECOWAS should be encouraged.

The final paper in this issue is focused on Bosnia and Herzegovina. "The influence of macroeconomic trends on the repayment of loans by households: evidence from the Federation of Bosnia and Herzegovina policy recommendations" by Pašić and and Omerbegović-Arapović explores the effect of the main macroeconomic indicators, namely GDP growth, the Consumer Price Index and the unemployment rate, on the quality of loan repayments by households in the Federation of Bosnia and Herzegovina (FBH). Potential effect is observed over a period of fourteen years at the level of nonperforming household loans. The author concludes that the unemployment rate and CPI movement do not influence the level of nonperforming loans in the banking sector of FBiH. However, GDP growth has a fairly strong impact on the level of nonperforming loans: higher GDP growth correlates with fewer nonperforming loans. Based on this finding, the author concludes the destiny of loan repayments does not depend solely on good customer assessment by the banks. The concluding section is rich in providing policy implications for both government and banks in FBiH.

> On behalf of Editorial Board Adnan Efendic

University of Sarajevo School of Economics and Business



# **INFLATION DIFFERENTIALS ACROSS REGIONS IN TURKEY**

Hasan Engin Duran

#### Abstract

The aim of the present article is to analyze the convergence of regional inflation rates in Turkey from 2004 to 2015 by adopting sigma convergence and distribution dynamics approaches. The outcomes of our research can be summarized in two groups. First, inflation disparities tend to decline over time, especially during the post-crisis period after 2010. Hence, the aggregate price stabilization and disinflation process in Turkey is coupled with convergence in inflation rates across regions. Second, in addition to the findings in the literature, we find that regions change their relative inflation rate positions quite often. This indicates that regional inflation behavior is random and non-structural, as the relatively high and low inflationary places tend to change their quintiles frequently. The results imply several policy suggestions. First, achieving inflation convergence is a harder task than initially understood, as it seems to show random behavior. Second, trade integration can be an option to foster regional price convergence.

Keywords: Inflation convergence, regional inflation, distribution dynamics, Kernel density, Panel Unit Root

**JEL Codes:** R1, E3, E5,

#### 1. INTRODUCTION

In the literature on monetary economics, the dispersion of inflation rates across the regions of a country may constitute severe policy distortions (Weber and Beck 2005). Firstly, if inflation rates differ largely between regions, monetary policy can hardly satisfy the needs of all regions equally (Weber and Beck 2005; Mundel 1961; Weyerstrass et al. 2011), such that places which experience high inflation rates naturally require a contractionary monetary policy, while those which experience low inflation need rather an expansionary monetary stance (Weber and Beck 2005). Furthermore, inflation differentials are likely to create regional dispersion in the real interest rates, which are likely to induce differential effects on local economic growth (Yılmazkuday 2013). Another policy problem regards the specific case of Turkey, for which regional integration is seen as a necessity prior to EU accession (Yeşilyurt and Elhorst 2014). For these reasons,

convergence across regional inflation rates is politically a crucial matter.

With regard to the literature on convergence, existing studies mostly rely on Neo-classical growth theory and its empirical predictions (i.e. Solow 1956; Barro and Sala-i Martin 1992; Rey and Montouri 1999). Within this stream, much of the attention has been devoted to testing the tendency of regional incomes or total factor productivity to converge. However, far little attention has been paid to the issue of inflation convergence (for some examples see Cechetti, Mark

#### Hasan Engin Duran, PhD

Izmir Institute of Technology City and Regional Planning Department E-mail: enginduran@iyte.edu.tr and Sonora (2002); Weber and Beck (2005); Yesilyurt (2014).

Methodologies that have been used so far in order to test inflation convergence are quite scant in the literature. Indeed, most of them rely on a class of Panel Unit root tests (see for some examples, Breitung and Das 2003; Breitung 2000; Chang 2002; 2004; Levin, Lin and Chu 2002; Im et al. 2003) which are known as useful longitudinal tools in testing whether relative rates of inflation follow a stationary process and converge to an equilibrium.

However, the major drawback of such a methodology is that it gives no information about intra-distributional dynamics, the shape of the inflation distribution and its evolution over time (Quah 1993a; Magrini 2009). However, the distribution dynamics approach is more informative in that sense (Magrini 2009). It provides information on both understanding the convergence trend since one can observe the evolution of the shape of relative inflation distribution, and also it provides information on the mobility of regions within the distribution (Magrini 2009).

The aim of the present study is to analyze the convergence of regional inflation rates in Turkey from 2004 to 2015 by adopting the sigma convergence and distribution dynamics approaches, namely, simple discrete time Markovian chains (Asmussen 2003). The regional and aggregate consumer price index and inflation dataset are obtained from the Central Bank of Turkey (TCMB), Turkish Statistical Institute (Turkstat) and Ministry of Development.

Turkey is an interesting case study as it includes large socio-economic and territorial imbalances (Yıldırım, Öcal and Özyıldırım 2009; Gezici and Hewings 2007). There are differentials in inflation rates across provinces (Yeşilyurt and Elhorst 2014). Moreover, Turkey has experienced a rapid stabilization and disinflation period over the last three decades, such that the annual inflation rate has declined from about 116% (in 1994) to 8% (in 2015). However, the distributional aspect of inflation within the country has not yet been adequately studied. This makes our analysis more interesting per se.

The paper is organized in the following way. In Section 2, a summary of the related literature is provided. Section 3 is devoted to empirical analysis composed of two parts. In 3.1, we implement descriptive and exploratory analyses which document the stylized facts on both regional and national inflation in Turkey. In 3.2, we perform a formal convergence analysis by using first Panel Unit Root tests and then apply a distribution dynamics methodology. Finally, Section 4 is devoted to concluding remarks.

#### 2. LITERATURE REVIEW

In the existing literature, the issue of inflation convergence is thoroughly and heatedly debated in a number of theoretical and empirical studies.

From a theoretical point of view, economic drivers of inflation convergence/divergence are extensively discussed. The intensity of the traded-goods sector and trade integration among countries are referred to as the major reasons fostering convergence in price movements (Yılmazkuday 2013). This is consistent with the Balassa-Samuelson effect, which explains why prices are higher and non-convergent in the nontraded sector (Balassa 1964; Samuelson 1964; Tunay and Silpagar 2007). In other words, it implies that the intensity of trade linkages across regions hamper arbitrage-driven profit possibilities and enhance price equilibration (Yılmazkuday 2013). However, there are some crucial distinctions between the Balassa-Samuelson effect and the Baumol-Bowen effect and these arguments are examined in several papers (Mihaljek and Klau 2004; 2008). The main distinction regards the fact that in the services sector productivity growth is likely to be slower than in the capital-intensive goods sector. Therefore, prices in the services sector are expected to be higher and non-convergent. While services are in general non-tradable, some are in fact tradable. Hence, this point is crucial but has not been taken into account in the Balassa-Samuelson effect (Baumol and Bowen 1966)

One of the other reasons why prices do not converge might be related to rigidities in wages or exchange rates (Becker 2011). Any factor that prevents the nominal exchange rates and wages to adjust in response to an economic shock can be a reason for inflation differentials (Becker 2011). Finally, asymmetric economic shocks that can change the demand/ supply conditions in different countries and can cause dispersed price movements (Weber 2004; Tunay and Silpagar 2007).

On empirical grounds, the vast majority of studies point to the tendency towards declining inflation disparities either at the cross-national or cross-regional level.

With regard to the cross-national examples, there is, one the one hand, a number of studies that address EU (European Union) countries. For instance, Siklos and Wohar (1997), Mentz and Sebastian (2003), Rogers, Hufbauer and Wada (2001), Kocenda and Papell (1997), Beck and Weber (2001), Holmes (2002), Beck, Hubrich and Marcellino (2006) and Busetti et al. (2007) are among the studies which find evidence in favor of inflation convergence within the EU. This finding is also supported theoretically, as it is consistent with the conventional view that increased trade integration, financial linkages and migration, as well as the introduction of a common monetary system, promote price convergence (Rogers 2007).

On the other hand, there is a strand of studies focusing on inflation differentials across the regions of a country. Beck, Hubrich and Marcellino (2006), for instance, focus on the regions of 6 EU member states and 11 U.S. metropolitan areas over the period 1995-2004. They report evidence suggesting two facts. First, compared to early 1990s, inflation dispersion has lowered within the EU, and therefore a convergence trend has been observed. Second, inflation dispersion within the U.S has been found to be lower compared to the EU.

In another study, Cechetti, Mark and Sonora (2002) investigate whether inflation rates in 19 major U.S. cities tend to converge over the period 1918-1995 and report evidence in favor of convergence. Weber and Beck (2005) examine the convergence process across 24 Metropolitan areas in U.S. between 1980-2002, across 12 provinces in Canada between 1980 and 2002, and across 47 prefectures in Japan between 1985 and 2000. The main result of the paper is that regional dispersion of inflation rates has been found to be lowest in Japan and at considerable levels in U.S. and Canada. However, the disparities tend to decline in the U.S.-Canada sample, whereas it tends to increase in Japan.

From a methodological point of view, sigma and beta convergence models are typically used in income and inflation convergence studies (see Barro and Sala-I-Martin 1992 and Rey and Montouri 1999 for detailed explanations). In beta convergence, usually a regression analysis is pursued. Typically, initial incomes of the regions are regressed on the growth rates of regions over the period of analysis, with the possibility of the inclusion of control variables. In sigma convergence, an index that represents the level of regional inequalities in each year is calculated. This index is then analyzed using unit root tests to understand whether it exhibits a downward trend, which would mean convergence among regions. To investigate the inflation convergence, we use the sigma convergence and distribution dynamics approach, as it is more convenient for time series studies with a large cross-sectional dimension.

Although extensive literature exists on other countries, studies in this field are quite limited for Turkey. Initially, Tunay and Silpagar (2007) examined inflation convergence across geographical regions for the period 1994-2004 using monthly regional CPI (Consumer Price Index) data. They adopt a widely accepted Panel Unit Root test in their study. Specifically, they use the type of test developed by Breitung and Das (2003), Levin, Lin and Chu (2002) and Im, Pesaran and Shin (2003). In all tests, they reject the null hypothesis of non-stationary regional rates of inflation, which indicates evidence of convergence. Moreover, using panel regressions, they show that price movements in a region spill over to neighbouring regions significantly.

Similarly, Akdi and Sahin (2007) find a sectoral inflation convergence pattern over the period 1988-2007. More recently, Yılmazkuday (2013) investigated whether inflation dispersion has structurally changed after the introduction of "inflation targeting" policy of the Central Bank in January 2002. He employed monthly CPI data for 10 sub-groups of products and 7 geographical regions over the period 1994-2004. He found that both the mean and the standard deviation of inflation rates declined following an inflation targeting policy. Moreover, it is also claimed that the adoption of flexible exchange rate in 2001 (February) is another reason for such a decline.

Finally, Yeşilyurt (2014) adopts monthly CPI data for 26 NUTS-2 regions over the period 2004-2011. She uses pairwise unit root test which had been introduced initially by Pesaran (2007), and incorporates the structural breaks in series by using a technique developed by Zivot and Andrews (1992). As an outcome, she rejects the null hypothesis of no convergence, and therefore finds evidence in favor of declining inflation disparities.

Although existing studies on Turkey reflect, more or less, the same result, our contribution to the debate will be methodological. Technically, studies in the literature mostly focus either on panel unit root tests or traditional convergence methodologies such as  $\beta$ or  $\sigma$  convergence. Both are criticized due to biases in regression techniques and unreliable outcomes (as in Galton's Fallacy explained in Quah 1993b). Moreover, these conventional methods are inadequate in terms of providing more information on the shape of inflation distribution, its evolution over time and the mobility of regions within the distribution (Magrini 2009). Specifically, a distribution dynamics approach estimates the empirical distribution of regional incomes (i.e. Kernel density estimates), their evolution over time and their ergodic distribution (Magrini 2009). In this way, the researcher is able to observe whether the distribution tends to take a more homogenous and uni-modal form, which indicates a decline in income disparities, or a bi-modal and more heterogeneous form, which indicates an increase in disparities. Moreover, using discrete time Markov transition matrices, the researcher is able to observe if the mobility of regions within the distribution is high or low.

Thus, we pursue such a methodology in this paper by implementing an empirical analysis in the next section.

#### 3. EMPIRICAL ANALYSES

#### 3.1. Descriptive and Exploratory Analysis

The initial step in our analysis is to describe the historical evolution of the inflation rate in Turkey. The data declared by Turkstat (Turkish Statistical Institute) reveal that percentage changes in CPI at the national level from 1983 to 2010 indicate an increasing trend of inflation until the mid-1990s and a sharp decline afterwards, hitting levels of about 7-8% after 2005.

Rapid changes in inflation rates deserve a few words on their political and historical evolution. Over the last decades, high inflation has been a major policy concern of the government (Yeşilyurt 2014; Yeşilyurt and Elhorst 2014). Following the military revolution and economic crisis in 1980, a set of policies aiming at both disciplining fiscal deficits and trade liberalization were applied. However, the outcomes were not successful in lowering inflation. Thus, in 1994 the national inflation rate reached a peak of about 116%. Public sector deficits, the devaluation of Turkish liras against foreign currencies, the consequent increased prices of imported goods, political instability and the first Gulf War have been put forward as the major reasons for the hyperinflation (Yeşilyurt 2014; Yeşilyurt and Elhorst 2014).

On 5 April 1994, a new economic program was declared. Although inflation rates were reduced considerably, in 1999 an economic crisis and the earthquake hit the supply side of the economy and caused another pressure on prices (Yeşilyurt 2014; Yeşilyurt and Elhorst 2014). After the economic crisis in 2001, successful years in terms of inflation began (Yeşilyurt 2014; Yeşilyurt and Elhorst 2014). Tight fiscal and monetary policies and budget discipline played a major role in this process (Yeşilyurt 2014; Yeşilyurt and Elhorst 2014). An implicit inflation targeting policy was implemented during the years 2002-2005 (Yeşilyurt 2014). After 2006, explicit inflation targeting was applied (Yeşilyurt 2014). In 2005, increases in oil prices and a supply shock caused an increase in price (Yeşilyurt 2014). During the global economic crisis of 2008-2009, a rise in interest rates led to lower pressures on prices (Yeşilyurt 2014). Finally, after 2010 a more stable price index was observed.

With regard to the regional dimension of inflation, several stylized facts can be identified. For that purpose, we document the geographical distribution of inflation rates among regions. Figure 1 below illustrates the percentage changes in CPI for 26 Nuts-2 regions over the period from January 2003 to March 2015.

There is an important level of cross-regional variation in inflation rates. The darkest color represents the regions which have had the highest inflation rates, while the lightest color represents the regions which have had the lowest rates. The regions which have had the highest inflation are TR22 (Çanakkale-Balıkesir), TR51 (Ankara) and TR10 (İstanbul), which have had cumulative interest rates of 183%, 179% and 178%,



Figure 1: Geographical Distribution of Inflation Rates

respectively, over the last 12 years. The regions which have had lowest inflation are TRC3 (MardinBatman-Şırnak-Siirt), TR61 (Antalya-Isparta-Burdur) and TR81 (Zonguldak-Karabük-Bartın), which have had inflation rates of 146%, 158% and 162%, respectively.

High inflation is generally observed around the Marmara region. There are several possible reasons why this is the case. First, since it is an industrial base, it attracts inward migration, which makes demand grow faster than in other regions. Indeed, wages are most probably higher, which causes demand-pull inflation (Barth and Bennet 1975). Apart from the demand side, supply side factors are also quite important (Barth and Bennet 1975), such that intermediate goods are known to be intensively imported in this region. Hence, any depreciation in the Turkish lira against foreign currencies is likely to increase the cost of inputs considerably (capital goods, raw materials etc.), leading to cost-push inflation (Barth and Bennet 1975).

Looking at the general picture, however, we do not observe a distinct geographical pattern in inflation. The commonly found east/west dualism in economic development is not observed in inflation. The visual inspection of the map gives us the idea that changes in price levels are rather randomly distributed within the country. This makes it even harder to explain the phenomenon.

Anyhow, in order to confirm this statistically and to understand whether or not the inflation rates are distributed in a spatially correlated manner, we test spatial dependence using Moran I's test, which was initially introduced by Moran (1950) and is widely used in the empirical literature (Rey, 2001). The test takes the following form (Rey 2001)<sup>1</sup>:

$$I = \frac{n}{\sum_{i} \sum_{j} w_{i,j}} \frac{\sum_{i} \sum_{j} (X_i - \bar{X})(X_j - \bar{X})}{\sum_{i} (X_i - \bar{X})^2}$$
(2)

where x is a variable of interest,  $\bar{X}_i$  is its cross-sectional mean, and w is a spatial weight matrix. It is in the form of a raw standardized inverse distance matrix. Hence, the nearest neighbors get a high weight in this scheme.

A positive and significant I would indicate a positive spatial correlation, which means that regions which have similar inflation rates locate nearby. However, what we observe from our test is totally different. The estimated Moran I's statistic is negative as well as insignificant (Table 1). One may then conclude that inflation rates in Turkey seem to follow a random geographical distribution. 
 Table 1: Moran I's Test Results

Test Statistics	Values
Moran I's statistics	-0,053
Expectation	-0,04
Variance	0,002
P-Value	0,61

Note: raw standardized inverse matrix has been used.

Overall, the cross-regional differentials in inflation cannot be neglected, as it ranges over a large interval (between 146% and 183%). Moreover, the geographical distribution of inflation is quite random.

The descriptive analysis, however, does not provide any information about inflation convergence. Therefore, we pursue this analysis in the next section.

#### 3.2 Convergence Analysis

The evolution of inflation disparities is analyzed in the present section. Initially, we present in Figure 2 the cross-sectional standard deviation (SD) of regional yearly inflation rates over time (from January 2003 to March 2015). Regional Inflation rate in this case has been defined as the first differences of 12-month moving CPI (in natural logarithms):

$$\pi_t = \ln(CPI_t) - \ln(CPI_{t-12})$$

where t indicates the months.



Figure 2: Cross sectional SD of Inflation Rates,

Source: Central Bank of Turkey, 2015

<sup>&</sup>lt;sup>1</sup> The Moran I test's formula is obtained from Rey (2001).

Looking at the SD of regional inflation rates, it is immediate to note that a tendency towards a decline in dispersion is obvious. In other words, regions tend to become more equal in their inflation rates, indicating preliminary evidence of inflation convergence.

The only exception that does not fit this trend is the period of the global economic crisis during 2008 and 2009, which is shaded in grey. During the financial crisis, regional price levels increased arbitrarily and this caused an inflation differential.

For three important periods, pre-crisis, during the crisis and post-crisis, we document the yearly inflation rates of regions along with their cross-sectional means and standard deviations. We report the calculations in Table 2.

In the period of 2004-2007, inflation rates ranged between 7.18% and 10%, whereas they ranged between 7.11% and 9.57% in the period of 2008-2009 and between 6.99% and 8.02% in the period of 2010-2014. Hence, the range tends to narrow, indicating a sign of declining inflation differentials across regions. Moreover, the regions tend to experience lower inflation rates, as the mean of inflation is 8.80% in the first period, 8.42% in the second period and 7.77% in the last period. Furthermore, the declining disparities and inflation convergence hypothesis is supported by the standard deviation values, which decline from 0.71 to 0.39 over these years.

In order to provide supportive statistical evidence on convergence, we apply a unit root test on regional inflation rates shown in Figure 3. Specifically, the test is developed by Levin, Lin and Chu (2002) (LLC) and is very widely used in this field. The test relies on the following ADF (Augmented Dickey Fuller) regression (Dickey and Fuller 1979) <sup>2</sup>:

$$\Delta x_{i,t} = \alpha x_{i,t-1} + \sum_{j=1}^{\rho_j} \beta_{i,j} \Delta x_{i,t-j} + Y'_{i,t} \delta + e_{i,t}$$

where x is the variable of interest. In our case, x represents relative annual regional inflation rates. Specifically, it is the cross-sectional de-meaned  $\pi_t$  where  $\overline{\pi_t}$  is the cross-sectional average of inflation rates at time t:

$$x_{i,t} = \pi_{i,t} - \overline{\pi_t}$$

The sign and significance of  $\alpha$  parameter, which is a common coefficient for all cross-sectional units, is the

The empirical analysis in this paper is implemented using Eviews 6, Eviews 4, Excel, R 3.12 software programs

Table 2:	Descriptive	statistics	on	yearly	inflation	rates	of
regions							

Regions	2004-2007	2008-2009	2010-2014
TR10	9,81	9,23	6,99
TR21	9,76	7,11	7,80
TR22	9,41	8,70	7,84
TR31	9,42	7,58	7,71
TR32	9,53	7,58	7,56
TR33	8,37	8,13	7,69
TR41	9,64	8,05	7,18
TR42	10,00	8,69	7,21
TR51	9,76	8,76	7,39
TR52	9,14	7,72	7,72
TR61	8,61	7,43	7,38
TR62	9,23	8,26	8,02
TR63	8,42	8,33	7,78
TR71	8,44	8,69	8,29
TR72	8,68	8,40	7,99
TR81	8,39	9,14	7,22
TR82	8,37	8,24	7,61
TR83	8,83	8,20	7,61
TR90	8,35	8,98	7,76
TRA1	8,74	8,89	7,98
TRA2	8,26	9,57	8,07
TRB1	8,02	8,55	8,22
TRB2	8,36	9,40	7,79
TRC1	7,78	9,00	8,45
TRC2	8,27	8,19	8,43
TRC3	7,18	8,07	7,28
Mean	8,80	8,42	7,73
SD	0,71	0,63	0,39

Source: Central Bank of Turkey, 2015

indicator of convergence (or divergence). The null and alternative hypotheses take the following form:

*Ho*:  $\alpha$ =0 (unit root and non-stationary series) *Ha*:  $\alpha$ <0 (no unit root and stationary series)

In case,  $\alpha$ =0, there is evidence of a unit root process and no indication of stationary relative inflation rates. By contrast,  $\alpha$ <0 indicates evidence of no unit root and convergence of relative incomes to an equilibrium level.

In the LLC test, a different lag order for each region has been allowed. The lag order is represented by  $\rho$ . In our case, we determine it using three different measures from Akaike (1974), Schwarz (1978) and Hannan and Quinn (1979). We set the maximum possible time lag at 12 months.

The outcomes of the test are summarized in Table 3. The  $\alpha$  value is negative and significant at 1% level

<sup>&</sup>lt;sup>2</sup> The panel unit root specification and ADF regression are obtained from Eviews 6 program's user guide.

in all regressions. This indicates strong and robust evidence of the rejection of the null hypothesis of a unit root. Therefore, it suggests the presence of a convergence pattern and declining differentials across regional inflation areas.

**Table 3:** Levin, Lin and Chu (2002), Panel Unit Root TestResults

Lag Selection Criteria	αValue	P-Values
Akaike	-11.29***	0.000
Schwartz	-15.68***	0.000
Hannan-Quinn	-13.98***	0.000

**Note:** Max. Lag=12 months, no intercept or trend, common unit root, eviews 6

Hence the declining disparities in inflation rates are confirmed both visually, through the graph of standard deviations and, inferentially, by panel unit root tests.

#### 3.3 Distribution Dynamics Analysis

The distributional aspects of inflation help provide additional insights into the convergence process.

To be able to pursue such an analysis, we first need to organize our dataset by dividing the period of analysis into three sub-periods. These are the pre-crisis period of 2004-2007, the crisis period of 2008-2009, and the post-crisis period of 2010-2014. This type of division is relevant as the sub-periods cover different phases of the economic cycle during which the regions may show arbitrary price reactions to economic disturbances. Moreover, it also captures the effect of the economic crisis and related policy changes.

From a cross-sectional viewpoint, we divide the regions into 5 classes with respect to their annual average inflation rates. The regions which had the highest inflation rates are included in the first quintile, while those which experienced the lowest annual average inflation are included in the 5th quintile. The documentation of these quintiles is presented in Table 4 below.

Table 4: Regional inflation rates during different periods and quintiles

Quintiles	Regions	Pre-crisis, 2004-2007	Regions	Crisis, 2008-2009	Regions	Post-Crisis, 2010-2014
	TR42	9,48	TRC2	9,12	TRC1	7,77
	TR10	9,47	TRB2	9,12	TRA1	7,58
	TR22	9,14	TRC1	8,90	TRA2	7,53
	TR41	9,01	TRB1	8,67	TRC2	7,52
1st Quintile	TR32	8,99	TR62	8,41	TRB1	7,52
	TR31	8,98	TR63	8,37	TR71	7,45
	TR51	8,97	TRC3	8,28	TR21	7,33
	TR21	8,83	TR90	8,23	TR31	7,30
	TR62	8,75	TR71	8,21	TR22	7,29
2nd Quintile	TR52	8,59	TRA2	7,85	TR51	7,27
	TR83	8,36	TR51	7,83	TR82	7,26
	TRA1	8,36	TR72	7,53	TR72	7,17
	TR72	8,29	TR22	7,49	TR90	7,17
	TR81	8,25	TR21	7,35	TRB2	7,15
3rd Quintile	TRA2	8,19	TR83	7,35	TR62	7,13
	TR61	8,12	TR61	7,29	TR81	7,12
	TR90	8,10	TR10	7,22	TR63	7,12
	TR71	8,06	TRA1	7,15	TR33	7,11
	TR33	8,06	TR82	7,01	TR83	7,09
4th Quintile	TRB2	8,02	TR31	6,98	TR10	7,03
	TR63	8,00	TR33	6,98	TR52	6,98
	TR82	7,98	TR52	6,93	TR61	6,95
	TRC2	7,78	TR42	6,92	TR32	6,92
	TRC1	7,73	TR32	6,89	TR42	6,88
	TRB1	7,67	TR41	6,73	TR41	6,85
5th Quintile	TRC3	6,79	TR81	6,45	TRC3	6,79

We then estimate the Kernel density functions of regional inflation rates for each period in order to understand the evolution of the shape of the regional inflation distribution. The results are shown in Figure 3

**Figure 3:** Kernel Density estimation of inflation rates, normal distribution assumed







At a glance, during the first period, the probability mass is concentrated on two main modes. It therefore seems to be a bi-modal distribution. On the one hand, the highest probability mass is surrounded by about

> an 8% inflation rate as a first mode. On the other hand, the second mode is about a 9% rate, which is much less obvious compared to the first. During the second period, the shape of the distribution remains almost constant. The only difference is that the probability mass seems more uniform rather than bi-modal, and the probability mass has concentrated on 7% inflation rate instead of 8%. Looking at these results, one may argue that national inflation rates seem to have declined during the crisis, while its regional distribution was not much affected. The decline in overall inflation during the recession seems plausible since unemployment tends to rise, while real wages and aggregate demand tend to decline. Therefore, prices increase at a slower rate since aggregate demand does not grow fast. In the last period, however, the results are quite different. During 2010-2014, the regional inflation rates have a very normally shaped distribution with much higher cross-regional homogeneity compared to previous years. This homogenization process points to a tendency towards decline in inflation disparities.

> Another merit of this methodology is that it provides information on the intra-distributional mobility of regions. In other words, it helps in figuring out how mobile the regions are within the distribution. To understand this, we create Transition Markov Matrices by mapping regional inflation distribution in two consecutive periods (Asmussen, 2003). We calculate two matrices. The first shows the Transition Markov Matrix between the pre-crisis and crisis periods (in 5.1) and the second shows the Transition Markov Matrix between crisis and post-crisis periods (in 5.2).

> Specifically, each value in these matrices shows the number of regions moving between two quintiles from the previous period to the current period. For instance, the value of "3" in Table 5.1 means that there are 3 regions that were in the 5th quintile during the period of 2004-2007, and that they have moved to the 1st quintile in the period of 2008-2009. The number of regions included in the diagonal indicates the degree of immobility, as those regions did not change their quintiles over those periods.

In 5.1, the immobility seems quite low. Only 2 regions out of 26 kept their relative position, while the rest of the 24 regions switched their quintiles between periods. In 5.2, 10 regions keep their quintile and 16 regions change.

Hence, one may argue that the relative position of regional inflation rates is far from a structural pattern. In contrast, relatively high and low inflationary places tend to change their quintiles frequently over time, indicating behavior that is random rather than structural.

The areas in Table 5 that are below the diagonal part (in blue) represent regions that moved to a better quintile (lower inflation), while the areas above the diagonal part (in orange) represent the regions which moved to a worse quintile (higher inflation). As 5.1 shows, 10 regions improved their quintiles, whereas 12 regions worsened. Similarly, as 5.2 shows, 9 regions improved their quintiles, whereas 6 regions worsened.

Overall, the distribution dynamics analyses indicate two main results. First, the distribution of regional inflation rates manifest a tendency to exhibit a unimodal and homogenous distribution form, which complements the convergence result found in panel unit root tests. Second, we have learned that within this distribution, the mobility of regions is quite high and that inflation behavior is not structural.

We think that the random dynamics of inflation found in our study is proof of a well-functioning market price system. Indeed, in none of the regions did we observe persistent and systematic high inflation. Recent policy changes have contributed to this process. From the mid-2000s onwards, the Turkish Central Bank has started to apply a direct inflation targeting policy, after which inflation rates have lowered, and price stability has been maintained both at the regional and national level. The flexible exchange rate policy adopted in 2001 was also influential in this process. The only negative side of this mechanism is that policies can hardly be designed as region-specific, as there is no systematic geographical pattern of inflation.

				Crisis		
		1st Quintile	2nd Quintile	3rd Quintile	4th Quintile	5th Quintile
	1 <sup>st</sup> Quintile	0	0	1	1	3
	2 <sup>nd</sup> Quintile	1	0	2	1	1
Pre-crisis	3 <sup>rd</sup> Quintile	0	1	2	1	1
	4 <sup>th</sup> Quintile	1	2	0	1	1
	5 <sup>th</sup> Quintile	3	2	0	1	0

(5.2)

(5.1)

				Post-Crisis		
		1st Quintile	2nd Quintile	3rd Quintile	4th Quintile	5th Quintile
	1 <sup>st</sup> Quintile	3	0	2	0	0
	2 <sup>nd</sup> Quintile	1	1	1	1	1
Crisis	3 <sup>rd</sup> Quintile	0	3	1	1	0
	4 <sup>th</sup> Quintile	1	1	1	1	1
	5 <sup>th</sup> Quintile	0	0	0	2	4

#### 4. CONCLUSIONS

The current paper analyzed regional inflation convergence in Turkey over the period of 2004-2015 by adopting existing methodologies and a relatively new methodology. The outcomes of the research can be summarized in two parts.

First, inflation disparities have declined over time, especially during the post-crisis period after 2010. Hence, the overall price stabilization and disinflation process in Turkey has been coupled with inflation convergence across its regions. The inflation targeting policy has also contributed to this process (Yılmazkuday 2013). These results are confirmed using several methodologies, (i.e. SD graph, panel unit root tests and Kernel Density Estimates) and they seem consistent with the existing literature.

Second, in addition to the findings in the literature, we found that regions change their relative inflation rate positions quite often. This indicates that regional inflation behaviour is random in time and non-structural, as the relatively high and low inflationary places tend to change their quintiles frequently. Similarly, geographical randomness is also verified using Moran I's test.

All these results imply several policy suggestions. First, achieving inflation convergence is a harder task than initially understood, as it seems to be random behavior. The economic drivers behind this should be carefully analyzed by policy makers. Second, trade integration should be promoted so as to make regional prices converge with each other. Finally, during possible recessions in the future, in addition to targeting aggregate disinflation, regional dispersion should be addressed with great care as it is critical to Central Bank policy success.

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# FINANCING CONSTRAINTS AND FIRM GROWTH IN EMERGING EUROPE

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#### ABSTRACT

The paper aims to shed light on the effects of different types of financing constraints on firm sales and employment growth in Emerging Europe before and after the onset of the financial crisis. It analyzes the group of emerging NMS-10 economies (plus Turkey) and the group of economically and financially lagging Western Balkan countries. The paper demonstrates that financing constraints significantly obstruct firm growth, particularly in the Western Balkan countries, which calls for policy intervention to ensure swifter job-rich growth and catching-up with the rest of Europe. It also emphasizes that particular firm characteristics are essential for growth in Emerging Europe and demonstrates that exporting only and innovating are recipes for faster firm growth, while importing only and a high foreign ownership share seriously retard firm growth. Finally, it stresses the importance of the particular institutional environment for firms to thrive.

Keywords: financing constraints, establishment growth, NMS-10, Western Balkans, financial crisis.

**JEL Code:** *L25, D22, D53, O16, O57.* 

#### 1. INTRODUCTION

Alarmingly, the burgeoning empirical literature on the causes and effects of financing constraints finds considerable and robust evidence that financing constraints severely affect firm behavior, obstruct firm performance and greatly curb firm growth.<sup>1</sup>

Theoretically, the presence of financing constraints is ascribed to capital market imperfections such as non-negligible information asymmetries between entrepreneurs and uninformed outside investors. For instance, in the model of credit rationing developed by Stiglitz and Weiss (1981), imperfect information induces banks to resort to rationing credits instead of increasing the interest rate to maximize profits. Since the interest rate banks charge for credits also affects the riskiness of their pool of loans through an adverse selection effect and a negative incentive effect, higher interest rates would both attract riskier projects and induce debtors to realize projects with a generally lower probability of success but higher returns when successful. Hence, the on average higher riskiness of potential borrowers lowers overall profits for the banks and induces profit-maximizing banks to restrict the number of credits they grant.

Empirically, a quickly growing body of literature finds strong evidence of financing constraints, but also stresses that the prevalence and extent of such constraints strongly depend on specific firm characteristics. For instance, due to insufficient collateral and resources, smaller firms are more financially constrained

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than larger ones (see, e.g., Angelini and Generale 2005; Beck, Demirgüç-Kunt, and Maksimovic 2006; Hadlock and Pierce 2010 or Winker 1999) or that due to the lack of relevant reputation and credit history, younger firms face stronger financing constraints (see, e.g., Beck, Demirgüç-Kunt, and Maksimovic 2006; Winker 1999 or Ferrando and Mulier 2013). Furthermore, due to the presence of and easier access to internal capital markets, financing constraints are lower among foreign-owned firms (see, e.g., Schiantarelli and Sembenelli 2000 or Beck, Demirgüç-Kunt, and Maksimovic 2006) or among firms that are part of a business group (see, e.g, Shin and Park 1999 or Beck, Demirgüç-Kunt, and Maksimovic 2006). Likewise, preferential treatment from state-owned financial institutions or generous budgetary support from the government also renders state-owned firms less financially constrained (see, e.g., Héricourt and Poncet 2007). Additionally, empirical evidence highlights that the macro-economic context matters and points to the decisive role of economic, financial and legal system development in alleviating funding obstacles (see, e.g., Beck, Demirgüç-Kunt, and Maksimovic 2003 and 2006 or Clarke, Cull, and Martinez Peria 2001).

These impediments to external funding are even more important in lagging economies, where access to financial markets is not only a crucial determinant of the growth and survival of firms, but, more importantly, of economic growth and catching-up processes with richer economies. In this context, the analysis pursues the following key objectives: first, it sheds light on the effects of financing constraints on firm growth for a rich sample of transition economies in Central, East and Southeast Europe. It analyzes the group of emerging Central and Eastern economies comprising all NMS-10 economies<sup>2</sup> plus Turkey and the group of economically and financially lagging Western Balkan countries<sup>3</sup>. More importantly, it seeks to establish whether the growth-effects of financial constraints differ by level of economic development, and analyzes whether financially constrained establishments located in economically and financially lagging Western Balkans experienced worse growth performances than those located in the more advanced NMS-10. Second, it studies two different firm growth indicators, namely the widely used growth of sales, as well as the growth of employment to point to and identify potential labor-market consequences of financing constraints that have so far widely been neglected in this line of research (notable exceptions include Hashi (2001) or Aghion, Fally, and Scarpetta (2007)) but are a key concern in the context of jobrich growth. Third, it differentiates between different

types of financing constraints to establish whether the effects on growth differ by the relative strictness of prevailing financing constraints. Partly due to data restrictions, this issue has so far not been addressed in the literature. Third, it studies two different economic phases – the pre- and post-crisis periods - to account for the effects of the recent global financial crisis on financing constraints and their role for growth. From a global perspective, the crisis hit the NMS the hardest, particularly the Baltic countries. However, while the severity of the recession was higher in the group of NMS than in the group of Western Balkan countries, recovery was also stronger, leaving fewer legacies in terms of high unemployment rates or excessive nonperforming loans.

The rest of the paper is structured as follows: section 2 provides an overview of the literature on different barriers to firm growth, with a special focus on financial barriers. Section 3 then discusses the data used in the analysis. The prevalence of different financing constraints is briefly discussed in section 4, while section 5 presents the methodological approach applied in the analysis. Results of the analysis are presented and discussed in section 6, while section 7 summarizes and concludes the paper.

#### 2. RELATED LITERATURE

Given the key role of firm growth for employment creation, value-added or knowledge generation, or for research and technology development, this area has been high on the policy agenda of developing and developed countries alike and has sparked substantial research. In general, a quickly burgeoning body of literature finds consistent evidence that firms face numerous non-negligible and partly insurmountable internal and external barriers.

The role of **financial systems** for growth and the consequences of barriers to finance in terms of retarding or altogether stopping growth has received much attention. Generally, economists tend to hold different views as to the exact role of the financial sector for growth. Some argue that financial systems play a crucial role in stimulating technological innovation and economic development by mobilizing savings, evaluating projects, managing risk, monitoring managers, and facilitating transactions (see Schumpeter 1912), while others highlight that financial development responds to and therefore follows economic development (e.g., Robinson 1952 or Lucas 1988). Empirical evidence seems to corroborate that countries with better developed financial systems also

experience faster growth (see, e.g., Goldsmith 1969; King and Levine 1993; Levine and Zervos 1998). More recently, thanks to the availability of comprehensive and comparable micro-data, cross-country firm-level analyses have come to support the assertion that 'finance matters,' and that financing constraints are obstructive to growth. For instance, Demirgüç-Kunt and Maksimovic (1998) use firm-level data for 30 developing and developed countries to investigate whether underdeveloped or dysfunctional legal and financial systems prevent firms from investing in growth opportunities. They show that more developed financial systems - proxied by larger banking sectors and more active and liquid stock markets – allow firms to obtain external funds and grow faster than they would if they had to finance growth endeavors internally only or through short-term borrowing. Similarly, prevailing funding obstacles are proven to be detrimental to firm growth. Beck, Demirgüç-Kunt, and Maksimovic (2005) use a rich sample of developing and transition economies, and demonstrate that observable financing obstacles exert a negative effect on firm sales growth. However, the smallest firms are affected the most, which is particularly worrying, since SMEs contribute greatly to the overall economy in terms of job creation, knowledge generation and research and innovation performance. Ayyagari, Demirgüç-Kunt, and Maksimovic (2008) analyze whether, how and to what extent different characteristics of the business environment firms report as obstacles actually affect their sales growth performance. They use the World Bank World Business Environment Surveys for 80 developed and developing economies and show that finance is the most robust and largest obstacle to firm growth. However, effects differ by firm size, leaving smaller firms most affected. Furthermore, among a number of different financing obstacles like collateral requirements, paperwork and bureaucracy, high interest rates, need for special connections, banks lacking money to lend, access to foreign banks, access to nonbank equity, access to export finance, access to financing for leasing equipment, inadequate credit and financial information on customers, or access to long-term loans, only high interest rates are directly and negatively related to firm growth. In particular, a one-standard deviation increase in this particular obstacle leads to a 3.3 percent decrease in firm growth. Similar negative consequences of funding obstacles are observable for establishments located in Central, East and Southeast Europe. Hashi (2001) uses Albanian enterprise survey data and highlights that financial obstacles significantly hamper employment and asset growth of Albanian SMEs. Similarly,

Hashi and Krasnigi (2011) study two different groups of transition economies, namely a group of advanced transition economies (comprising Poland, Hungary and the Czech Republic) and a group of laggard transition economies (comprising Albania, Macedonia and Serbia and Montenegro), to identify differences in growth determinants of SMEs across country groups at different stages of transition. They highlight that external financing constraints only inhibit the growth of sales in the group of advanced transition economies, where, given the advanced stage of economic development, establishments can no longer grow using the owners' own funds only but also need external sources of finance. Furthermore, Rajan and Zingales (1998) use industry-level data for 44 economies over the 1980s and show that financially dependent industries tend to have better value-added growth performance in more financially developed countries. Similarly, De Serres et al. (2006) test the impact of financial systems' development on sectoral value-added and productivity growth and new firm entry in a rich sample of OECD countries. They highlight that policies that improve contract enforcement, access to credit, the efficiency of bankruptcy procedures, or reduce barriers to entry and government control in the banking sector tend to foster labor productivity and value-added growth in sectors most dependent on external finance. Related to that, Aghion, Fally, and Scarpetta (2007) use harmonized firm-level panel data on entry and post-entry growth of firms in a sample of OECD, transition, and Latin American countries and show that financial development not only spurs new firm entry, but also post-entry employment growth among firms in sectors that more strongly depend on external finance.

In addition to financing obstacles, firm growth is affected by a number of other factors. In particular, specific demographic characteristics of firms are found to inhibit their growth prospects and performance. For instance, small firm size or young age tends to speed up growth. The size-growth nexus is typically analyzed in the context of Gibrat's law, which states that firm size and growth are independent. While empirical evidence is rather mixed and generally leads to a rejection of Gibrat's law, most empirical studies find a negative relationship between firm size and growth. Similarly, empirical evidence more consistently points to a negative relationship between age and firm growth.<sup>4</sup> However, this relationship seems to be nonlinear, eventually disappearing or even reversing after a certain period of time (see, e.g., Coad and Tamvada 2008; Bigsten and Gebreeyesus 2007). In a similar vein, an establishment's legal form and ownership – as well as changes thereof - matter for its growth. For instance, Harhoff, Stahl, and Woywode (1998) highlight that among a sample of West German firms public firms and firms with limited liability have significantly higher growth rates. Furthermore, the growth performance of family-owned businesses, as well as changes in growth due to their transfer to successive generations, have received a fair amount of interest, suggesting that family control exerts a negative impact on firm growth (see, e.g., Gallo, Cappuyns, and Tapies 2004; Hamelin and Trojman 2007; Mahérault 2004) and that a transfer of familyowned businesses to successive generations tends to result in lower firm growth, at least initially (Molly, Laveren, and Deloof 2010). In addition, a large amount of empirical evidence finds that due to higher levels of efficiency, better knowledge of and access to global markets, and more contacts and networks or better access to financing, foreign ownership is conducive to firm growth (Lipsey, Sjöholm, and Sun 2010; Hake 2009; Bellak 2004; Petkova 2008). Additionally, a series of theoretical papers emphasizes the key role played by innovation for growth (Solow 1957; Aghion and Howitt 1992; Romer 1990; Grossman and Helpman 1991). While the positive effect of innovation on output growth is well documented in the literature, its role for employment has been subject to extensive debate, particularly since product and process innovations both create and destroy jobs, rendering the net effect an a priori unclear outcome. This is also reflected in the vast literature on the employment-effects of innovations, which highlights that the employment effects of process innovations are mixed and inconclusive,<sup>5</sup> while product innovations are associated with employment growth<sup>6</sup>. Moreover, firm growth also critically depends on establishments' trading activities. Analyses of European firm-level data highlight that exporting exerts a positive effect on firm employment and sales growth (see, e.g., Wagner 2002 or Serti and Tomasi 2008).

Likewise, empirical evidence highlights that **individual entrepreneur characteristics** also strongly matter for firm growth. In this respect, an entrepreneur's level of education, years of working experience or gender are highlighted in the literature. In particular, as a source of technical, managerial or business knowledge and skills or enhanced learning capacities, (formal) education is expected to spur firm growth. By and large, this positive *education*-growth nexus is corroborated by empirical evidence (Nichter and Goldmark 2009). Furthermore, theoretically, *work experience* is expected to be growth-enhancing, since learning-on-the-job is a vital mechanism to enhance the capabilities, knowledge and skills of both owners and employees, therefore contributing to firm growth. However, empirical evidence is rather mixed (particularly for developed countries) (for an overview of the literature, see Nichter and Goldmark 2009) and in some cases even negative (Storey 1994). Furthermore, because of particularly difficult challenges faced by *women* in terms of asymmetrical rights and obligations or greater problems with innumeracy, illiteracy, and a lack of business skills (Nichter and Goldmark 2009), female-headed establishments tend to grow more slowly (Mead and Liedholm 1998; McPherson 1996; Coad and Tamvada 2008).

Finally, it is widely recognized that the external environment plays a crucial role for firm growth. On the one hand, the state of the economy directly determines profitable business opportunities, rendering economic upturns periods of strong demand, characterized by more favorable growth prospects and generally higher firm growth (Liedholm 2002; Oberhofer 2010). On the other hand, the regulatory and institutional environment shapes and determines business and the growth opportunities of establishments, and may adversely affect an establishment's growth prospects. Previous analyses have demonstrated that labor and product market regulations deter firms from expanding even if successful (Scarpetta et al. 2002; Haltiwanger, Scarpetta, and Schweiger 2006) or that firm growth is significantly lower if firms face financial, legal, and corruption problems (Beck, Demirgüç-Kunt, and Maksimovic 2005), obstacles related to finance, crime or political instability (Ayyagari, Demirgüç-Kunt, and Maksimovic 2008; Hashi and Krasniqi 2011) or consider taxes too constraining (Hashi 2001; Hashi and Krasniqi 2011).

#### 3. DATA SOURCES

The ensuing analysis uses firm-level data for a large set of Central Eastern and South Eastern European countries (CESEEC) comprising all new Member States (apart from Malta and Cyprus) (referred to as NMS-10), all of the Western Balkan countries (namely the EU Candidate Countries of the former Yugoslav Republic, including Macedonia (MK), Montenegro (ME), Serbia (RS) as well as Albania (AL), Bosnia and Herzegovina (BA), Croatia (HR) and Kosovo (XK)) and Turkey (TR) to shed light on the role of financing constraints on firm growth in both the pre- and post-crisis periods. It uses the 4th and 5th waves of the Eastern European component of the Business Environment and Enterprise Performance Survey (BEEPS), which is a joint initiative of the World Bank Group (WB) and the European Bank for Reconstruction and Development (EBRD). In particular, the 4th wave - which was conducted in the calendar years 2008/09 and refers to fiscal year 2007 is used to analyze the period prior to the onset of the global financial crisis, while the 5th wave - which was conducted between calendar years 2012 and 2013 and refers to fiscal year 2011/12 - is used to shed light on the post-crisis period.

The Enterprise Surveys have been conducted regularly since 2002 by means of face-to-face interviews with managers, owners or directors of establishments on a three- to four-year rotation in order to collect information on the quality of individual firms' business environments, how they are perceived by them and how they change over time, identifying various constraints or obstacles to firm performance and growth and capturing the effects that a country's business environment has on firms' international competitiveness. It focuses on the private, non-agricultural sector of an economy.

Country samples are selected using random sampling, stratified by firm size (small: 5-19 employees; medium: 20-99 employees; large: more than 99 employees), region (of major economic activity) and industry (based on the ISIC classification, revision 3.1, covering all manufacturing sectors (group D), construction (group F), services (groups G and H), transport, storage and communications (group I) and IT (from group K)). The primary sampling unit of each survey is the establishment with five or more full-time employees, located in a major urban center, and engaged in non-agricultural activities. This particular sampling methodology generates country samples that are representative of the whole non-agricultural private sector. Available sampling weights which account for the varying probabilities of selection across different strata can be used to derive population estimates. Furthermore, the standardized sampling strategy and survey instruments used in collecting the data guarantee that survey data from different countries are comparable.

Country samples are also adjusted to account for items that elicit non-responses – questions with missing responses – which is a problem the Enterprise Survey shares with other surveys, since some data, particularly accounting data, are considered too sensitive to share. Item non-responses are accounted for by factoring in a rate of 25 percent for non-responses per stratum. This automatically increases the number of necessary interviews, but guarantees that enough valid responses are available to compute indicators with the required precision.

Overall, the pre-crisis sample consists of 6,182 establishments, while the post-crisis sample covers 6,009 establishments (see Table A.1 in the Annex for a more detailed overview by country and period and Table A.2 for summary statistics).

#### 4. THE PREVALENCE OF DIFFERENT FINANCING CONSTRAINTS

The analysis uses two different proxy variables for financing constraints to identify whether and to what extent such constraints affect firm growth. First, the dummy variable **Rejected** is derived from the following question covered in the BEEPS questionnaire: 'Referring to this most recent application for a line of credit or loan, what was the outcome of that application?' Several options are available to the interviewee: a) the application was approved, b) the application was rejected, c) the application was withdrawn by the establishment, d) the application is still in process, and e) don't know. The dummy variable Rejected is set equal to 1 if the application was rejected, and 0 if the application was either withdrawn by the establishment or was still in process at the time of the interview, while "don't know" is treated as missing. Second, the dummy variable **Constrained** is derived from the following guestion in the BEEPS guestionnaire: 'What was the main reason why this establishment did not apply for any line of credit or loan?' A number of different options were available to the interviewee. The variable Constrained is set equal to 1 for either of the following reasons: (i) the application procedures were complex, (ii) interest rates were not favorable, (iii) the collateral requirements were too high, (iv) the size of the loan and maturity were insufficient, (v) it was necessary to make informal payments to get bank loans, (vi) did not think it was approved, and finally, (vii) other (not specified). It is equal to 0 if there was no need for a loan, since the establishment had a sufficient amount of its own capital. The first indicator (i.e. Rejected) will be used to analyze the sub-set of establishments which actually applied for any loans or lines of credit, while the second indicator (i.e. Constrained) will be used for the sub-set of establishments which - for all of the different reasons outlined above - did not apply for any loans or lines of credit, despite the need for funds.



Figure 1: Prevalence of different types of constraints

**Note:** NMS-10 comprises Bulgaria (BG), the Czech Republic (CZ), Estonia (EE), Hungary (HU), Latvia (LV), Lithuania (LT), Poland (PL), Romania (RO), Slovakia (SK), and Slovenia (SI). TR refers to Turkey. The Western Balkans comprise Albania (AL), Bosnia and Herzegovina (BA), Croatia (HR), Montenegro (ME), the former Yugoslav Republic of Macedonia (MK), Serbia (RS) and Kosovo (XK).

Source: BEEPs, own calculations.

The prevalence of different types of financing constraints is depicted in Figure 1 for each country and period separately. It points to a number of interesting findings: first, irrespective of country or economic period considered, credit constraints (labeled 'Applied and rejected') were only of little importance, while constraints of establishments that would have needed external funds but restrained from applying for bank loans (labeled 'Not applied but need') dominated. Interestingly, with the exception of Lithuania, credit constraints were more widespread during the precrisis period, which is probably the result of more and riskier credit applications during the pre-crisis credit boom. Second, the extent of financing constraints varies across countries. During the pre-crisis period, among NMS-10 countries, financing constraints were lowest in Slovenia (with around 10 percent) but highest in Bulgaria (with around 30 percent), followed by Latvia and Slovakia. During the post-crisis period, financing constraints in Bulgaria increased even further, to almost 35 percent. On the contrary, financing

constraints were lowest in Turkey, the Czech Republic, Estonia and Poland. In the Western Balkan countries, financing constraints during the pre-crisis period were lowest in Albania with around 15 percent, and highest in Montenegro and Macedonia, with above 30 percent. During the post-crisis period, financing constraints decreased significantly in Macedonia, Bosnia and Herzegovina and Montenegro, while they increased somewhat in Albania and Serbia. Third, the majority of establishments had their bank loan applications approved, rendering a rejection a rather rare incident.

#### 5. DRIVERS OF AND OBSTACLES TO FIRM GROWTH: METHODOLOGICAL APPROACH

To shed light on the role of prevailing financing constraints for firm growth and on whether their growth-effects differ across country samples, the following specification is analyzed<sup>7</sup>:

$$Growth_{ijkt} = \alpha + \beta_1 F C_{ijkt}^m + \beta_2 Balkan_{kt} + \beta_3 F C_{ijkt}^m * Balkan_{kt} + \gamma X_{ijkt} + \cdots$$
$$\dots \delta Y_{jt} + \vartheta D_{kt} + \varepsilon_{ijkt}, \qquad (1)$$

where  $Growth_{iikt}$  is the dependent variable and refers to the annualized growth rate (between time t and t-3) of establishment i in industry j and country k at time  $t^8$  As highlighted above, the analysis uses two different growth indicators, namely (i) growth in sales and (ii) growth in (full-time, permanent) employment. Furthermore, the analysis sheds light on the effects of the global financial crisis on the determinants of establishment growth. Unfortunately, even though during the data gathering procedure maximum effort was taken to generate country panels by re-interviewing establishments, the panel structure of the underlying country sample is rather poor. This renders the use of panel data analyses which account for unobserved establishment heterogeneity futile. Hence, instead, the analysis looks at two different periods separately: the pre-crisis period, referring to fiscal year 2007 (t = 2007), and the post-crisis period, referring to fiscal year 2011/12 (t = 2011/12).

 $FC_{ijkt}^{m}$  is the main variable of interest, capturing the effect of different types of financing constraints on firm growth (m = Total, Rejected or Constrained). As highlighted in section 4, the analysis differentiates between two different types of financing constraints, namely Rejected, which is equal to 1 for establishments that applied for a bank loan but whose credit application was rejected (and 0 otherwise), and Constrained, which is equal to 1 for establishments that would have needed external funds, but due to different reasons (outlined above) did not apply for loans or lines of credits (and 0 otherwise). As a starting point, a composite financing constraint variable is used, namely Total. It is a dummy variable that is equal to 1 for establishments that faced any kind of financing constraints, i.e. Rejected or Constrained, and 0 otherwise. This allows us to shed light on the determinants of growth, in general, and the role of financing constraints, in particular, for all firms in the sample. In contrast, differentiating between the two different types of financing constraints separates the overall firm sample in two separate sub-samples - depending on whether establishments faced one or the other type of financing constraint - potentially leading to different inferences depending on the average characteristics of all establishments in the two different samples.

 $Balkan_{kt}$  is a dummy variable that is equal to 1 if a country is a Western Balkan country, and 0 otherwise. It is included to test whether establishments located in the Western Balkans grow at significantly different rates than those located in the more advanced NMS-10 countries.

 $FC_{ijkt}^{m} * Balkan_{kt}$  is an interaction term between two dummy variables, namely between each individual type of financing constraints  $FC_{ijkt}^{m}$ and  $Balkan_{kt}$ . It is included to capture whether (different types of) financing constraints exert different effects on the growth of establishments located in Western Balkan countries compared to those located in the NMS-10 region.

Furthermore,  $X_{ijkt}$  is a matrix of establishment-level control variables, capturing:

**Firm age:** defined as the log of firm age, calculated as the difference between the current year *t* and the year of the firm's establishment or registration. It is included to test for the empirically supported assertion that age and growth are negatively related. Furthermore, to test for the presence of a non-linear relationship between firm growth and age, the square of log firm age is also included.

**Firm size:** defined as the firm's initial size and included to test the size-growth nexus. As highlighted above, most empirical studies find a negative relationship between firm size and growth. Contingent on the particular dependent variable studied, different measures of firm size were used to avoid issues of endogeneity. In particular, for the sales growth equation, the log of the initial number of employees was used, while for the employment growth equation, the log of initial sales was used instead. In addition, to test for the presence of a non-linear relationship between firm growth and size, its square terms were also included.

Years of experience of Top Manager: defined as the log of the number of years of work experience of the Top Manger in the establishment's sector. It captures whether the Top Manager's work experience is indeed growth-enhancing. In general, however, empirical evidence is rather mixed and sometimes even negative.

**Ownership structure**: the analysis uses two different ownership indicators to test whether a particular ownership structure is more conducive to growth: first, the share of the establishment owned by *private foreign* individuals, companies or organizations (in %); second, the share of the establishment owned by the *government or state* (in %); the share of the establishment owned by private domestic individuals, companies or organizations serves as a reference group. Empirical evidence generally emphasizes that foreign ownership is conducive to firm growth.

**Trading status:** captured by means of three different dummy variables. First, a dummy variable is included for *exporters only*, which is equal to 1 if an establishment is a direct exporter only (i.e. reports positive direct exports only but no direct imports of material inputs or supplies), and 0 otherwise. Second,

a dummy variable is included for *importers only*, which is equal to 1 if an establishments is a direct importer of material inputs or supplies only (but no direct exporter), and 0 otherwise. Finally, a dummy variable is included for *exporters and importers*, which is equal to 1 if an establishment is both a direct exporter and a direct importer, and 0 otherwise. Trading status is included to identify whether exporters, through more diversified markets and customer bases or better technological capacities and improved competitiveness, grow faster or whether importers, through better access to foreign knowledge and technology, grow faster.

**Product innovator:** a dummy that is equal to 1 if an establishment introduced a new or significantly improved product or service during the previous three years. Unfortunately, given the absence of information on process innovations in the 4<sup>th</sup> wave of the Enterprise Survey, their role for firm growth could not be consistently estimated. Empirically, product innovations are generally found to be associated with stronger employment growth.

**Big city:** a dummy that is equal to 1 if an establishment is located in the capital city or a city with a population of over 1M. It is included to highlight that establishments located in larger cities/metropolises profit more from growth-enhancing spillovers than those located in less densely populated areas.

 $Y_{jt}$  refers to a matrix of country characteristics:

**Real GDP growth rate:** defined as the average annual real GDP growth rate (in %) (over the last three years) to capture the state of the economy and the potentially favorable growth opportunities it offers to establishments.

Institutional characteristics: a number of different institutional characteristics to test whether and how the institutional environment affects the business and growth opportunities of establishments. First, paying taxes, which refers to all taxes and contributions that are government mandated (at any level: federal, state or local) and that apply to the standardized business and have an impact in its financial statements; second, starting a business which refers to all procedures officially required, or commonly done in practice, for an entrepreneur to start up and formally operate an industrial or commercial business, as well as the time and cost to complete these procedures and the paid-in minimum capital requirement; third, resolving insolvency, which refers to the time, cost and outcome of insolvency proceedings involving domestic entities. These indicators stem from the WB 'Distance to Frontier' Database. The reported score benchmarks economies with respect to regulatory best practices, showing the absolute distance to the best performance on each indicator. An economy's distance to frontier is indicated on a scale from 0 to 100, where 0 represents the worst performance and 100 the frontier. Hence, in any given year, the score measures how far an economy is from the best performance at that time.

Finally,  $D_k$  refers to industry dummies (i.e. Manufacturing, Construction with Services as reference group), while  $\varepsilon_{ijkt}$  refers to the error term.

However, the above specification may result in badly estimated coefficients because of the endogeneity of the product innovation indicator. In particular, faster growing firms may have a larger incentive to introduce new product innovations, which in turn fosters further growth. Hence, to deal with endogeneity, a 2SLS approach is pursued in what follows, which solves a two-equation system and produces efficient estimators. Potential instruments for the endogenous variable must be related to whether product innovations were introduced but were unrelated to the error term. Several candidates were taken into account, but based on different tests, the analysis uses (all or some of) the following exogenous instruments:

Innovation strategy: three different innovation strategies are deemed relevant for the success of an establishment's innovative activities. In particular, as highlighted by Veugelers and Cassiman (1999), establishments often apply different innovation strategies to develop technological innovations: establishments either (i) invest in R&D to 'make' innovations in-house or indigenously, (ii) source externally and invest in machinery and equipment (M&E) and 'buy' technology and know-how embodied in machinery and equipment from the original innovator that can then be used to also develop new products or services or modify existing ones, or (iii) apply a mix of both strategies, both making and buying innovations and technology. Hence, three dummy variables are used: make only for establishments that only pursue the make-strategy, identified by current positive R&D expenditures, buy only for establishments that only pursue the buystrategy, identified by positive investments in machinery and equipment or the use of technology licensed from a foreign-owned company, and make and buy for establishments that pursue both strategies. The three dummy variables are equal to 1 if the respective innovation strategy is pursued, and 0 otherwise.

**ISO:** a dummy variable that is equal to 1 if the establishment has an internationally-recognized quality certification.

**Computer use**: a dummy variable that is equal to 1 if an establishment's workforce currently uses computers in their jobs, and 0 otherwise.

A number of test statistics were used to determine the validity of the abovementioned instruments.

Serious problems arise if the correlations between the excluded instruments and endogenous regressor are nonzero but only 'weak,' such that the excluded instruments have little explanatory power only, i.e. if the correlations between the endogenous regressor and the excluded instruments are nonzero but small. Hence, the Stock-Yogo (2005) test for the presence of weak instruments is used, which tests the null hypothesis that the estimator is weakly identified only and is therefore subject to bias one finds unacceptably large. The test for weak identification is an F-version of the Cragg-Donald Wald statistic. Stock and Yogo (2005) have compiled critical values for the Cragg-Donald F-statistic for different definitions of 'perform poorly' based on bias and size. Hence the Stock-Yogo weak-instruments test comes in two forms: maximal relative bias and maximal size, where the null is that the instruments do not suffer from the specified bias. Rejection of their null hypothesis represents the absence of a weak-instruments problem. To test whether (1) is identified, the Anderson (1984) underidentification test is used, which uses canonical correlations between the excluded instruments and the endogenous regressors. Anderson's likelihood ratio test tests the null hypothesis that the smallest canonical correlation is zero. A failure to reject the null hypothesis calls the identification status of the estimated equation into question. Furthermore, an overidentification test of all instruments is conducted based on the Sargan statistic. Rejection of the null hypothesis highlights that the instruments used in the analysis are not valid. Finally, an endogeneity test is conducted, which tests the null hypothesis that the specified endogenous regressor can actually be treated as exogenous. Rejection of the null hypothesis means that the variable needs to be treated as endogenous.

#### 6. FINDINGS

The results in Tables 1 and 2 highlight that financing constraints (FC) do significantly obstruct firm growth, in terms of both sales and employment. The exact effects, however, differ by the type of financing constraint and the economic period considered. In particular, the composite financing constraint indicator (FC-Total) is significantly negative, irrespective of period considered. This finding suggests that, in the pre-crisis period, financially constrained establishments had almost 8 percentage points lower sales growth rates and 4 percentage points lower employment growth rates than unconstrained establishments, while in the post-crisis period financially constrained establishments had only around 6 percentage points lower esales growth rates and 4 percentage points lower esales growth percentage points lower esales growth per

employment sales growth rates than unconstrained ones. The results are less robust once the two different types of financing constraints are considered instead. In particular, irrespective of period considered, establishments whose credit applications were rejected (FC-Rejected) did not experience significantly lower sales growth rates, but around 6 percentage points lower employment growth rates than unconstrained establishments. However, this only holds for the postcrisis period. On the contrary, growth effects are more obstructive for establishments that abstained from applying for bank loans despite the need for external financing (FC-Constrained). During the post-crisis period only, establishments in need of external funds experienced around 6 percentage points lower sales growth rates than those that had no need for external funding. However, irrespective of period considered, establishments with a need for external funding had around 4 percentage points lower employment growth rates than those that had no such need.

Our results also show that sales and employment growth experiences differed across country samples. During the post-crisis period, employment growth rates were between 2 and 3 percentage points higher in the Western Balkans than in the group of NMS-10 (plus Turkey)<sup>9</sup>. In contrast, sales growth rates did not differ significantly across the two country groups.

Furthermore, we also find geographically differentiated growth-effects of financing constraints, but only in terms of employment growth and only during the pre-crisis period. With an average of around 7 percentage points lower employment growth rate, financing constraints were significantly more harmful to the employment growth of establishments located in the economically less advanced Western Balkan countries than to those located in the group of economically more advanced NMS-10 countries (plus Turkey).

In line with related empirical evidence, we find a significant negative relationship between firm age and growth. Our results suggest that another year of an establishment's life is associated with around 0.5 percentage points lower sales growth rate and around 0.1 percentage points lower employment growth rate. However, the relationship between age and employment growth (in the post-crisis period only) is characterized by a non-linear, U-shaped relationship, highlighting that the negative age-growth effect eventually dies out and probably even reverses as establishments grow older.

Similarly, in line with related empirical results, there is also consistent evidence of a significant negative size-growth nexus and a non-linear, U-shaped relationship between size and growth. However, for sales growth, this U-shaped relationship is confined to the

Table 1: Regression results f	or sales grow	ŕħ										
	Pre-crisis period	Post-crisis period	Pre-crisis period	Post-crisis period	Pre-crisis period	Post-crisis period	Pre-crisis period	Post-crisis period	Pre-crisis   period	Post-crisis period	Pre-crisis F period	ost-crisis period
Variables	(1)	(2)	(3)	(4)	(5)	(9)	(2)	(8)	(6)	(10)	(11)	(12)
FC-Total	-7.640** (-2.228)	-5.656*** (-2.700)	-6.324 (-1.493)	-4.835* (-1.703)								
Balkan*FC-Total			-3.761 (-0.530)	-1.765 (-0.426)								
FC-Rejected					-7.344	-2.481	-13.052* (_1 704)	2.622				
Balkan*FC-Rejected					(202.1-)	(0++-0-)	15.351 (1.268)	-12.075 -12.075 (-1.106)				
FC-Constrained									-6.520	-5.696**	-1.741	-6.364**
									(-1.504)	(-2.404)	(-0.332)	(-1.962)
Balkan*FC-Constrained											-14.894 (-1.611)	1.422 (0.300)
Balkan (yes=1)	-1.903	2.282	-1.017	2.697	0.343	9.867***	-1.964	10.609***	-3.454	-0.052	1.318	-0.478
	(-0.529)	(1.112)	(-0.257)	(1.189)	(0.065)	(2.582)	(-0.350)	(2.741)	(-0.694)	(-0.021)	(0.231)	(-0.168)
Log age	-52.982***	-50.871***	-53.024***	-50.977***	-34.411***	-36.283***	-34.112***	-36.351***	-66.557***	-58.380***	-66.408***	-58.291***
	(-5.855)	(-6.991)	(-5.860)	(-7.002)	(-2.679)	(-3.006)	(-2.655)	(-3.013)	(-5.220)	(-6.309)	(-5.215)	(-6.295)
Log age <sup>2</sup>	8.087***	7.344***	8.093***	7.365***	5.091**	4.687**	5.040**	4.694**	10.319***	8.828***	10.282***	8.810***
	(4.888)	(5.342)	(4.892)	(5.355)	(2.195)	(2.131)	(2.172)	(2.135)	(4.366)	(4.952)	(4.355)	(4.937)
Log size	-7.110*	-5.860**	-7.086*	-5.851**	-9.272*	-12.823***	-9.403*	-12.633***	-5.591	-2.938	-5.515	-2.939
	(-1.905)	(-2.144)	(-1.899)	(-2.141)	(-1.687)	(-2.914)	(-1.710)	(-2.870)	(-1.074)	(-0.781)	(-1.061)	(-0.781)
Log size <sup>2</sup>	0.304	0.750*	0.305	0.749*	0.397	1.574***	0.399	1.554***	0.213	0.365	0.221	0.366
	(0.619)	(1.953)	(0.621)	(1.951)	(0.577)	(2.818)	(0.580)	(2.782)	(0.296)	(0.643)	(0.307)	(0.644)
Log years of experience TM	-1.358	-0.194	-1.363	-0.170	0.365	0.585	0.351	0.651	-3.204	-0.481	-3.271	-0.505
	(-0.625)	(-0.136)	(-0.628)	(-0.119)	(0.119)	(0.249)	(0.115)	(0.277)	(-1.047)	(-0.268)	(-1.070)	(-0.281)
Foreign ownership share												
(%)	-0.081	-0.065*	-0.081	-0.064*	-0.087	-0.137**	-0.090	-0.136**	-0.072	-0.038	-0.079	-0.039
	(-1.493)	(-1.824)	(-1.504)	(-1.804)	(066.0-)	(-2.071)	(-1.033)	(-2.046)	(-1.018)	(-0.874)	(-1.115)	(-0.889)
State ownership share (%)	-0.069	-0.079	-0.068	-0.078	0.030	-0.055	0.030	-0.063	-0.162	-0.069	-0.151	-0.072
	(-0.395)	(-0.490)	(-0.388)	(-0.482)	(0.117)	(-0.258)	(0.118)	(-0.292)	(-0.681)	(-0.297)	(-0.635)	(-0.306)
Exporter only (yes=1)	0.988	1.453	0.980	1.452	4.767	1.964	4.976	1.804	-3.380	1.395	-3.289	1.390
	(0.262)	(0.589)	(0.260)	(0.588)	(0.920)	(0.519)	(0.961)	(0.477)	(-0.611)	(0.431)	(-0.595)	(0.430)

Financing constraints and firm growth in Emerging Europe

South East European Journal of Economics and Business, Volume 11 (1) 2016

27

Financing constraints and firm growth in Emerging Europe

Table 1: continued

	Pre-crisis	Post-crisis	Pre-crisis	Post-crisis	Pre-crisis	Post-crisis	Pre-crisis	Post-crisis	Pre-crisis	Post-crisis	Pre-crisis	Post-crisis
	period	period										
Variables	(1)	(2)	(3)	(4)	(5)	(9)	(7)	(8)	(6)	(10)	(11)	(12)
Importer only (yes=1)	-3.815	-7.549*	-3.947	-7.542*	4.067	-3.020	4.049	-3.087	-14.905	-8.902*	-16.073	-8.901*
	(-0.523)	(-1.855)	(-0.540)	(-1.853)	(0.419)	(-0.462)	(0.417)	(-0.472)	(-1.349)	(-1.724)	(-1.451)	(-1.724)
Exporter & importer (yes=1)	-5.962	-0.349	-6.001	-0.287	-9.190	-0.953	-9.093	-0.844	-2.957	-0.209	-3.108	-0.258
	(-1.172)	(-0.101)	(-1.179)	(-0.083)	(-1.313)	(-0.172)	(-1.300)	(-0.152)	(-0.396)	(-0.047)	(-0.416)	(-0.058)
Product innovator (yes=1)	7.449***	2.337***	7.439***	2.327***	8.083***	3.632***	8.126***	3.631***	6.466***	1.797**	6.446***	1.804**
	(5.913)	(4.043)	(5.907)	(4.019)	(3.979)	(3.583)	(3.988)	(3.584)	(3.978)	(2.509)	(3.974)	(2.510)
Big City (yes=1)	-2.285	-3.673*	-2.289	-3.684*	0.170	-6.378*	0.493	-6.520*	-3.092	-2.746	-2.824	-2.743
	(-0.767)	(-1.746)	(-0.768)	(-1.751)	(0:039)	(-1.755)	(0.114)	(-1.795)	(-0.744)	(-1.060)	(-0.681)	(-1.059)
Real GDP growth rate	0.086	3.274***	0.065	3.286***	-0.928	3.559***	-0.827	3.437***	0.528	3.258***	0.487	3.242***
	(0.100)	(5.809)	(0.075)	(5.828)	(-0.664)	(3.687)	(-0.592)	(3.534)	(0.484)	(4.627)	(0.447)	(4.599)
Paying taxes	-0.264*	-0.067	-0.261*	-0.067	-0.358*	-0.218	-0.355	-0.198	-0.124	-0.007	-0.108	-0.007
	(-1.750)	(-0.744)	(-1.728)	(-0.741)	(-1.657)	(-1.380)	(-1.643)	(-1.246)	(-0.583)	(-0.064)	(-0.508)	(-0.066)
Starting a business	1.025***	0.512***	1.023***	0.512***	1.530***	0.893***	1.513***	0.886***	0.578	0.428***	0.535	0.428***
	(3.929)	(3.964)	(3.919)	(3.968)	(4.053)	(3.632)	(4.008)	(3.600)	(1.602)	(2.747)	(1.482)	(2.746)
Resolving insolvency	-0.381**	-0.173*	-0.380**	-0.172*	0.091	0.128	0.074	0.111	-0.757***	-0.282**	-0.769***	-0.283**
	(-2.025)	(-1.885)	(-2.021)	(-1.873)	(0.336)	(0.793)	(0.270)	(0.686)	(-2.856)	(-2.481)	(-2.900)	(-2.490)
Sector dummies	Yes	Yes										
Constant	35.061	55.750***	35.008	55.538***	-43.501	3.677	-42.041	3.172	102.430***	70.995***	104.298***	71.220***
	(1.360)	(3.400)	(1.358)	(3.388)	(-1.109)	(0.118)	(-1.073)	(0.102)	(2.946)	(3.600)	(3.003)	(3.612)
No of observations	3,566	3,654	3,566	3,654	1,730	1,096	1,730	1,096	1,836	2,558	1,836	2,558
Underidentification test												
Anderson can.corr. LM stat.	264.1	374.5	264.2	373.3	114.0	95.64	113.6	95.66	142.3	277.5	142.8	275.7
p-value	(0000)	(0000)	(0000)	(0000)	(0000)	(0000)	(0000)	(0000)	(0000)	(0000)	(0000)	(0000)
Overidentifcation test												
Sargan statistic	1.929	5.015	1.908	4.968	4.614	2.450	4.603	2.420	2.658	3.174	2.643	3.217
p-value	(0.587)	(0.171)	(0.592)	(0.174)	(0.202)	(0.484)	(0.203)	(0.490)	(0.447)	(0.366)	(0.450)	(0.359)
Endogeneity test												
Endogeneity test	27.08	12.06	27.01	11.93	11.67	12.20	11.70	12.26	12.27	3.803	12.12	3.808
p-value	(0000)	(0.001)	(0000)	(0.001)	(0.001)	(0000)	(0.001)	(000.0)	(0000)	(0.051)	(0000)	(0.051)
Weak identification test												
Cragg-Donald Wald F-stat.	70.83	103.6	70.84	103.2	30.08	25.62	29.95	25.60	38.05	77.08	38.17	76.51
5% maximal IV relative bias	16.85	16.85	16.85	16.85	16.85	16.85	16.85	16.85	16.85	16.85	16.85	16.85
10% maximal IV size	24.58	24.58	24.58	24.58	24.58	24.58	24.58	24.58	24.58	24.58	24.58	24.58
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South East European Journal of Economics and Business, Volume 11 (1) 2016

Note: Instruments used in all specifications: all different innovation strategies and iso

post-crisis period only, while for employment growth it refers to the pre-crisis period only.

Counter to expectations, the Top Manager's work experience in the industry plays a rather limited role. While the Top Manager's work experience is irrelevant for an establishment's sales growth, it exerts a significant negative effect on an establishment's employment growth. However, this negative effect only emerges during the post-crisis period and seems to suggest that more experienced Top Managers pursued more conservative and cautious employment policies in a business environment still characterized by strong crisis-related domestic and global uncertainties.

In a similar vein, ownership structure matters little for firm growth. In contrast to related empirical evidence, we find that foreign ownership is associated with both significantly lower sales and employment growth, though at different points in time: in the pre-crisis period, a higher foreign ownership share (by another percentage point) was associated with (0.03 percentage points) lower employment growth, while in the post-crisis period it was related to (0.06 percentage points) lower sales growth. In contrast, higher state-ownership exerted no significant effect on either sales or employment growth.

Furthermore, an establishment's particular trading status matters for its sales growth experience, with effects again differing by period. In the pre-crisis period, when global demand was high and trade flourished, exporters only experienced significantly higher employment growth rates than establishments that sourced from and catered to domestic markets only. However, in the post-crisis period, which was still characterized by muted global growth and only slowly recovering global trade, importing establishments experienced significantly lower sales growth than establishments that sourced from and catered to domestic markets only. Hence, before the financial crisis struck, exporting to international markets proved conducive to employment growth. This advantage and associated growth stimulus from exporting disappeared as a result of the crisis. In the aftermath of the crisis, importing turned out to be obstructive to sales growth.

An important finding of our analysis is the consistent positive growth-effect of innovation. As expected, it makes a huge difference for both sales and employment growth whether an establishment is a product innovator or not.<sup>10</sup> Irrespective of the period considered, product innovators – i.e. establishments that introduced a new product or service - grew significantly faster than non-product innovators. The growth-effect was markedly stronger in the pre-crisis period, yet, due to sluggish and only slowly recovering domestic and global demand, it fell considerably in the post-crisis period. Hence, innovativeness turns out to be a recipe for success, guaranteeing more pronounced growth, even during economically difficult times.

Our results also point to 'agglomeration' effects and the importance for growth of being located in more densely populated, more competitive environments. More specifically, we find evidence of temporary diseconomies of agglomeration. Probably due to lower demand and fiercer competition in the wake of the global financial crisis, establishments located in larger cities experienced both significantly lower sales and employment growth rates. A more nuanced picture emerges, however, for the sub-sample of firms that applied for bank loans. For this particular sample of establishments, both economies as well as diseconomies of agglomeration are present, although at different points in time: during the pre-crisis period, being located in a larger city proved conducive to employment growth, while during the post-crisis period the opposite effect was present, rendering larger cities less advantageous and growth-restricting locations for establishments.

We also tested the relevance of a set of macroeconomic characteristics for firm growth. First, in line with related empirical evidence, our results indicate that the state of the economy, which determines an establishment's growth opportunities, is conducive to its sales and employment growth. Second, the institutional environment turns out to matter greatly, which points to the important role policy-makers play for creating a business environment that is attractive and conducive to growth. However, the exact direction and scale of the growth-effect differ depending on the particular institution considered. In particular, business environments that make starting a business a comparatively easy and cheap endeavor are very conducive to sales growth, and were particularly conducive to sales growth in the pre-crisis period. However, no significant role is observable for employment growth, which suggests that newly entering establishments are very small in size, producing no or only limited demand for additional labor. On the contrary, business environments that help resolve insolvencies in a quick and costless manner are obstructive to sales growth, resulting in significantly lower sales growth, particularly in the pre-crisis period, and significantly lower employment growth since, as a consequence, the firing of personnel becomes an administratively and legally easy and costless effort. Business environments with conducive tax regimes in terms of tax rates, the number of number of times the establishment pays taxes or the time taken to prepare, file and pay taxes (i.e. high distance-to-frontier rankings) are obstructive to sales growth but conducive to employment growth, particularly during the pre-crisis period.

Regression results for employment growth
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Financing constraints and firm growth in Emerging Europe

	Pre-crisis period	Post-crisis period	Pre-crisis   period	<sup>o</sup> ost-crisis period	Pre-crisis period	Post-crisis period	Pre-crisis period	Post-crisis period	Pre-crisis period	Post-crisis period	Pre-crisis   period	ost-crisis period
Variables	(1)	(2)	(3)	(4)	(5)	(9)	(2)	(8)	(6)	(10)	(11)	(12)
FC-Total	-3.453*** (-2.620)	-3.960*** (-5.163)	-1.244 (-0.784)	-3.415*** (-3.052)								
Balkan*FC-Total			-6.275** (-2.266)	-1.157 (-0.774)								
FC-Rejected					-2.223	-5.342** / 2005/	0.072	-2.885				
Balkan*FC-Rejected					(8/6.0-)	(CQN.7-)	(0.020) -6.098 (-1.262)	(-0.904) -5.700 (-1.128)				
FC-Constrained									-4.149**	-3.902***	-1.766	-3.877***
									(-2.466)	(-4.637)	(-0.921)	(-3.110)
Balkan*FC-Constrained											-7.379**	-0.052
											(-1.968)	(-0.031)
Balkan (yes=1)	1.360	2.513***	2.833*	2.785***	1.724	3.014**	2.626	3.374**	1.767	2.073*	4.138	2.088*
	(0.945)	(2.888)	(1.711)	(2.845)	(0.855)	(2.155)	(1.195)	(2.404)	(0.853)	(1.940)	(1.586)	(1.647)
Log age	-10.395**	-14.082***	-10.438** -	14.151***	-13.938**	-16.924***	-13.976**	-16.959***	-5.770	-12.683***	-5.722 -	12.686***
	(-2.384)	(-4.222)	(-2.408)	(-4.247)	(-2.096)	(-3.011)	(-2.110)	(-3.006)	(-1.017)	(-3.038)	(-1.016)	(-3.044)
Log age <sup>2</sup>	0.206	1.606***	0.222	1.620***	0.629	1.923**	0.642	1.929**	-0.345	1.400*	-0.347	1.401*
	(0.283)	(2.802)	(0.305)	(2.828)	(0.579)	(2.071)	(0.594)	(2.070)	(-0.350)	(1.896)	(-0.355)	(1.901)
Log size	-6.227**	-1.822	-6.310**	-1.822	-6.757*	-3.689	-7.027*	-3.750	-7.033*	-0.891	-6.953*	-0.891
	(-2.438)	(-1.115)	(-2.479)	(-1.113)	(-1.843)	(-1.458)	(-1.937)	(-1.476)	(-1.828)	(-0.519)	(-1.811)	(-0.519)
Log size <sup>2</sup>	0.178**	0.055	0.181**	0.055	0.190	0.145	0.199	0.148	0.208	0.011	0.206	0.011
	(1.960)	(0.926)	(2.001)	(0.927)	(1.520)	(1.513)	(1.608)	(1.533)	(1.468)	(0.177)	(1.454)	(0.177)
Log years of experience TM	-1.258	-1.029*	-1.276	-1.015*	-0.252	-0.014	-0.252	0.022	-2.293*	-1.402*	-2.339*	-1.401*
	(-1.424)	(-1.764)	(-1.450)	(-1.737)	(-0.217)	(-0.017)	(-0.217)	(0.027)	(-1.734)	(-1.846)	(-1.777)	(-1.843)
Foreign ownership share (%)	-0.032*	-0.011	-0.032*	-0.010	-0.031	-0.029	-0.029	-0.028	-0.021	-0.000	-0.024	-0.000
	(-1.676)	(-0.836)	(-1.696)	(-0.802)	(-1.116)	(-1.528)	(-1.030)	(-1.470)	(-0.824)	(-0.007)	(-0.921)	(-0.005)
State ownership share (%)	-0.097	-0.039	-0.094	-0.038	-0.205***	-0.042	-0.204***	-0.046	0.011	-0.047	0.017	-0.047
	(-1.235)	(-1.594)	(-1.204)	(-1.560)	(-3.223)	(-1.347)	(-3.275)	(-1.512)	(0.077)	(-1.345)	(0.119)	(-1.344)
Exporter only (yes=1)	3.257**	0.141	3.262**	0.128	3.723**	1.697	3.665**	1.594	2.103	-0.845	2.162	-0.845
	(2.319)	(0.165)	(2.326)	(0.151)	(1.994)	(1.174)	(1.971)	(1.102)	(1.007)	(-0.801)	(1.037)	(-0.801)

South East European Journal of Economics and Business, Volume 11 (1) 2016

Financing constraints and firm growth in Emerging Europe

Table 2: continued

	Pre-crisis	Post-crisis	Pre-crisis	Post-crisis	Pre-crisis	Post-crisis	Pre-crisis	Post-crisis	Pre-crisis	Post-crisis	Pre-crisis	Post-crisis
Variables	period (1)	(2)	period (3)	period (4)	period	period	period	period (8)	period (9)	(10)	period (11)	period (12)
Importer only (yes=1)	4.842	-1.687	4.602	-1.705	7.655	-3.125	7.660	-3.172	0.001	-1.139	-0.627	-1.140
	(1.381)	(-1.185)	(1.313)	(-1.199)	(1.415)	(-1.451)	(1.416)	(-1.465)	(0000)	(-0.612)	(-0.175)	(-0.612)
Exporter & importer (yes=1)	2.975	0.172	2.937	0.193	1.404	-0.904	1.382	-0.838	4.823	0.502	4.774	0.503
	(1.400)	(0.156)	(1.386)	(0.175)	(0.567)	(-0.518)	(0.557)	(-0.478)	(1.355)	(0.350)	(1.348)	(0:350)
Product innovator (yes=1)	14.162***	6.126***	14.100***	6.100***	16.648***	3.636	16.807***	3.660	14.736***	7.260***	14.546***	7.256***
	(7.283)	(4.247)	(7.278)	(4.229)	(4.043)	(1.600)	(4.074)	(1.615)	(5.720)	(3.940)	(5.715)	(3.932)
Big City (yes=1)	1.704	-2.087**	1.665	-2.097**	4.672***	-2.563**	4.526***	-2.616**	-0.916	-2.171**	-0.832	-2.171**
	(1.536)	(-2.522)	(1.503)	(-2.530)	(3.026)	(-2.110)	(2.939)	(-2.148)	(-0.579)	(-2.072)	(-0.530)	(-2.070)
Real GDP growth rate	-0.466*	0.906***	-0.499*	0.915***	-0.752	0.361	-0.787*	0.303	-0.348	1.106***	-0.369	1.107***
	(-1.647)	(4.188)	(-1.760)	(4.218)	(-1.610)	(0.929)	(-1.693)	(0.773)	(-0.974)	(4.211)	(-1.030)	(4.193)
Paying taxes	0.099*	0.053	0.102*	0.053	0.159*	0.203***	0.157*	0.212***	0.026	-0.009	0.032	-0.009
	(1.652)	(1.575)	(1.711)	(1.579)	(1.954)	(3.082)	(1.933)	(3.162)	(0.308)	(-0.228)	(0.372)	(-0.228)
Starting a business	0.115	0.081	0.113	0.081	0.120	-0.037	0.128	-0.041	0.147	0.121*	0.129	0.121*
	(1.284)	(1.576)	(1.256)	(1.586)	(1.002)	(-0.435)	(1.066)	(-0.472)	(1.106)	(1.928)	(0.976)	(1.926)
Resolving insolvency	-0.323***	0.037	-0.322***	0.038	-0.213**	-0.038	-0.207**	-0.046	-0.354***	0.055	-0.359***	0.055
	(-4.747)	(1.160)	(-4.741)	(1.177)	(-2.238)	(-0.627)	(-2.168)	(-0.769)	(-3.490)	(1.432)	(-3.548)	(1.424)
Sector dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	59.664***	31.227**	60.077***	31.044**	63.435**	46.700**	64.578**	46.910**	62.663**	25.169*	63.039**	25.160*
	(2.990)	(2.312)	(3.022)	(2.296)	(2.195)	(2.365)	(2.249)	(2.371)	(2.163)	(1.658)	(2.186)	(1.655)
No of observations	3,678	3,449	3,678	3,449	1,779	1,024	1,779	1,024	1,899	2,425	1,899	2,425
Underidentification test												
Anderson can.corr. LM stat.	144.9	935.4	144.9	934.1	45.14	293.0	45.35	293.1	94.45	617.9	94.87	616.8
p-value	(0000)	(0000)	(0000)	(0000)	(0000)	(0000)	(0000)	(0000)	(0000)	(0000)	(0000)	(0000)
Overidentifcation test												
Sargan statistic	0.385	0.000690	0.393	1.14e-06	0.820	2.335	0.861	2.456	0.0150	1.089	0.0139	1.080
p-value	(0.535)	(0.979)	(0.531)	(0.999)	(0.365)	(0.127)	(0.354)	(0.117)	(0.902)	(0.297)	(0.906)	(0.299)
Endogeneity test												
Endogeneity test	55.00	5.196	54.84	5.128	13.03	0.0486	13.56	0.0586	38.09	5.947	37.73	5.875
p-value	(0000)	(0.023)	(0000)	(0.024)	(0000)	(0.083)	(0000)	(0.081)	(0000)	(0.015)	(0000)	(0.015)
Weak identification test Cradia-Donald Wald E-stat	106.7	6800	106.7	670 F	30.65	1770	30 86	1770	60 78	0 601	60 50	1010
10% maximal IV size	19.93	19.93	19.93	19.93	19.93	19.93	19.93	19.93	19.93	19.93	19.93	19.93

Note: Instruments used in all specifications: a composite indicator for innovative activities and ict use.

South East European Journal of Economics and Business, Volume 11 (1) 2016

31

#### 7. SUMMARY AND CONCLUSION

A quickly growing body of empirical literature finds robust evidence that establishments face non-negligible financial constraints that prove detrimental to their performance and growth. These impediments to external funding are particularly worrying in economically lagging economies, where easy and unhindered access to financial markets is not only a crucial factor for the growth and survival of establishments, but, more imporatantly, for economic growth and catching-up processes with richer economies.

Against this backdrop, the analysis uses firm-level data for a large set of European emerging economies to identify the effects of financing constraints on firm growth. It analyzes and compares the economically more advanced group of NMS-10 (plus Turkey) and the group of economically and financially lagging Western Balkan countries and tests whether the growth-effects of financial constraints differ by the stage of transition in each economy. Furthermore, it addresses some gaps in the literature (i) by looking at growth in terms of sales and employment to also address the grossly under-researched labor market effects of financing constraints; (ii) by differentiating between different types of financing constraints to demonstrate how growth-effects differ by the strictness of financing constraints; and (iii) by studying the effects of the global financial crisis on the constraint-growth nexus.

In line with related empirical evidence, our results highlight that financing constraints significantly obstruct firm growth, although the exact effects differ by growth indicator, the type of financing constraints present and the economic period. In general, observable negative effects are most robust for employment growth and suggest that establishments whose credit applications were rejected experienced lower employment growth than those that, despite the need for external funding, did not apply for a bank loan for reasons pertaining to complex application procedures, unfavorable interest rates, high collateral requirements, insufficient size and maturity of loans or the necessity to make informal payments to get the loan. Furthermore, the results point to geographic differences in the growth-effects of financing constraints and highlight that only during the pre-crisis period were financial constraints more harmful to employment growth in establishments located in the economically less advanced Western Balkans than to establishments located in the group of economically more advanced NMS-10 (plus Turkey). Together, these results emphasize the need for policy intervention in Emerging Europe to reduce existing financing constraints, subject to compliance with financial

prudence, to ensure swifter job-rich growth and stimulate catching-up with richer economies. However, the need for action is much stronger in the Western Balkans, where financing constraints also prove significantly more damaging to growth.

In addition, the analysis identifies particular firm characteristics and institutions that matter for firm growth and therefore call for management action and policy intervention. For instance, it consistently shows that exporters only grow faster - in terms of employment - than domestically-oriented establishments, and that, in general, product innovators grow faster than non-innovators. This suggests that entrepreneurs should more strongly engage in exporting, and perhaps more importantly, in innovating for stronger establishment growth and policy-makers need to devise and implement policies and measures that encourage and facilitate activities such as export promotion schemes to inform and train exporters and to guarantee and help fund exports or innovation policies that help improve the performance of research and innovation systems. By contrast, our findings highlight that being an importer only was harmful for sales growth only during the post-crisis period, when global trade and growth were still weak, or when the Top Manager's higher work experience was disadvantageous for employment growth. This latter effect was particularly relevant for the post-crisis period and suggests that more experienced Top Managers probably resort to more conservative and cautious hiring policies during economically turbulent and uncertain times. Moreover, contrary to related empirical evidence, foreign ownership, which is expected to boost growth through easier access to knowledge and superior technology, global markets, contacts and networks, turns out to be an impediment to faster sales and employment growth, although at different points in time. The presence of a negative growtheffect seems to suggest that foreign-owned establishments in Emerging Europe are unable to reap the benefits of foreign-ownership, which emphasizes the need for appropriate management action to identify and eliminate internal bottlenecks and problem areas. Furthermore, it corroborates the negative size-growth and age-growth hypotheses identified in the literature and highlights that old age or large size are disadvantageous for both sales and employment growth. However, these negative effects of size and age tend to diminish as establishments grow larger and older, and eventually even reverse.

Finally, the analysis shows that the state of the economy and the institutional environment matter for establishment growth, a finding that is highly relevant for policy makers in Emerging Europe, who

need to build a business environment conducive to growth and develop and implement policies aimed at encouraging (job-rich) growth and fostering swifter catching-up with richer economies. For instance, business environments with favorable tax regimes were conducive to employment growth but obstructive to sales growth - particularly before the global financial crisis hit Central East and Southeastern Europe. Furthermore, business environments that make starting a business a comparatively easy and cheap endeavor were conducive to sales growth - particularly in the pre-crisis period – but had no significant effect on employment growth whatsoever. Hence, a business environment that is conducive to starting a business does not automatically guarantee job-rich growth. And business environments that help resolve insolvencies in a quick and costless manner were obstructive to both sales and employment growth, since liquidating an establishment and firing its personnel is guaranteed to be an administratively and legally easy and comparatively costless effort.

#### **ENDNOTES**

<sup>1</sup> In particular, financially constrained establishments are found to have significantly lower R&D investment levels (Triwari et al. 2007; Mancusi and Vezzulli 2010). Furthermore, financially constrained establishments are significantly less likely to penetrate new markets and export (Minetti and Zhu 2011), to pursue R&D activities (Mancusi and Vezzulli 2010; Mohnen et al. 2008; Männasoo and Meriküll 2011; Hajivassilou and Savignac 2008 or Álvarez and Crespi 2011) to invest in capital goods (Hasan 2013) or to offer formal training programs to their employees (Popov 2013), to name but a few of their negative consequences.

<sup>2</sup> The group of NSM-10 countries comprises Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia.

<sup>3</sup> The group of Western Balkan countries comprises Albania, Bosnia and Herzegovina, Croatia, Kosovo, the former Yugoslav Republic of Macedonia, Montenegro and Serbia.

<sup>4</sup> See, e.g., Dunne et al. (1989), Evans (1987a, b), Variyam and Kraybill (1992), Sleuwaegen and Goedhuys (2002), Geroski and Gugler (2004) or Dollar, Hallward-Driemeier, and Mengistae (2005).

5 Specifically, positive effects are found by Smolny (1998), Lachenmaier and Rottmann (2006) and Becker and Egger (2007) for West German firms or Garcia et al. (2002) for a set of Spanish firms. In contrast, Ross and Zimmermann (1993) in their study on German

manufacturing firms point to the destructive effect of process innovations while Van Reenen (1997) for UK manufacturing firms, Rottmann and Ruschinski (1998) for West German firms or Hall, Lotti, and Mairesse (2008) for a panel of Italian firms find no significant effect of process innovations on firm-level employment.

6 See, e.g., Van Reenen (1997), Smolny (1998), Rottmann and Ruschinski (1998), Lachenmaier and Rottmann (2006), Zimmermann (2008), Piva and Vivarelli (2005), Hall, Lotti, and Mairesse (2008) or Harrison et al. (2014).

<sup>7</sup> See Annex Table A.2 for summary statistics and Annex Tables A.3 and A.4 for correlation matrices of the main variables used in the estimations.

8 It refers to the annualized growth rate defined as follows:  $\left(\frac{A(t_0)}{A(t_{-3})}\right)^{1/n} - 1$ , where  $A(t_0)$  refers to the current  $A(t_{-3})$  value, refers to the value three years previously and  $n = t_0 - (t_{-3})$ 

<sup>9</sup> A more thorough analysis (not presented here) demonstrates that this finding is entirely driven by developments and the employment changes of establishments located in Macedonia and Kosovo, which both avoided recessions during the crisis and postcrisis stress and where average annual employment growth rates were among the highest during the post-crisis period.

10 Test statistics reported in Table 1 and Table 2 generally demonstrate that the variable "product innovations" needs to be treated as endogenous (the endogeneity test is rejected for all specifications at the 1% or 5% level), that the instruments are valid (Sargan test is never rejected) and not weak (Stock-Yogo weakinstruments test is rejected) and that the specifications are identified (Anderson's likelihood ratio test is always rejected).

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## ANNEX

Table A1: List of countries included in the analysis, by period

Country	Abbrov	N	lumber of establishments	
Country	Abbrev.	Pre-crisis period	Post-crisis period	Total
Bulgaria	BG	288	293	581
Czech Republic	CZ	250	143	393
Estonia	EE	273	273	546
Hungary	HU	291	310	601
Lithuania	LT	276	270	546
Latvia	LV	271	336	607
Poland	PL	455	542	997
Romania	RO	541	540	1,081
Slovenia	SI	276	270	546
Slovakia	SK	275	173	448
Turkey	TR	1,151	707	1,858
Albania	AL	175	360	535
Bosnia and Herzegovina	BA	361	360	721
Croatia	HR	159	360	519
Montenegro	ME	116	150	266
Macedonia	MK	366	360	726
Serbia	RS	388	360	748
Kosovo	ХК	270	202	472
	Total	6,182	6,009	12,191

## Table A2: Summary statistics

	Post-crisis
Mean (Std.Dev)	Mean (Std.Dev)
[Min; Max]	[Min; Max]
Sales growth 38.45 (90.5)	14.6 (65.3)
[-9/.9; 9/9.5]	[-100; 995.5]
[-80.060 7]	5.7 (21.0) [-75 8:386 5]
FC-Total 0.2 (0.4)	0.2 (0.4)
[0:1]	[0:1]
FC-Rejected 0.1 (0.3)	0.1 (0.3)
[0; 1]	[0; 1]
FC-Constrained 0.3 (0.4)	0.23 (0.4)
[0; 1]	[0; 1]
Balkan 0.3 (0.5)	0.4 (0.5)
[0; 1]	[0; 1]
Baikan*FC-Total 0.1 (0.3)	0.1 <i>(0.3)</i>
[0; 1]	[0; 1]
Balkan*FC-Rejected 0.1 (0.2)	0.0 (0.2)
[0;1]	[0; 1]
Balkan*FC-Constrained 0.1 (0.3)	0.1 <i>(0.3)</i>
[0; 1]	[0; 1]
Log age 2.6 (0.7)	2.7 (0.6)
[0; 5.2]	[0; 5]
Log age <sup>2</sup> 7.0 (3.8)	7.3 (3.2)
[0; 27.1]	[0; 25.2]
Log size 3.4 (1.5)	2.9 (1.3)
[0; 9.0]	[0; 9] 10 1 <i>(</i> 9 1)
[0:925]	[0: 81 7]
Log years of experience TM 2.8 (0.7)	2.8 (0.6)
[0; 4.1]	[0; 4.1]
Foreign ownership share8.5 (26.1)	7.7 (25.3)
[0; 100]	[0; 100]
State ownership share 1.1 (7.8)	0.4 (5.1)
	[0; 99]
[0; 99]	
Exporter only 0.2 (0.4)	0.2 (0.4)
[U; 1]	[0; 1]
[0·1]	[0: 1]
Exporter & importer 0.1 (0.3)	0.1 (0.3)
[0; 1]	[0; 1]
Big City 0.4 (0.5)	0.2 (0.4)
[0; 1]	[0; 1]
Real GDP growth rate6.3 (1.8)	1.9 (2.1)
[1.6; 10.9]	[-1.7; 6.7]
Paying taxes 63.45 (12.6)	67.6 (11.6)
[44.0; 84.9] Starting a husiness 78.1 /8.3]	[48.9; 82.1] 86 5 (7 0)
[60.3, 00.8]	[62 4· 96 1]
Resolving insolvency 34.9 (11.1)	38.8 (9.9)
[19.9; 54.4]	[24; 60.3]
Dummy: Manufacturing 0.4 (0.5)	0.4 (0.5)
[0; 1]	[0; 1]
Dummy: Construction 0.1 (0.3)	0.1 (0.3)
[ <b>∩</b> · 1]	[0; 1]

Source: BEEPS 2013, own calculations.

Table A3: Co	rrelation	matrix –	pre-crisi	is															
	FC- total	Balkan	Log age	Log age <sup>2</sup>	Log size	Log size <sup>2</sup>	Log exp TM	For- Share	State- Share	Exp- only	-dml only	Exp- Imp	Big City	GR- rgdp	Тах	Start	Insolv	Manuf Con	str
FC-total	-																		
Balkan	0.113	1																	
Log age	-0.007	0.084	-																
Log age <sup>2</sup>	-0.004	0.108	0.974	-															
Log size	-0.104	-0.056	0.342	0.362	-														
Log size <sup>2</sup>	-0.085	-0.045	0.342	0.367	0.968	1													
Log expTM	-0.018	-0.051	0.224	0.186	0.031	0.015	-												
ForShare	-0.053	-0.024	-0.047	-0.038	0.215	0.223	-0.103	-											
StateShare	0.030	0.078	0.141	0.166	0.157	0.175	0.016	-0.018	-										
Exponly	-0.038	0.011	0.024	0.021	0.078	0.070	0.036	0.041	0.016	-									
Imponly	0.007	0.044	-0.002	0.002	0.034	0.031	0.016	-0.037	0.005	-0.100	-								
Explmp	-0.027	0.010	0.136	0.146	0.273	0.268	0.014	0.144	0.017	-0.195	-0.082	-							
Big City	0.007	0.014	0.019	0.022	0.081	0.082	0.058	0.081	-0.033	0.059	0.030	-0.011	-						
GRrgdp	0.027	-0.318	-0.092	-0.096	-0.007	-0.012	-0.125	0.003	-0.053	-0.030	0.020	0.001	0.067	-					
Тах	-0.070	-0.323	-0.001	-0.012	0.062	0.056	-0.009	0.016	-0.044	0.040	0.005	0.055	0.142	0.425	-				
Start	-0.026	-0.402	-0.090	-0.098	0.085	0.076	-0.025	-0.011	-0.064	-0.016	0.002	-0.014	0.227	0.365	0.399	-			
Insolv	-0.022	-0.022	-0.071	-0.072	-0.077	-0.072	-0.106	0.067	0.012	-0.007	-0.030	-0.028	-0.262	0.152	0.279	-0.445	-		
Manuf	0.013	-0.075	0.101	0.107	0.189	0.166	0.039	0.018	-0.023	0.004	0.209	0.448	0.031	-0.015	0.075	0.137	-0.197	-	
Constr	-0.002	0.036	0.036	0.037	0.072	0.064	0.039	-0.049	0.025	-0.065	-0.060	-0.125	-0.030	-0.004	0.004	-0.071	0.099	-0.284	-
Source: BEEPS	2009, owr	ר calculati	ons.																

Financing constraints and firm growth in Emerging Europe

South East European Journal of Economics and Business, Volume 11 (1) 2016

39

Table A4: Correlation matrix – post-crisis

Constr																			-
Manuf																		-	-0.239
Insolv																	-	-0.066	0.016
Start																-	0.126	0.015	0.001
Тах															-	0.244	0.266	0.072	-0.017
GR- rgdp														-	0.460	-0.023	-0.040	0.141	-0.023
Big City													-	0.203	0.076	0.116	0.026	-0.027	-0.019
Exp- Imp												-	-0.044	-0.071	-0.005	0.017	0.058	0.397	-0.093
lmp- only											-	-0.082	-0.011	0.004	-0.008	-0.077	0.009	0.262	-0.068
Exp- only										-	-0.106	-0.151	0.083	0.022	0.070	0.044	0.018	0.012	-0.064
State- Share									-	0.000	-0.016	-0.002	-0.025	-0.025	-0.016	-0.005	-0.002	-0.004	0.011
For- Share								-	-0.009	0.116	-0.018	0.151	0.109	-0.054	-0.034	0.042	0.063	0.036	-0.050
Log exp TM							-	-0.094	-0.016	0.018	-0.003	0.015	-0.038	-0.011	0.041	0.033	-0.061	0.055	0.047
Log size <sup>2</sup>						-	0.039	0.243	0.144	0.069	-0.005	0.260	0.026	-0.038	-0.029	-0.008	-0.010	0.135	0.053
Log size					-	0.969	0.061	0.234	0.130	0.087	0.012	0.264	0.015	-0.036	-0.036	-0.028	-0.023	0.156	0.055
Log age <sup>2</sup>				-	0.284	0.278	0.253	-0.058	0.121	0.022	0.000	0.072	-0.062	-0.046	0.008	-0.002	-0.015	0.059	0.000
Log age	•		-	0.980	0.270	0.258	0.280	-0.057	0.102	0.027	0.004	0.057	-0.072	-0.049	-0.005	-0.002	-0.011	0.044	0.002
Balkan		-	-0.074	-0.059	-0.086	-0.086	-0.071	-0.057	-0.002	-0.057	0.061	-0.027	0.001	-0.344	-0.165	-0.333	-0.150	-0.057	-0.026
FC- total	-	0.079	-0.052	-0.050	-0.106	-0.101	-0.016	-0.047	0.025	-0.046	0.017	-0.024	-0.025	-0.106	-0.053	0.015	-0.044	0.007	0.013
	FC-total	Balkan	Log age	Log age <sup>2</sup>	Log size	Log size <sup>2</sup>	Log expTM	ForShare	StateShare	Exponly	Imponly	Explmp	Big City	GRrgdp	Tax	Start	Insolv	Manuf	Constr

Source: BEEPS 2013, own calculations.

## AN INVESTIGATION INTO THE IMPACT OF SERVICE QUALITY, FREQUENT FLIER PROGRAMS AND SAFETY PERCEPTION ON SATISFACTION AND CUSTOMER LOYALTY IN THE AIRLINE INDUSTRY IN SOUTHERN AFRICA

Maxwell Sandada, Bright Matibiri

### Abstract

This study aims to identify the factors that make passengers loyal to an airline in Southern Africa by investigating the impact of service quality and safety perception on customer satisfaction and how satisfaction and frequent flyer programs (FFP) subsequently influence customer loyalty. The key finding was that service quality positively influenced customer satisfaction, and satisfaction was an important antecedent of customer loyalty. The analysis also suggested that safety perception and FFP positively influence customer loyalty, while their relationship with satisfaction was not significant. An analysis of switching behaviour revealed that satisfied customers may still switch to other airlines. The main contribution of this study is the development of a customer loyalty model for the aviation industry in Southern Africa. Knowledge of customer loyalty drivers will assist airline marketing managers in developing strategies for improving passenger load factors and profitability.

Key words: Customer loyalty, satisfaction, service quality, safety, frequent flier programmes, aviation.

JEL: M31; N77.

## 1. INTRODUCTION

Increasing competition, the rise of digital technologies such as the Internet and more informed consumers in today's aviation industry implies that airlines must do more to satisfy and retain customers if they are to remain profitable and survive. It is in the airlines' best interest to develop systematic ways of identifying and measuring the factors that shape customer satisfaction and loyalty. Gounaris and Stathakopoulos (2004) assert that loyal consumers have fewer reasons to engage in a comprehensive search for information among different alternatives, thus reducing the propensity to substitute and the probability of switching to alternative choices offering similar performance. Some researchers have suggested that customer acquisition costs five times more than the cost of satisfying and retaining customers, while empirical studies in the US show that a 5 percent increase in customer

retention rate can increase profit by between 25 and 95 percent depending on the type of industry (Reichheld, 2001). By dissecting the microeconomic forces that link loyalty to profits, Reichheld and Teal (1996) demonstrated that the high costs of acquiring customers render most customer relationships

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**Bright Matibiri** MBA student University of Zimbabwe Email: bmatibiri@ecbinternational.biz unprofitable during the early stages of the customer life cycle.

The key challenges facing the airline business include the volatility of fuel prices, the danger of overcapacity and an increase in labor and maintenance costs. According to IATA data, labor and maintenance costs, which constitute the largest non-fuel expenses, have been steadily rising since 2009, thus reducing operating margins for airlines (IATA 2014). The profitability of African Airlines has also been negatively impacted by weak load factors, which on average are the lowest in the world and a reflection that the region's airlines are struggling to match capacity with demand (CAPA, 2012).

Oliver (1997) argues that customer loyalty is a key driver of profitability, yet little is known about what drives customer loyalty in the airline business in Southern Africa. Extant literature has mainly been confined to more mature markets in Europe, Australia, the Americas and Asia. Airlines in Southern Africa do not appear to benefit from customer loyalty, as evidenced by weak passenger load factors noted by CAPA reports (CAPA, 2012). Differences in culture, consumer behaviour and income levels between different continents make it very difficult to generalize the findings of extant literature to the predominantly developing countries in Southern Africa. This research is also motivated by the need for further research into loyalty drivers in light of declining loyalty in the airline industry as a result of fierce competition driven by online comparison engines and social media platforms that allow passengers to share experiences. The worsening financial positions of airlines in Southern Africa is a threat to their long term viability and makes it reasonable to look for ways of retaining customers as a way of improving their profitability and ensuring long term survival. If airline managers are aware of customer loyalty drivers they can use such information to make effective decisions on resource allocation and the crafting of marketing strategies that give their airlines sustainable competitive advantage. This paper aims at improving our understanding of the factors that make passengers loyal to an airline by proposing and testing a conceptual framework that includes service quality, safety perception, satisfaction, FFPs and customer loyalty.

The rest of the paper is structured as follows: first, a literature review, hypotheses and the conceptual framework will be presented. This will be followed by the research methodology, data analysis and conclusions. The managerial implications, limitations and recommendations for future research will form the last part of the article.

## 2. LITERATURE REVIEW 2.1 Customer Loyalty

Customer loyalty is an important element of organizational success and profitability, because consumers that demonstrate the highest levels of loyalty towards a service are more inclined to repurchase the service more often and spend more (Dehghan and Shahin, 2011). Also, as alluded to by Gómez, Arranz and Cillán (2006), loyal customers are more attractive for firms because they tend to be less price-sensitive and do not require much effort to communicate with than people with no prior experience with the company. Retaining profitable and frequent fliers is an attractive proposition for every airline because businesses succeed by getting, retaining, and growing customers (Kotler and Keller, 2012; Peppers & Rogers, 2005).

Dehghan and Shahin (2011) identified five dimensions of loyalty from services literature: namely, repeat purchase of a service, resistance to switching, provision of positive word-of-mouth, identifying with a service and preference for a particular service provider. This study uses the term customer loyalty as opposed to brand loyalty, so as to emphasize that loyalty is a characteristic of people as opposed to being something that is inherent in brands (Uncles, Dowling and Hammond, 2003).

A number of studies have focused on identifying effective methods of enhancing loyalty in the services industry, including the use of FFPs to reward repeat purchases as a way of capturing a greater share of consumers' spending (Meyer-waarden, 2008; Lewis, 2004). Other studies identified service quality as a key determinant of customer loyalty, either directly or via the mediating effects of other constructs such as satisfaction (Park, Robertson and Cheng-Lung, 2005). In the same vein, other researchers have shown that corporate image significantly and positively impacts customer loyalty (Kandampully and Hu 2007; Kandampully and Suhartanto 2000). Han, Kwortnik and Wang (2008) carried out a study across service contexts including airlines and hotels and concluded that the key determinants of loyalty are service quality, service fairness, customer satisfaction, commitment and trust. Dolnicar, Grabler, Grun and Kulnig (2011), however, conclude that the drivers of behavioral airline loyalty vary for different market segments,

thus highlighting the need for marketing managers to develop customized offerings for each segment.

## 2.2 Customer Satisfaction

Szczepańska and Gawron (2011) highlight that a customer's level of satisfaction with a product/service they have purchased is shaped by his/her subjective evaluation of the product/service, the value of the benefits they have received and the customer's overall interaction with the company. Services literature considers customer satisfaction to be one of the most significant outcomes of all marketing activities in any company that is market-oriented (Kandampully & Suhartanto, 2000).

Angelova and Zekiri (2011) argue that satisfied customers are the foundation of successful businesses because they lead to repeat purchases, positive word of mouth and customer loyalty. Customer loyalty can be a result of high switching barriers or a lack of close substitutes, while in some instances customers are persuaded to continue the relationship because they are satisfied with the product or service (Dehghan & Shahin, 2011). In the airline industry, where exit barriers are limited and alternatives exist, customer satisfaction is one of the key mechanisms that can be used to keep existing customers, and as such any discussion on loyalty should include a comprehensive analysis of customer satisfaction (Szczepańska & Gawron, 2011).

Satisfaction is widely acknowledged as a predictor of customer loyalty by a number of empirical studies (Cheng & Rashid, 2013; Wong & Sohal, 2003; Eggert & Ulaga, 2002; Gures et al., 2014). Other researchers (Bowen & Chen, 2001), however, conclude that the relationship between customer satisfaction and customer loyalty is nonlinear and asymmetric, with loyalty increasing exponentially beyond a certain level of satisfaction and equally falling dramatically when satisfaction declined beyond a certain point. Other studies also noted that customers may still defect even after indicating that they are satisfied with a service provider. For example, Chandrashekaran, Rotte, Tax and Grewal (2007) concluded that satisfaction strength is a key driver in translating satisfaction into loyalty and argued that satisfaction translated into loyalty when it is strongly held, while weakly held satisfaction makes customers vulnerable to defection.

Davis and Heineke (1998) argued that while high levels of satisfaction do not necessarily translate into customer loyalty, dissatisfied customers are likely to search for alternatives or reduce purchase frequency. Although there is no consensus in literature on the relationship between satisfaction and loyalty, a paper by Jan, Abdullah and Smail (2013) highlight that a number of studies carried out in the airline context provide evidence of a positive correlation between customer satisfaction and loyalty. Given this background the following hypothesis is proposed:

**H1:** Customer satisfaction has a positive effect on customer loyalty.

## 2.3 Service quality

Caruana (2002) highlights that service quality has been a subject of extensive interest from researchers and practitioners alike because they believe that it improves the profitability of a firm. Cheng and Rashid (2013) assert that managing service quality implies that a service provider has to match the service performance with the perceived service in order to achieve customer satisfaction. Also as alluded to by Kotler and Keller (2012), service quality expectations play a big part in customer satisfaction formation. Companies attain acceptable levels of satisfaction by providing services that not only meet customer expectations but exceed them. Several empirical studies reveal the importance of service quality in influencing satisfaction and loyalty. For example Cheng and Rashid (2013) investigate the impact of service quality on customer satisfaction and how customer satisfaction subsequently affects customer loyalty in the hospitality industry. The researchers concluded that a positive relationship exists between service quality and the level of customer satisfaction leading to customer loyalty.

Park et al. (2005) conclude that service quality elements for the airline industry can be categorized into three dimensions: "Reliability and customer service", "Convenience and accessibility" and "Inflight service." The study also concludes that significant positive relationships exist between the dimensions of "Convenience and accessibility", "Inflight service" and airline image, while airline image subsequently influenced behavioral intentions. Jan et al. (2013) come up with a validation model to test the same dimensions of service quality developed by Park et al. (2005) and conclude that all three service quality constructs play a significant role in explaining airline loyalty, particularly in the airline industry in Malaysia. In the same vein Lovelock and Wirtz (2010) argue that service quality is a key input in satisfying customers and that satisfaction forms the basis for developing a loyal customer base. On the strength of findings of these prior studies, the following hypotheses are proposed:

**H2**: Service quality measured by reliability, customer service, convenience, accessibility and inflight service has a positive effect on customer satisfaction.

## 2.4 Frequent flier programs

A customer loyalty program is a well-coordinated membership-based marketing strategy designed to provide incentives to customers in order to strengthen continued marketing exchanges with customers and secure their allegiance (Gómez *et al.*, 2006; Lacey & Sneath, 2006). Firms in travel related industries such as airlines offer customer loyalty programs (referred to as Frequent Flyer programs - FFPs) to encourage repeat purchasing thereby improving customer retention rates by offering incentives for customers to purchase more regularly and in larger volumes (Lewis, 2004).

A number of studies confirm the importance of FFPs in influencing airline preference and customer loyalty (Hess, Adler & Polak, 2007; Lederman, 2007; Lewis, 2004). By dissecting research data into customer segments, Dolnicar *et al.* (2011) conclude that loyalty programs are strongly correlated with behavioral loyalty for business and frequent travellers, while the relationship was weak for casual and leisure travellers. Loyalty program privileges are mostly attained by frequent fliers in particular business travellers, and hence there is low interest in such programmes among casual and leisure travellers. Frequent flyer programs also influence habit formation for airline passengers because they increase switching costs for customers (Carlsson & Lofgren, 2006).

Liu (2007) investigated the long term effectiveness of loyalty programs by conducting a longitudinal study and concludes that these programs positively influenced purchase frequencies and transaction sizes for both light and moderate buyers, making them more loyal. After taking these arguments into account, the following additional hypothesis is proposed:

H3: FFPs positively influence customer loyalty.

## 2.5 Safety Perception

Safety is regarded as an important consideration in passenger airline choice (Gilbert & Wong, 2003; Wessels, 2006). The observed declines in air passenger numbers following the September 11 attacks in the US also confirm the influence of safety on consumer behavior. Also as alluded to by Ringle, Sarstedt, Zimmermann (2011), airline disasters receive extensive media coverage, implying public awareness of such events. Examining the impact of an airline's safety perception therefore becomes an important consideration in the context of developing long term customer relationships given the potential destabilizing effect safety failures may have on airline selection. Despite the airline industry's claim that safety "has always been the top priority" of the industry and the various measures being put in place to ensure increased passenger safety (IATA, 2014), the occurrence of air accidents cannot be eliminated completely as witnessed by three major airline disasters in 2014 involving Malaysia-based airliners.

Factual airline safety levels are difficult to access (Ringle et al., 2011), therefore passengers resort to proxy measures of safety such as an airline's service quality or their perceptions of an aircraft's appearance (Rhoades & Waguespack, 2000). The literature reviewed indicates that safety is an important consideration in airline choice (Oyewole, Sankaran & Choudhury, 2007; Gilbert & Wong, 2003). On the other hand, the literature is silent on the impact of safety perception on airline image and customer loyalty. Only one study by Ringle et al. (2011) investigated the impact of perceived safety on customer satisfaction, with the purpose of travel as a moderating variable. The research concludes that perceived safety is one of the key drivers of overall customer satisfaction, and the relationship was stronger for leisure travellers than business travellers. Based on the strength of this argument the following hypothesis is proposed:

**H4**: Safety perception has a positive effect on satisfaction.

## 3. CONCEPTUAL FRAMEWORK

This study builds on extant literature that investigated factors influencing airline customer loyalty and passenger's behavioral intentions (Gures *et al.*, 2014; Jan *et al.*, 2013; Dolnicar *et al.*, 2011; Park *et al.*, 2005). The researchers propose the conceptual framework in Fig. 1 below for testing the hypothesized relationships through empirical research.

## 4. METHODOLOGY 4.1 Research design

This study operationalized seven variables, namely FFPs, three service quality dimensions, safety perception, satisfaction and customer loyalty, to test the hypothesized relationships. The researchers carried

Figure 1: Conceptual framework for the study



out an empirical study at Harare International airport (HRE) by collecting data from airline passengers who had booked to travel with the airlines under study and admitted to having travelled with the same airline within the previous 12 months. The study focused on routes to international destinations that were exposed to competition to ensure passenger discretion in airline selection. The reasons for choosing HRE for this study are threefold. First, there has been renewed interest in the airport from a number of airlines in the aftermath of the dollarization of the economy in 2009, which brought economic stability and contributed to a steep increase in passenger numbers, which grew by 27% between 2010 and 2014 (ZimStat, 2015). Secondly, the central location of the airport, which is within three and half hours flight time from the majority of the Southern African capitals, makes it a potential hub for the region.

This study adopted the positivism paradigm because it seeks to prove or disapprove hypotheses developed from existing theories (Saunders *et al.*, 2009). The research was explanatory in nature because it sought to determine the cause and effect relationships between variables. Quantitative data collection techniques were used because data should be quantifiable to facilitate the application of statistical analysis (Malhotra, 2007). A systematic random sampling method was used to select respondents at a sampling interval of five. The study was carried out on five randomly selected days within a two week period in order to randomize data collection. The criteria used for the study was deemed to produce a representative sample to justify statistical inference.

## 4.2 Data collection instrument

A self-administered questionnaire was used as a data collection instrument. The questionnaire design was based on prior studies investigating airline loyalty and behavioral intentions. Service quality was measured using a modified scale developed by Park et al. (2005) by incorporating additional service quality dimensions specific to air travel on the original SERVQUAL scale attributed to the work of Parasuraman et al. (1988). All three dimensions of service guality identified by Park et al. (2005) namely (i) Reliability and customer service, (ii) Convenience and customer service and (iii) In-flight service, were adopted for this study. The measurement dimensions for satisfaction were adopted from Olorunniwo, Hsu and Udo (2006) and Fraering and Minor (2013). Customer loyalty dimensions were adopted from Dehghan and Shahin (2011) and Caruana (2002) and were aimed at evaluating a customer's repurchase intensions, willingness to engage in positive word of mouth and switching behavior. Measurement dimensions for safety perception were derived from earlier studies by Ringle et al. (2011) and Gilbert and Wong (2003). All the questions related to each dimension were measured using 7-point Likert scales.

# 5. RESULTS AND DATA ANALYSIS 5.1 Sample characteristics

The profiles of the passengers who participated in the study are shown in Table 1. The gender distribution was uneven, with more males, 58.8% (n=87) of

Table 1: Sample	characteristics
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Attributes	Distribution	Frequency	Percent (%)
	Female	61	41.2
Gender	Male	87	58.8
	Total	148	100
	18 to 30 years	30	20.3
	31 to 40 years	48	32.4
٨٥٥	41 to 50 years	38	25.7
Age	51 to 60 years	24	16.2
	Over 60 years	8	5.4
	Total	148	100
	Single	40	27
	Married	98	66.2
Marital	Separated	1	0.7
Status	Divorced	5	3.4
	Widowed	4	2.7
	Total	148	100
	African	99	66.9
	European	35	23.6
Ether: a	Asian	6	4.1
Ethnic	North American	5	3.4
ongin	Latin American	1	0.7
	Australian	2	1.4
	Total	148	100
	High School	11	7.4
Highest	Diploma/Higher diploma	27	18.2
educational	Undergraduate degree	37	25
level	Post graduate degree	73	49.3
	Total	148	100

the respondents, compared to women, 41.2% (n=61). The majority of the respondents were aged between 31 and 50 years (58.1%; n=86). A fifth of the remaining passengers were below the age of thirty and the rest were above the age of fifty (50). The ethnic composition was skewed towards Africans and Europeans, representing 90.5% (n=134) of the valid cases. Almost half the respondents (49.3%, n=73) indicated that they had completed post-graduate studies and the income levels for all the cases were evenly distributed. The passenger profiles were a fair representation of the travellers and the interview questions were fairly understood.

## 5.2 Structural Equation Modelling

To analyze the psychometric properties of the measurement scales and test the hypothesized causal relationships, the Structural Equation Modelling (SEM) procedure suggested by Anderson and Gerbing (1988) was used. According to this procedure, a measurement model was established before the structural model. A confirmatory factor analysis (CFA) was utilized to estimate the measurement model and to ascertain data quality, including a verification of reliability and construct validity (Ali, Dey & Filieri, 2015). Structural equation modeling was used to test the overall fit of the model and to test the hypothesized causal relationships among the constructs under investigation. The reasons for using the SEM were twofold. First, it is able to estimate several inter-relationships among latent constructs simultaneously in a model. Second, the SEM can efficiently estimate the CFA in the measurement models, analyze the causal relationships of latent constructs in a structural model, calculate their variance as well as covariance, and test hypotheses in the model simultaneously (Ali et al., 2015).

## 5.3 Measurement Model

In order to evaluate convergent validity and discriminant validity, a CFA was carried out. The results indicated a good model fit as advised by Hair *et al.* (2010) because the chi-square = 13.230; df = 19; p = 0.000; NF1

= 0.940; CFI = 0.943; 1F1 = 0.944 and RMSEA = 0.051. The model was therefore used for further analysis. For convergent validity, the factor loadings of each item, the average variance extracted (AVE) and Cronbach's Alpha coefficient were analyzed. Table 2 shows high factor loadings ranging between 0.701 and 0.842, which surpassed the minimum threshold of 0.5 (Har et al., 2010), thereby demonstrating convergence of the indicators with suitable underlying factors. Table 2 also shows that both the Cronbach alpha coefficients and Composite reliability values were above 0.7 as suggested by Nunnally (1978). Furthermore, the AVE values for individual constructs were all above 0.50. The general indication is that there is evidence

#### Table 2: Confirmatory factor analysis of the model

Factor	ltem	Standard Ioadings	Cronbanch alpha	AVE
	The employee attitude of airlines demonstrates their willingness to help me.	0.720	0.853	0.522
Service quality	The employee attitude of airlines shows me that they understand my needs.	0.717		
. ,	The airline employees are able to handle my complaints directly and immediately.	0.702		
	The toilet in the cabin is clean.	0.810		
	The airline's facility is well designed.	0.713		
	I rarely have to wait long to receive the airline service	0.842		
	The airline tells me the accurate time on which it provides service	0.701		
	The airline provides me with convenient flight schedules.	0.772		
Satisfaction	I am satisfied with the airline's customer loyalty programmes	0.767	0.892	0.511
	I am happy with rewards offered by the reward programme	0.790		
Safety	There are thorough security checks at the airport	0.752	0.791	0.587
	I feel safe during the flight	0.820		
	The cabin crew members are competent	0.755		
Lovalty	Loyalty programmes make me strongly connected to the airline	0.743	0.802	0.651
programmes	I fly more frequently on this airline to earn more points	0.785	0.802	0.651
	If an airline does not have a customer loyalty programme I miss out on benefits	0.840		
Loyalty	l intend to continue flying with the airline	0.724	0.853	0.611
	I have confidence in recommending the airline to friends and relatives	0.806		
	I resist influences for me to switch to other airlines	0.805		

#### Table 3: Discriminant validity

	Service quality	Loyal/frequent flyer programmes	Safety	Satisfaction	Loyalty
Service quality	.723				
Loyal /frequent flyer programmes	.223**	.715			
Safety	.665**	.149	.766		
Satisfaction	.692**	.106	.605**	.758	
Loyalty	.600**	.464**	.486**	.586**	.760

to demonstrate the uni-dimensionality, reliability and validity of the measures (Ali *et al.*, 2015). The results of discriminant validity are shown in Table 3. The diagonal in the table indicates that the square root of the AVE between each pair of factors was higher than the estimated correlation between the factors, thereby proving discriminant validity (Hair *et al.*, 2010). The bold diagonal numbers in the table are the square root

of the AVE shared between the constructs and their measures, while the remaining numbers are the correlations among the constructs. Overall, the R<sup>2</sup> results for passenger satisfaction and passenger loyalty to the airline shown in Table 3 indicate that the research model explains more than 55% and 50% respectively of the variance in the endogenous variables.

Figure 2: Path coefficients



#### Table 4: Results of structural model

Hypothesis	Standardized coefficients	S.E.	p-value	Decision
H1 Satisfaction ——> loyalty	0.800	.071	0.000	Supported
H2 Service quality ————————————————————————————————————	0.720	.081	0.000	Supported
H3 Frequent flyer program $\longrightarrow$ loyalty	0.220	.046	0.000	Supported
H4 Safety perception ————————————————————————————————————	0.150	.074	0.039	Rejected

## 5.4. Structural model results

To test the parameters, a structural model of airline service quality, safety reputation, frequent flyer programs (loyalty programs) and passenger loyalty was constructed. The aim of building a structural model was to establish if airline service quality, passenger satisfaction, frequent flyer programs and airline safety reputation have a significant influence over passenger loyalty. The chi-square = 20.859; df = 5; p = 0.001; NF1 = 0.937; CFI = 0.951; GF1 = 0.93 and RMSEA = 0.055 all show that the model was significant. The results of the structural model are shown in figure 2.

Regarding the structural equations, the results demonstrate that passenger satisfaction has positive effects on passenger loyalty ( $\beta = 0.800^{*}$ ), airline service quality positively influences passenger satisfaction ( $\beta = 0.720^{*}$ ), and frequent flyer program/

loyalty programs positively impact passenger loyalty ( $\beta = 0.220^*$ ). Therefore *H1*, *H2* and *H3* are supported. However, the perceived safety of an airline did not exhibit a significant influence on passenger satisfaction ( $\beta = 0.150$ ) and thus *H4* is rejected. As depicted in Table 4, the standard errors (SE) are very small and this means that the possibility of making errors is minimal. Table 4 presents a summary of the hypotheses testing.

#### 6. DISCUSSION OF FINDINGS

The findings confirmed that service quality positively impacts customer satisfaction and satisfaction subsequently influences customer loyalty in the airline industry in Southern Africa. This finding was consistent with the results of studies conducted in other parts of the world (Gures et al. 2014; Jan et al. 2013). The implication of this outcome is that managers intending to develop customer loyalty must satisfy customers through the provision of an outstanding service quality experience to passengers. In addition, the findings also confirmed the consumer marketing theory that highly satisfied customers repurchase more and provide positive word of mouth, resulting in improved profitability (Kotler & Keller, 2012).

Additionally, the research findings confirmed some earlier empirical studies (Lederman ,2007; Lewis, 2004) on the positive impact of FFPs in influencing airline preference and customer loyalty. In light of the opposing views on the usefulness of FFPs in influencing behavioral intentions and customer loyalty it was necessary to drill down further on the relationship between the two variables. By using the part correlations it was evident that FFPs uniquely explained only 6.5% of the total variance in customer loyalty as opposed to satisfaction, which uniquely contributed 20.3%. The customer loyalty program dimension also recorded the lowest mean score of 4.78 and the highest standard deviation of 1.35, implying divergent views and low importance attached to this dimension in influencing customer loyalty. FFP should be viewed as a complementary service that can be used to reward an airline's profitable customers as a way of persuading them to remain loyal and create some switching costs for those customers. Contrary to findings by Ringle et al. (2011), safety perception was not a significant determinant of satisfaction, but it was a statistically significant contributor to the prediction of customer loyalty. By utilizing part correlations it was apparent that safety perception uniquely explained only 1.5% of the total variance in customer loyalty. While the result reached statistical significance it might be of limited practical significance. The possible explanations for this result are twofold. First, it is difficult to assess the safety dimensions of an airline objectively, therefore passengers resort to proxy measures of safety such as an airline's service quality or based on their perceptions of an aircraft's appearance (Rhoades & Waguespack, 2000). Secondly, this result could be attributed to the fact that all the airlines under study had good safety records and had not been involved in any major disasters since 2011.

## 7. MANAGERIAL IMPLICATIONS

The present study provided some practical implications for marketing managers in the airline industry in Southern Africa. An analysis of the results from the empirical research revealed that all three service quality dimensions were significant drivers of customer satisfaction and that satisfaction subsequently influenced customer loyalty development. Since we already know that loyalty drives profitability (Reichheld, 2001; Oliver, 1997), it is incumbent upon airline managers to develop systematic ways of continuously assessing, monitoring and improving service quality in order to keep customers delighted and make them more loyal to the airline. Airlines should continuously have a finger on the pulse of satisfaction through regular surveys that are designed to measure and track customer satisfaction. Inevitably, drivers of customer satisfaction will continue to change over time as new technologies are introduced and other changes occur in the market place, making it obligatory for airlines to design and set up processes that allow them to quickly respond to changes in the environment. Marketing managers should ensure their airlines deliver the promised service. Social media and online chat forums have made it easier for customers to share experiences and it is to an airline's advantage if the shared experiences are coming from satisfied customers.

Airline cabin crew and all employees working at customer touch points should be provided with exceptional training regularly and be equipped to ensure that they are able to offer outstanding service quality. As alluded to by Kotler and Keller (2012), welltrained personnel are courteous, reliable, competent, credible and responsive. An airline can only promise excellent service to passengers when they are confident that their customer facing staff is able to provide it. Employees deliver the service promise and when they are truly committed to their job, they go the extra mile in order to match or exceed customer expectations, resulting in high levels of satisfaction. Internal marketing is thus an important element of the service marketing toolkit because of the high level of interaction between customers and service personnel.

This study also showed that FFPs and safety perception were determinants of customer loyalty. Safety is a number one priority in aviation (IATA, 2014) and airlines should ensure that flying is safe by investing in staff training, newer equipment and complying with all safety regulations. FFPs should be designed carefully to ensure that the benefits to the airlines outweigh the costs of setting up such programs. FFPs are also a potential source of valuable customer data that can be harnessed by the airlines to provide important insights into their customers' travelling patterns and preferences. Airline marketing managers can utilize this information to communicate unique offers, such as price specials or the introduction of value added services such as In-flight Wi-Fi on their frequent routes.

## 8. CONCLUSION

This study investigated the factors that drive customer loyalty in the airline industry in Southern Africa by analyzing the causal relationships between service quality dimensions, safety perception and satisfaction and the subsequent effect of satisfaction and FFP on customer loyalty. The results of multiple regression analysis demonstrated that all service quality dimensions have a significant positive effect on satisfaction and satisfaction subsequently drives customer loyalty, implying that satisfied customers are more likely to continue flying with the same airline in the future, spread positive word of mouth and are less inclined to switch to other airlines. The results also showed that FFP had a positive effect on customer loyalty. The relationship between safety reputation and satisfaction could not be confirmed in the present study. While satisfaction is necessary for the development of loyalty, having satisfied customers on its own is not good enough, making it imperative for airlines to go beyond satisfaction and excite passengers so that they disregard situational influences that could potentially cause switching behavior.

## 9. STUDY LIMITATIONS AND AREAS OF FURTHER STUDY

Inevitably there were a few limitations in this study that point to areas of further investigation in the area of customer loyalty in the airline industry in Southern Africa. First, the study was carried out in only one airport (HRE) that has relatively few airlines and a limited number of direct flights to destinations outside Southern Africa. Future studies can replicate the investigation at bigger airports such as OR Tambo international airport to enhance the generalizability of these findings to all Southern African airports. The second limitation relates to the study timelines and the use of revealed preference (RP) data collected from departing passengers. The study was carried out over a two week period, implying that the results could have been influenced by some one-time events such as flight delays or flight cancellations. Future studies could take the form of longitudinal studies to compensate for short term influences and consider the use of stated preference data in order to provide a validation of the results from the current study.

Another notable limitation of this study relates to the use of service quality dimensions adopted from studies carried out in developed countries. While this approach improves the internal consistency and reliability of the measures, it does not guarantee that all such factors are relevant in a different social and economic setting with passengers from predominantly developing countries. Future studies can explore and investigate the important service quality dimensions for the airline industry in Southern Africa leading to the development of a more refined service quality measurement scale for the airline industry in Southern Africa.

Lastly, this study only considered the impact of airline-specific FFPs on customer loyalty. Future studies on airline loyalty in Southern Africa can also explore whether passengers prefer airline specific FFPs or FFPs for airline alliances. Airline alliances such as One World and Star Alliance broaden the routes coverage for airlines, thus giving frequent fliers more opportunities to earn points and more options for redeeming accumulated points. Future research studies could also further develop the model of this study in order to better explain customer loyalty in the airline industry in the context of Southern Africa. Despite all the limitations that have been identified, the researcher is still confident that this study provided a number of practical guidelines for airline marketing managers and direction for future research.

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## ECONOMIC STRUCTURE AND REGIONAL ECONOMIC PERFORMANCE IN ADVANCED EU ECONOMIES

Nebojša Stojčić, Heri Bezić, Tomislav Galović

#### Abstract

Recent economic turmoil has revived interest in the quest for sustainable growth. Current economic thinking attaches growing importance to industrial development. The roots of such thinking can be traced back to traditional arguments about the beneficial role of manufacturing for economic growth through horizontal and vertical spillovers to other sectors. These spillovers are of particular importance at the regional level, as such externalities tend to be localized in nature. The objective of this paper is to explore the relationship between economic structure and regional growth in ten Western European EU member states in the post-crisis period. The analysis wishes to answer the question of whether regions with a higher concentration of manufacturing outperform their counterparts with more diverse economic structures. A spatial panel econometric technique is applied in order to distinguish between the intra-regional and inter-regional effects of economic structure, yielding recommendations for policy makers in the field of industrial policy.

Keywords: growth, manufacturing, spatial panel model, regional analysis, industrial policy

**JEL:** *L16, O14, R12* 

## 1. INTRODUCTION

The relationship between changes in economic structure and growth has attracted the interest of economists for quite a long time. It was noted already in the 1950s by Clark (1957) that economic advancement is supplemented by a shift from agriculture towards manufacturing and in turn towards services. Recent decades have, if anything, provided substantial amount of empirical evidence in favor of such reasoning (Brown, 1988; Jasinowski, 1992; Kollmeyer, 2009; Rowthorn and Coutts, 2013; Rodrik, 2015). Across the developed world one sees once predominantly manufacturing landscapes being transformed into pools of service activities. This phenomenon, commonly known as deindustrialization, has been widely discussed and analyzed by both academics and policy makers. While for some its occurrence is a conseguence of a common development path of nations,

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There are several reasons why manufacturing may exert a beneficial effect on economic growth. Economies of scale and extended scope for learning, as well as potential for application of its knowledge and technologies in other sectors, are only some of the reasons why manufacturing is considered to be the engine of technological progress (Szirmai, 2009). A particularly important feature of manufacturing is its spillover effects to other economic sectors through backward and forward linkages between economic agents in the vertical production chain, as well as horizontal spillovers between competitors. Recent economic turmoil raised numerous questions about European growth policies. A growing number of academics and policy makers nowadays argue that the road towards growth and a better standard of living in the post-crisis European environment leads through reindustrialization. The recent Competitiveness Report of the European Commission (2013), for example, refers to manufacturing as the engine of the modern economy. Similarly, Corrocher and Cusmano (2014) provide analysis that questions the common wisdom on the importance of knowledge- intensive services for economic growth.

The objective of this paper is to explore the relationship between economic structure and growth at the regional level in ten advanced EU member states in the post-crisis period. Bearing in mind that manufacturing spillover effects tend to be localized in nature the analysis is undertaken at the level of NUTS2 regions. Both intra-regional and inter-regional effects of economic structure on growth are assessed through the use of a spatial econometric model. The rest of paper is organized as follows. Section 2 is a discussion of the relationship between regional economic structure and growth. The analysis of regional economic structure and growth in the post-crisis period of the analyzed countries is described in section three. Section four presents an econometric model of investigation while the results of an econometric investigation are revealed in section five. Section six concludes the paper.

# 2. REGIONAL ECONOMIC STRUCTURE AND GROWTH

The investigation of economic growth has often been made with the nation state as the unit of observation. Moreover, there is literature concentrated

on the relationship between growth and economic structure. Jula and Jula (2013) stress the premise of Dobrescu (2011), which cites and investigates this literature, beginning with Fisher (1939) and Clark (1957) up to Echevarria (1997), Dietrich (2009), and Memedovic and lapadre (2010). Memedovic and lapadre (2010, pp. 3-5) go even further back, referring to the Physiocrats and the beginning of classical economics: "Since its origin, economic theory has given significant attention to structural change. For Adam Smith, structural features were significantly connected to the stage of economic development, while for Ricardo the changing composition of the productive system was a requisite for economic growth". In his paper, Dobrescu (2011) investigates the relationship between sectoral structure and economic growth using data on the world economy spanning the period 1970 to 2008.

The research of Chenery (1968, 1975, 1977) and other authors into the development patterns of a large number of Third World countries in the post-1950 period found that modern economic development is significantly impacted by country size, factor endowments, and availability of capital. Three types of development were noted: big countries with low ratios of trade to GNP and usually low capital inflow; small countries with a relative specialization in the export of primary products; and small countries with a relative specialization in the export of manufactures. However, while smaller countries expanded through export-oriented development, larger countries were sustained by higher levels of internal demand, and trade dependency was limited by import substitution. If, as these studies say, economic development represents a reproducible experience with a limited number of patterns, then this should be true at the regional as well as at the national aggregate level (Lee, 1981).

During the last two decades, other studies have very intensively discussed the relevance of human capital for economic growth (Čadil et. al, 2014). The theoretical emphasis on human capital was laid mainly by endogenous growth theory, starting with Arrow (1962) and Uzawa (1965). Nelson and Phelps (1966) were among the first authors to emphasize the significance of human capital in technology adoption and its influence on economic growth. However, the concept of human capital was fully integrated later, mainly in studies of Romer (1986) and Lucas (1988). Many scientific articles and analyses oriented towards human capital and growth followed - Barro (1991) finds human capital to be one of main determinants of per capita income, Aghion and Howitt (1998) emphasize the relevance of human capital as a factor promoting higher investment in technology with positive impact on growth. However, there are several studies against the common attitude that point to an insignificant relationship between human capital and economic growth, possible reverse causality or the presence of an omitted variable that artificially links human capital with economic growth (Bils and Klenow 2000).

On the other side, the majority of studies are not part of such direct opposition. Sometimes they focus on the unequal or asymmetrical impact of human capital on competitiveness and economic growth. The results of these studies often include the positive impact of human capital, which differs between countries or regions. Krueger and Lindahl (2001) found that the impact of education on economic growth varies among countries. López-Bazo and Motelón (2012) conclude that there is a difference in the education effect on regional wages. Ramos et al. (2009) stress that the effect of human capital represented by education level can even have a negative effect on unemployment connected to over-education. Recent developments in Spain and other, mainly southern Europeean countries truly reveal that education level itself could not lead to higher growth rates and lower unemployment levels. It seems more likely that education should reflect the economic structure of the region and its market needs. Alternatively, there is research that analyzes economic growth at the regional level in order to provide a complete and more accurate picture of national growth and to understand more fully the nature of the process of economic change.

Before continuing with this background theory analysis, it is necessary to define what the characteristics of regional economic growth are. These can be explained using a general sequence of stages through which regions move in the course of their development. According to North (1955), the first stage in the economic history of most regions is one of a selfsufficient subsistence economy in which there is a low level of investment or trade. The basic agricultural stratum of the population is simply located according to the distribution of natural resources. In the second stage, parallel with improvements in transport, the region develops some trade and local specialization. "A second stratum of the population comes into being, carrying on simple village industries for the farmers. Since the materials, the market, and labor are all furnished originally by the agricultural populations, the new 'industrial superstructure' is located in reference to that 'basic stratum' (Hoover, 1937). The third stage includes the increase of interregional trade from which the region tends to move through a succession of agricultural crops, from extensive grazing to cereal production to fruit growing, dairy farming, and truck gardening.

With increased population and diminishing returns in agriculture and other extractive industries, a region has to become industrialized. "Industrialization means the introduction of so-called secondary industries (mining and manufacturing) on a considerable scale." Typically the early stages of industrialization are built on the products of agriculture and forestry and include such activities as the processing of food, the manufacture of wood products, and the preparation of textile fibers. If industrialization is to continue, mineral and energy resources become critical (North 1955, Hoover and Fisher 1949). A fifth stage of regional growth is accomplished when a region specializes in tertiary industries producing for export. Such a region exports to less advanced regions capital, skilled personnel, and special services. The importance of transport costs has been evident in the advancement through these successive stages of growth.

The structural change investigated by Kuznets (1966) was based on a three-sector economy including agriculture, a manufacturing sector, and services, and in which the growth process was characterized by a movement of resources from agriculture to manufacturing and probably more modestly into services, although reallocation of resources within the service sector was seen to be relevant. Deane and Cole (1962) analyze structure using an eight-sector disaggregation, while Aldcroft and Richardson (1969) invoke structural change without quantifying its scale or nature. Although these studies have presented certain aspects of the economic structure, this problem of economic structure can be considered rather in more detail, in terms of a greater than threefold or eightfold sectoral disaggregation, before giving conclusions on the scale or impact of structural change.

According to Lee (1981), broad areas of research may conceal various significant elements of structural change, just as a national approach may conceal relevant variations of a certain region. His structural analysis is based on 27 industrial orders or sectors. By taking into consideration structural change in some detail, Lee (1981) examined the impact on regional employment structures to assess whether the traditional structural categories are in fact as homogeneous as their usage suggests they are thought to be. His conclusion justifies disaggregation at the regional level, and suggests that modern economic growth is reproducible and takes a limited number of forms. His measurement of the relationship between sectors of employment across regions suggests that the traditional threefold division into agriculture, manufactures, and services is not important at all and even misleading.

Besides considerable country-specific and crossnational research, regional analyses dealing with human capital and growth have been increasing. Regional human capital endowment is, next to national models, considered as one of the factors of regional economic growth (Cheshire and Margini, 2000 or Di Liberto, 2008). It is usually reckoned as one of the possible factors of differences and divergences in regional wages, income and productivity, especially in relation to migration flows (Faggian and McCann 2009). Furthermore, Čadil et al. (2013) come to a conclusion on the European level when the impact of human capital on wages and household disposable income was found significant only for regions with specific economic structure. Čadil et al. (2014) stress that regional economies were influenced differently and that human capital itself is no guarantee of guick recovery from a recessionary period.

Other studies focus on the importance of the spatial structure factor on regional economic growth. The work of Englander (1926), Ritschl (1927), Weigmann (1931), and von Boventer (1963) initially exemplified this field of analysis. It is explicitly concerned with the nature of an economy in a spatial setting, and the better-known work of Losch (1954) is very much in this tradition. The connection between a region's economy and its spatial structure has a particular significance when viewed in dynamic terms. Parr (1987) stresses the example in which existing sectors of an expanding regional economy are subject to technical change, and the assumption is that possibly important modifications in their locational characteristics result from a different spatial structure. A similar result could be expected if existing sectors are replaced with new sectors that have substantially different locational requirements. Research by Boisvert (1978), Friedmann (1956), and Johnson (1970) is oriented towards these processes and more generally to the impact of economic change on regional spatial structure. Lastly, the nature and pace of regional economic change over a given period may be influenced by the form of the spatial structure at the start of the period (Parr, 1979).

Parr (1987) has stressed that the process of regional economic growth could be connected to a variety of different transformations in the spatial structure, a variety that appears to be related to the differing conditions accompanying the process of regional economic growth. Many studies of spatial structure development have paid only scant attention to such influences. Parr (1987) concludes that changes in the spatial structure appear to be related to a group of factors that includes the locational characteristics of the dominant type of economic activity, the relevance of economies of scale in production, the agglomeration economies and diseconomies, the efficiency of communication and transportation systems (inter-regional, intra-regional, as well as intra-metropolitan), the level of per capita income and the locational preferences of households. The interactions among these factors appeared to determine the nature of spatial structure development under conditions of economic growth.

## 3. REGIONAL ECONOMIC STRUCTURE AND GROWTH IN THE POST-CRISIS ENVIRONMENT

The past decades have witnessed a reshaping of the economic landscape across a number of EU Member States. The share of manufacturing in output and employment has been declining in a process known as deindustrialization. Traditionally this process was linked to a rise in living standards and the development of EU economies as predicted by theories of long-term structural change. In recent years, this process has accelerated further. The burden of financial and construction sector bubbles that brought the latest economic downturn was more severely imposed on the manufacturing sector than on services. In a parallel development, the competitive pressure of importers on the EU market was intensifying over the past decade in both low and high technology intensive manufacturing sectors. Yet a recent Competitiveness Report of the European Commission (2013) notes that exports of manufacturing goods were among the principal driving forces behind the recovery of EU economies. It can be argued on these premises that future growth of European economies will require the reversal of deindustrialization trends and the rebuilding of a competitive and strong manufacturing sector.

Analysis of the economic structure at the national level in many European countries has been subject to investigation by many authors over the past few decades. However, the economic structure of regions within individual member states has attracted far less attention. To some extent, this can be attributed to the low availability of data at lower levels of territorial organization. While in some countries such data are completely non-existent, in others data for only some of the regions are available. The understanding of processes taking place at the regional level is particularly important as vertical and horizontal spillover effects of manufacturing on other sectors tend to be localized in nature.

For the purpose of this analysis the data on 148 NUTS2 regions from ten European Union Member

States (Austria, Belgium, Germany, Denmark, Finland, Ireland, Italy, Netherlands, Sweden and United Kingdom) was utilized. The data is taken from the Eurostat database and covers 2012, the year when these economies were already on the path to recovery. The main constraint in the selection of countries and the choice of variables to be included was data availability, as for many European regions relevant data is missing. Within these constraints, data was obtained on growth, the structure of regional employment and value added, population density, innovation intensity and unemployment rates.

Changes in economic structure are usually analyzed in terms of either employment or the output shares of particular sectors in an entire economy. Several authors note that the employment share presents a better measure of deindustrialization than output-based indicators (Saeger, 1997; Rowthorn and Ramaswamy, 1997; Cowie and Heathcott, 2003; Rowthorn and Coutts, 2013). An analysis of the regional economic structure in the post-crisis period based on the share of manufacturing employment in total employment is presented in Figure 1, where the darker colors refer to regions with higher shares of manufacturing employment. A close analysis of the numbers behind Figure 1 reveals that the regions with the highest share of manufacturing employment, ranging around 30 percent, are in south of Germany in Bayern







and Baden Wurttemberg and the northern Italian regions. At the opposite end, with manufacturing employment counting for as little as 3 percent, are the large metropolitan areas of London and Bruxelles. In all further analyzed regions the share of manufacturing in total employment ranges between 6 and 25 percent.

As noted earlier, the contribution of manufacturing to growth is likely to be more pronounced at the regional level due to the localized nature of its externalities. The analysis of regional growth rates taken as well from Eurostat is shown in Figure 2. The findings are somewhat heterogeneous across the analyzed countries. On the one hand, in countries such as Italy, Sweden, Belgium, Germany and Finland, more than half of the best performing regions (whose growth falls in the upper quantile) are regions where the share of manufacturing employment is among the highest in these countries. On the other hand, in all other countries regions with lower shares of manufacturing employment are those where the highest growth rates are recorded.

Two explanations can be offered for the abovementioned finding. First, the principal impulse to regional growth in the analyzed period originated in services rather than in manufacturing. Second, it is likely that the manufacturing sector of analyzed countries is characterized by high-technology intensive industries. In the latter case, the labor intensity of



Figure 2: Growth of GDP per capita (NUTS2 regions 2012)



manufacturing (and thus its share in regional employment) would be low, but its share in generated value added would be higher. The latter explanation seems more plausible if one looks at regional growth rates of value added in the manufacturing sector (Figure 3). In all of the analyzed countries regions with the highest quantile growth rates of GDP per capita are also the regions with the highest growth of value added in manufacturing.

When taken together these findings reveal a story consistent with the predictions of endogenous growth models and theories of long-term structural change: specialization in sophisticated industries with high value added bears potential for differentiation and the achievement of above average growth rates. By its nature such activities are characterized by low labor intensity and place instead emphasis on knowledge and technology. In the short run restructuring from the production of standardized products towards industries of higher technological intensity may cause the contraction of the labor market, particularly among low skilled employees. However, in the long run these effects are offset through the impact of demand for final goods on the creation of new jobs and the vocational retraining of displaced workers from other sectors. Bearing everything said above in mind our findings can be understood as evidence that the analyzed regions are going through the process of building their competitiveness in sophisticated knowledge and technology intensive industries.



Figure 3: Manufacturing value added share growth (NUTS2 regions 2012)



## 4. MODELLING OF INTRA- AND INTER-RE-GIONAL LINKAGES BETWEEN GROWTH AND ECONOMIC STRUCTURE

As was pointed out earlier, the importance of manufacturing for economic growth lies in its beneficial impact on other economic sectors. This impact takes place through several channels, such as the movement of workers (and their knowledge) among companies, the transfer of knowledge and technology among upstream and downstream firms in a vertical production chain and the spillovers generated through competition of firms within a particular industry. An important feature of these channels is their localized nature. For this reason, it can be expected that the beneficial effects of manufacturing on economic growth will be spatially limited to regions where firms are located and their surroundings. To explore the spatial existence of intra-regional and inter-regional spatial effects of economic structure on growth a model is developed in the form:

 $growth_i =$ 

$$\begin{split} & c_0 + \rho \sum_{j=1}^n w_{ij} \text{growth}_j + \beta_1 \text{employment growth}_i + \\ & \beta_2 \text{value added growth}_i + \beta_3 \text{population density}_i + \\ & \beta_4 \text{innovation intensity}_i + \beta_5 \text{unemployment rate}_i + \\ & \beta_6 \text{GDP level}_i + \theta_1 \sum_{j=1}^n w_{ij} \text{employment growth}_j + \\ & \theta_2 \sum_{j=1}^n w_{ij} \text{value added growth}_j + \lambda \sum_{j=1}^n \varepsilon_j + u_i \end{split}$$

(1)

The dependent variable in equation (1),  $growth_i$ is the annual growth rate of GDP per capita of crosssectional units (region) i. It is modelled as a function of its own spatial lag (growth), economic structure and a number of control variables. The spatial lag of the dependent variable growth<sub>i</sub> establishes a direct relationship between the dependent variable for region *i* and the dependent variables of other regions j. The expression  $\sum_{j=1}^{n} w_{ij} growth_j$  can be interpreted as the interaction effect of the dependent variable growth; and growth<sub>i</sub> the dependent variable of other spatial units. In the above expression the  $w_{ij}$  stands for the i,j-th element of a non-negative NxN spatial weights matrix W and p is a spatial dependence parameter. The inclusion of a dependent variable's spatial lag is intended to control for inter-regional (between-regional) growth effects. There are several channels through which the economic performance of some regions may exert impact on their counterparts. Sourcing of intermediate inputs and workforce from neighboring regions raises the revenues of their firms and the income of their residents. In both cases a positive effect on the growth of neighboring regions can be expected. Yet at the same time the movement of workers towards more prosperous regions reduces the pool of workforce in neighboring regions, which may exert adverse effects on their economic performance as predicted by coreperiphery models.

The modelling of economic structure draws on the existing restructuring literature, which defines restructuring as a multidimensional concept that cannot be assessed by means of a single indicator. To this end, and subject to data availability, two variables are included in the model, the regional share of manufacturing in total employment growth (*employment growth*<sub>i</sub>) and the regional share of manufacturing in total value added growth (*value added growth*<sub>i</sub>).

The effect of employment structure on growth will depend on the characteristics of the regional manufacturing sector. In regions where manufacturing consists mostly from standardized labor intensive industries a positive sign of this variable can be expected. However, in regions whose manufacturing sector consists mostly of sophisticated knowledge intensive industries or where services form the backbone of local economy the demand for employment in the manufacturing sector will be lower and thus a negative sign can be expected. To further control for these issues a variable measuring growth of regional share of manufacturing in total value added is included. Due to their potential for differentiation, knowledge and technology-intensive industries are characterized by higher value added than standardized labor and resource intensive sectors. A higher proportion of regional value added generated within manufacturing would signal the prevalence of these industries in regional economic structure. In line with predictions of endogenous growth models a positive effect on growth can be expected.

For both economic structure and growth of value added share the model distinguishes between intraregional (within-regional) and interregional (betweenregional) effects. The inclusion of their spatial lags (employment growth; and value added growth;) is intended to control for the previously described effects of individual regions on their surrounding areas. A positive effect would signal the existence of demand and supply side spillovers that take place through the sourcing of inputs, the demand for final goods and the rising living standard of the population from surrounding regions employed in prosperous ones. The negative sign, however, would be more consistent with predictions of core-periphery models, according to which a higher concentration of economic activity in particular geographic areas exercises an adverse effect on other geographic areas and leads to a spatial

polarization of economic activity. For both variables the expression  $\theta \sum_{j=1}^{n} w_{ij}$  refers to the interaction effect of independent variables from spatial units *j* and the dependent variable for region *i* where  $w_{ij}$  is the *i*,*j*-th element of a non-negative NxN spatial weights matrix. An alternative interpretation of these effects would be the effect of independent variables from region *i* on the dependent variables of all other regions *j*.

In addition to these key variables of interest a model includes several other control variables. A level of GDP per capita (GDP level<sub>i</sub>) from the previous year is included to control for the level of development of individual regions. The density of population (popu*lation density*) measured as an absolute value of the average population per square kilometer controls for between-industry agglomeration externalities. For a long time economists have recognized that greater density of population increases demand for final goods and services and acts as a source for a larger workforce pool. For this reason a positive sign can be expected for this variable. The innovation intensity (in*novation intensity*<sub>i</sub>) of the region is defined as the relative (in relation to national average) number of patents registered to an EPO in a given region and year. The greater intensity of innovation can be associated with higher knowledge intensity and the quality-driven competitiveness of regional firms, all of which lead to above average returns.

The last variable to enter our model is the unemployment rate (unemployment rate<sub>i</sub>). Traditional research on the relationship between unemployment and growth has predicted that in the long run growth and unemployment are in a negative relationship. Over the past decade or so a research field has emerged investigating the relationship between the two in the short run and in the context of business cycle fluctuations (Martin and Rogers, 2000). The general message from this literature is that in economies where learning by doing is a principal driving force behind growth, the effect of unemployment on economic growth will be negative as it implies foregone opportunities for human capital accumulation. Such an effect can be expected in periods of recession, for which reason a negative sign on this variable can be expected.

The analysis of the previously described model is undertaken with a spatial Durbin econometric technique. The particular feature of this technique is its ability to control for spatial correlation not only in the dependent variable but also in independent variables and in the error term. Hence, our modelling strategy allows for full spatial correlation. An important item in spatial econometric analysis is the choice of spatial weighting matrix, a quadratic matrix that defines relationships between units (regions) in space. In our analysis, a row standardized inverse distance spatial weights matrix is used, allowing spatial correlation across all regions. The validity of model was verified by means of a number of model diagnostics tests presented in Table 1.

#### Table 1: Model diagnostics

Spatial weights matrix	Inverse distance
Number of observations (regions)	148
Log likelihood function	-213
Wald test	85.64***
LR TEST SDM vs. OLS $H_0:(p=0)$	90.92***
LR TEST $H_0:(wX's=0)$	52.97***
p	-0.00004***
Acceptable range for <i>p</i>	-0.0001<<0.0000
Spatial Error Autocorrelation Tests H <sub>0</sub> : (no spatial error autocorrelation)	
Global Moran MI	0.25***
Global Geary GC	0.74***
Global Getis-Ords GO	-0.25***
Moran MI Error Test	21.47***
LM Error (Burridge)	174.09***
LM Error (Robust)	1.09
Spatial Lagged Dependent Variable Tests H <sub>0</sub> : (no spatial autocorrelation)	
LM Lag (Anselin)	229.12***
Lm Lag (Robust)	56.12***
General Spatial Autocorrelation Tests H <sub>0</sub> : (no general spatial autocorrelation)	
LM SAC (LMErr+LMLag_R)	230.21***
LM SAC (LMLag+LMErr_R)	230.21***
Heteroscedasticity $H_0$ : (homoscedasticity)	11.74
Normality (Jarque Berra) H <sub>0</sub> : (Normality)	0.49
Regression Specification Error – RESET H <sub>0</sub> : (Model is specified)	1.013

**Note:** \*\*\*,\*\* and \* denote statistical significance at 1%, 5% and 10% significance level

Source: Authors calculations

All diagnostics relevant for spatial regression techniques provide support to our specification. The reported value of  $\rho$  coefficient lies within an acceptable range, suggesting that the dependent variable follows a spatially integrated process SI(0). Two LR tests were carried out in order to determine whether spatial or conventional econometric techniques should be used. The null hypothesis of coefficient  $\rho$  being equal to zero, i.e. the absence of spatial effects in the dependent variable, is rejected with very high probability. Similarly, an LR test for spatial effects of independent variables rejected the null hypothesis of spatial coefficients on these variables being equal to zero with very high probability. On the basis of these findings spatial estimation techniques should be preferred over conventional econometric analysis (Elhorst, 2013; Shehata and Mickaiel, 2014).

Further analysis of model validity included conventional and robust Lagrange Multiplier (LM) tests for the existence of spatial effects in the dependent variable, independent variables and error term. Analysis of conventional and robust LM tests (Burridge, 1980; Anselin, 1988) indicates that a spatial Durbin model should be given preference when LM tests for both the spatial lag and spatial error are significant, or the conventional LR tests and robust LM tests point to different models (Elhorst, 2010; Shehata and Mickaiel, 2014). Based on this rule the findings from Table 1 suggest that the spatial Durbin model should be used in our estimation. Similarly, Global Moran, Geary and Getis-Ords tests reject the null hypothesis of no spatial autocorrelation in the error term.

The testing procedure reveals that our model does not encounter non-normality issues, while the Regression Specification Error - RESET test provides support to the chosen specification. The null hypothesis of no heteroscedasticity, however, is rejected, for which reason robust standard errors and the Huber-White robust matrix are used. Overall, the tests performed tests provide support to our model and enable us to proceed with interpretation of the results.

#### Table 2: Results of estimation

Variable	Coefficient
Spatial lag of dependent variable (Growth)	-0.00004***
Ecconomic Structure (Employment share)	-0.11***
Value added share growth (VA growth)	0.11**
Population density	0.0001
Innovation intensity	0.40
Unemployment rate	-0.37***
Initial GDP level	-0.0001***
Economic structure – spatial lag	0.00002***
Value added share growth – spatial lag	0.0001***
Constant term (cons)	10.53***

**Note:** *p*-values in brackets where \*\*\*,\*\* and \* denote statistical significance at 1%, 5% and 10% levels of significance respectively. Robust standard errors used.

Source: Author's calculations

The results of the estimation are shown in Table 2. Starting with the spatial lag of the dependent variable it is evident that the coefficient is statistically significant with a negative sign. Such a finding suggests that the better economic performance of some regions has an adverse effect on other areas. As noted by core periphery models, migration towards prosperous areas widens regional development gaps. As increasing economic activity is concentrated in core areas, their ability to exploit economies of scale and learning, as well as other between and within industrial agglomeration externalities, grows cumulatively. The coefficient on the variable measuring the regional share of manufacturing in total employment is statistically significant and negative. As we noted in the previous section two possible explanations can be offered for such finding. On the one hand, the reported finding may signal that the backbone of regional growth is in services rather than in the manufacturing sector. On the other hand, it may also signal the transitioning of the regional economic structure towards less labor intensive sectors of manufacturing.

The latter finding seems more convincing if one looks at the findings for the proportion of value added generated within the manufacturing sector. An increase in the share of manufacturing in regional value added positively contributes to regional growth. When taken together with the findings on regional employment structure this finding seems closer to the thesis that sophisticated knowledge and technology intensive manufacturing have a positive effect on the economic growth of the analyzed regions. Furthermore, the spatial lags of both variables provides further support for such reasoning. An increase in the share of manufacturing in employment has a negative effect on the growth of other regions. It is likely thus that the migration of workers towards prosperous areas reduces the quality of human capital in additional regions. At the same time, we can observe a positive effect of an increase in the share of manufacturing in total value added on the growth of other regions. It is likely thus that spread mechanisms of agglomerations are in effect here through sourcing of inputs from firms in other areas.

Among the control variables significant coefficients were reported on variables controlling for initial level of GDP and unemployment rates. Both variables have negative signs. While the finding on initial GDP per capita level is something commonly reported in studies dealing with growth related issues, the finding on the unemployment rate is particularly interesting in the context of the overall paper. As noted earlier, for regions and countries whose growth is built on learning by doing processes the extent of unemployment is particularly relevant. Displaced and unemployed workers in such settings present unexploited learning potential. Suboptimal accumulation of human capital has an adverse effect on the economic performance (or growth) of these regions and countries. It is for these reasons that in the crisis and immediate postcrisis periods the effect of unemployment on growth will be particularly pronounced. Our finding can be seen in such a context.

#### 5. CONCLUSION

One of the main objectives for policy makers across the world is to increase the ability of their nations to grow and to provide their citizens with a better standard of living. The accomplishment of this task requires an underlying economic structure capable of generating a sufficient amount of jobs, withstanding the pressure of competition in a globalized world and yielding sustainable rates of growth. The recent economic crisis has pointed to numerous weaknesses in the economic model pursued by many economies based on the promotion of the service sector. Early post-crisis reports suggesting that the recovery is largely driven by exports from manufacturing have after several decades revived interest in the question of industrial development. Proponents of reindustrialization are being found among academics, businessmen and policy makers. Questions pertinent to their thinking concern whether the development of industry can be encouraged and the kinds of industries Europe needs.

Unlike traditional neoclassical economics, contemporary growth models with roots in endogenous growth theory suggest that specialization in knowledge and technology intensive activities bears higher growth potential than the production of standardized, labor intensive products. A particularly important implication of these theories is that through investment in knowledge and the strengthening of innovation capacity above-average growth rates can be sustained over a longer period of time. Building on these premises, the growth and development strategies of many economies across the world devote particular attention to investment in knowledge and strengthening of their innovation potential. Similar trends of building a knowledge-driven economy are present in the post-crisis EU and incorporated into the core of its strategic documents.

The question of economic structure should not be approached only from the perspective of growth and industrial policy, as its implications also extend over cohesion and regional inequalities. While the benefits of manufacturing for economic growth are well known and widely discussed, the localized nature of its externalities poses the risk of a widening regional development gap that brings with it a number of other economic, social and demographic problems. As a result, the shaping of industrial policy in post-crisis in Europe is a multifaceted problem that has widespread implications in a variety of areas.

Our analysis of 148 regions from West European EU Member States in the post-crisis period has revealed several interesting findings that can serve as guidelines for future policies. It seems that the fastest growing regions across the analyzed countries are also those with the fastest growing share of manufacturing in their value added. Such reasoning signals are repositioning European industries towards sophisticated industries characterized by high value added, knowledge and technological intensity. The results of the econometric investigation further support that story. The growth of manufacturing value added and contraction of the workforce can be understood as signs of movement from labor towards knowledgeintensive activities. While the former findings breathe some optimism the results related to inter-regional effects are somewhat worrying. It appears that the development of the analyzed regions bears many resemblances to theoretical core-periphery models. It seems that backwash effects such as outflows of workers towards more prosperous areas have an adverse effect on peripheral regions. Yet our findings also suggest that spread effects in the production chain might also be in place.

Future industrial policy will have to find instruments for a more balanced distribution of economic activity and the strengthening of linkages between economic entities in different geographic areas. These measures will have to include not only incentives for firms in core areas to source some of their activities to the periphery in order to reduce development gaps and strengthen EU integration, but more importantly, measures aimed at the strengthening of competitiveness for firms in the periphery. These tasks will have to be complemented with structural measures aimed at the positioning of European industries within the quality-driven segment of the global market.

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## THE GRAVITY MODEL APPROACH: AN APPLICATION ON THE ECOWAS TRADING BLOC

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#### Abstract

This study aims to examine bilateral trade flows across ECOWAS-15 nations with the use of a panel and cross section for the period of 1981-2013. The methodology carried out to achieve this objective involves the use of various techniques of estimation for the gravity model (Static and dynamic). More specifically, this study aims to investigate the formational impact of regional trade integration agreements on trade flows within a group of countries using the same currencies and ECOWAS at large. The main use of regional variables into gravity models is intended to determine whether RTAs lead to trade creation, or diversion. The results show the presence of a strong relationship among the factors of both RIAs and trade flows.

Keywords: RTAs; Trade creation and diversion; Panel Data model; Gravity models

JEL classification: F15,F13,C33,F14

## INTRODUCTION

The fast increase of Regional Integration Aggreements (RIAs) has motivated numerous researchers to study the likely trade effects of regional integration. Since the 1990s, several RTAs have been establisehd, while some are still under negotiation. According to a trade report, as of January 2015, about 604 notifications of Regional Trade Agreements were due for implementation, while 398 were in force (WTO, 2015). Trades at the provincial level were comprehensively evaluated using the gravity model structure of international trade (Sapir 2001). Regional trade integration has turned into an issue of discussion for both non-academicians in industry, and academicians, in order to validate its existence.

ECOWAS was initiated by ECOWAS treaty in 1975. It comprises Gambia, Ghana, Burkina Faso, Cape Verde, Liberia, Guinea, Senegal, Togo, Nigeria, Niger, Guinea Bissau, Mali, Benin, Cote D'Ivoire and Sierra Leone. According to ECOWAS (2012), the population of the ECOWAS zone is around 300 million, with a GDP of approximately USD \$316 billion; the region represented

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Senior Lecturer Department of Economics and Agribusiness School of Economics, Finance and Banking UUM College of Business Universiti Utara Malaysia E-mail: mukhriz@uum.edu.my about 4.5% of the world populace, but contributed to only 0.5% of the global GDP. The empirical proof indicates that higher political stability is associated with higher savings and income levels moderate the adverse effect of political instability on savings, indicating that the impact of political instability on savings is higher in low income ECOWAS countries, but lesser at higher levels of income (Abu, Mohd Zaini and Mukhriz 2014) Studies on ECOWAS regional integration have been inconclusive, as the few available ones discover either a positive effect or no effect from ECOWAS regional integration.

However, RIAs have long been acknowledged as an important way to address the concerns of the small economic magnitude of many nations, and the often subjectively strained borders that pay little heed to the dissemination of natural endowments. Based on UNCTADstat (2013), the intra-trade of ECOWAS continues to deteriorate from 10.32% in 1995, to 6.46% in 2011, and fnally to 7.52% in 2012. Therefore, comparing its performance with that of other regional bodies shows that other regional bodies' trade performance was higher than that of ECOWAS (e.g., ASEAN: 24.1%; NAFTA: 43.8%; EU: 60.4%).

The main target of this study is twofold. Our prior aim is to contribute to the methodological discussions on heteroscedasticity in various magnitude (i, j, t) datasets and compare several techniques of estimations. Our second target is to critically examine the formational effect of regional integration agreements on intra-regional trade flows with the use of the gravity model on ECOWAS trade. First, in line with Vinerian specifications for determinants of either trade division or creation using the gravity model, both static and dynamic approaches are employed, such as: pool ordinary least squares (POLS), dynamic ordinary least squares (DOLS), dynamic least squares dummy variables (DLSDV), poisson pseudo maximum likelihood (PPML), and two stage least square (2sls). This article is divided into four main sections. Subdivision 1 presents the introduction to the study. Subdivision 2 determines the model specification and data used in the methodology carried out to satisfy the study's objectives. Subdivision 3 and 4 present the results, as well as conclusions with policy recommendations.

#### **METHODOLOGY**

For the purpose of this study, the gravity model was employed to estimate the bilateral trade flow among ECOWAS countries during the period of 1981-2013. In addition, theoretically grounded approaches for gravity models by Baldwin and Taglioni (2006), and Anderson and van Wincoop (2003), were adapted for this study. Our model was specified differently from theirs, because we included the similarity size of the GDP, an absolute difference of GDP per capita, the populations of exporting and importing countries, the inflation of importing and exporting countries, and the real exchange rate among exporters and importers, as well as trade openness and FDI inflow. For the purpose of achieving this study's research objective, the following techniques were considered: pool ordinary least square (POLS), dynamic ordinary least square (DOLS), two stage least square (2SLS) and dynamic least square dummy variable (DLSDV). Based on the recommendation of Santos Silva and Tenreyro (2006), we also estimate our model using the Poisson pseudo maximum -likelihood (PPML), in order to give proper account for the patterns of heteroskedasticity characteristics in trade data, and also for the protrusion of the occurrence of zeros in most sectoral trade flow data. The model specification for bilateral trade can be defined as follows:

where i and j represent exporting and importing countries, Exp<sub>iit</sub> represents nominal export from nation i to j,  $DIST_{iit}$  is the distance between nation i to nation j (measured in kilometers), POP<sub>it</sub> represents the existing population of the exporting country for the year t, POP<sub>it</sub> is the population of the importing nations,  $GDP_{it}$  is the GDP of the exporting country,  $GDP_{it}$ is the GDP for the importing countries, RER<sub>iit</sub> is the real exchange rate among exporters and importers over time, *INF<sub>it</sub>* is the inflation of exporting countries, *INF<sub>it</sub>* is the inflation of importing countries, *LANG<sub>ij</sub>* is represented by a dummy (i.e. the country is equal to 1 if countries within ECOWAS speak the same language, otherwise 0), FDIinflow<sub>iit</sub> is the inflow of foreign direct investment within ECOWAS, and Tradeopen<sub>iit</sub> is the trade openness index measuring the level of openness of the countries within ECOWAS. SGDP<sub>iit</sub> the similarity index, which can be calculated using the size of each country pair:

 $\begin{aligned} SIMGDP_{ij}^t &= \log\{1 - [GDP_i^t/(GDP_i^t + GDP_j^t)]^2 \\ &+ [GDP_j^t/(GDP_i^t + GDP_j^t)]^2 \} \end{aligned}$ 

Relative factor endowments can be captured with GDP per capita by taking the absolute difference, which are also in log form, and given as:

#### $DIFFGDGPPC_{ij}^{t} = (lnGDPPC_{i}^{t} - lnGDPPC_{j}^{t})$

This is represented in the model with *DGDPPC*<sub>ijt</sub>, and *ECOWAS*. *FRANCO* was represented with a dummy in order to capture the impact of a group of countries using the same currencies within ECOWAS, where the exporting country dummy equals to 1 as at 1990 if it is already a member, otherwise a value of 0 is assigned. This is denoted in the model as *ECOWAS*. *INTRA*<sub>ijt</sub>. Furthermore, our measurement of Viner trade diversion and creation was adopted from Martinez, Zarzoso, Nowak-Lehmann, and Horsewood (2009), and Carrere (2006), which is specified as follows:

where  $EXP_{ijt}$  represents the exports from nation i to nation j and  $EV_{ij}$  represents the other explanatory variables.  $D_r$  and  $D_{rij}$  represent the dummy variables defined in the former section as variables ECOWAS. FRANCO<sub>ijt</sub> and ECOWAS. intra<sub>ijt</sub> respectively. However, Olivero and Yotov (2012) construct a theoretical basis for a dynamic setting, employing a gravity model with the use of panel data. In line with Baldwin and Taglioni (2006), the time varying effects were used to control the effect of unobservable resistance that are multilateral terms. Theoretically grounded specifications were reported with a lagged dependent variable as a regressor, contemporary and trade barrier, which are lagged. The fixed effect performs very well with

#### Results

Table 1: Panel unit root result

time-varying types, which are directional. The dynamic model used in this study was employed by Olivero and Yotov (2012):

$$\begin{split} &InExp_{ijt} = \beta InExp_{ij,t-1} + \beta_1 InGDP_{it} + \beta_2 InGDP_{jt} \\ &+ \beta_3 InPOP_{it} + \beta_4 InPOP_{jt} + \beta_5 InDGDPPC_{ijt} \\ &+ \beta_6 InSGDP_{ijt} + \beta_7 InINF_{It} + \beta_8 InINF_{jt} \\ &+ \beta_9 InTradeOpen_{ijt} + \beta_{10} InFDIinflow_{ijt} \\ &+ \beta_{10} InDIST_{ijt} + \beta_{11} InRER_{ijt} + \beta_{12} LANG_{ij} \\ &+ \sum_{r} \alpha_r ECOWAS.FRANCO_{ijt} + \sum_{r} \theta_r ECOWAS.INTRA_{ijt} \\ &+ u_{ijt} \dots \dots \dots (3) \end{split}$$

For the purpose of comparison, suggestions from Baldwin and Taglioni (2006) were taken by including time invariant country specific-pair effects for the purpose of removing gold medal error completely. Another purpose of including a time invariant country pair effect is to take care of Nickell (1981) biases, which might occur due to the positive correlation between the lagged dependent variable and the country-pair effect, and which are unobservable. To include country-pair effects leaves distance and language to be removed or identified. Furthermore, DOLS can be used to eliminate the endogeneity bias that might result from tolerating the equation error term to be correlated with lags and leads based on the changes in the stationary regressors. For generalizing purposes under a specific model to accommodate explicit effects, DOLS estimators can also be regarded to as DSLDV estimators (Mark and Saul 2003). The nations include: Gambia, Ghana, Burkina Faso, Cape Verde, Liberia,

	Level			First differences		
Regressors	Constant	No of obs.	Trend & Constant	No of obs	Constant	No of obs
InExports	60.58	6090	35.69	6090	-22.43***	5880
GDPSimilarity	19.75	6090	4.74	6090	-34.92***	5880
GDPPC	13.99	6090	20.46	6090	54.41***	5880
InPopulation i	49.10	6090	79.57	6090	29.64***	5880
Inpopulation j	50.93	6090	80.72	6090	-27.46***	5880
InTopen	77.80	6090	94.49	6090	45.58***	5880
InFDIinflow	26.93	6090	63.58	6090	29.08***	5880
InGDPi	25.51	6090	39.74	6090	26.83***	5880
Ingdpj	39.32	6090	25.57	6090	26.69***	5880
Ininflation i	20.13	6090	69.77*	6090	42.01***	5880
Ininflation j	38.01	6090	43.42*	6090	48.13***	5880
InReR	22.42	6090	70.49*	6090	41.56***	5880

**Note:** Null hypothesis testing for a unit root against the alternative in order to test the stationary of a series are computed using t-statistics (Im et al. 2003). Bayesian information criteria (BIC) are chosen as the optimal lag in most of the cases. \*\*\* represents a significant level of 1%

Guinea, Senegal, Togo, Nigeria, Niger, Guinea Bissau, Mali, Benin, Cote D'Ivoire and Sierra Leone. The time period considered was 1983-2013. Bilateral exports of 15 nations were used for panel estimation, with 6510 observations 6510 (15 x 14 x 31). Data were obtained from the following sources: flow of export for ECOWAS countries (denominated in US Dollars) was downloaded from the International Monetary Fund (2014), specifically under Direction of Trade Statistics. This was denoted using US producer prices 2000 = 100. Per capita GDP and GDP variables were sourced from the World Bank Indicators Database (reported in US dollars). Time-invariant variables, which included distance and language, were downloaded from CEPII.

Based on the emerging literature on panel units and cointegration tests, variables of the gravity model were first checked before proceeding to estimate the gravity model. Numerous panel unit root tests are available. Panel variants also largely rely on whether data available for estimation is balanced or not, and also on whether cross sectional dependence and heterogeneity are allowed. Table 1 depicted above repo rts the panel unit root tests. The results indicate that all variables are integrated of order I(1), excluding real exchange and inflation, which rely on whether a deterministic trend is involved in the equation.

#### Table2: Kao Panel cointegration test

	5		
	Statistics	Null hypothesis	Test result
Kao (1997)	Panel t-statistics	No Cointegration	-35.51018***

The reported tests in Table 2 are less than the critical value, at a 1% level of significance, which implies a rejection of no cointegration for the null hypothesis.

#### Table 3: Coefficient of gravity model estimates

Variables	POLS	2SLS	DOLS	PPML	DLSDV
InExp <sub>ii</sub>					.497***
					( 33.58)
GDPi	1.241***	.159	.193	.145***	.289***
	(11.33)	(0.20)	(0.54)	(11.59)	(3.47)
GDPj	.355***	-5.028***	.715**	.059***	.184**
	(3.50)	(-2.96)	(2.00)	(5.02)	(1.98)
POPi	489***	2.804***	.346	033***	310
	(-4.11)	6.35	(0.17)	(-2.57)	(-0.76)
РОРј	.450***	4.33***	122	.0278**	1.27***
	(5.14)	(3.80)	(-0.05)	(2.49)	(3.05)
SGDPijt	193*	2.454**	-1.24*	001	.119
	(-1.78)	(2.30)	(-1.65)	(-0.32)	(1.27)
DGDPPCij	.414***	1.093***	.669 ***	.0336***	.086**
	(5.63)	(3.69)	(7.63)	(5.45)	(2.05)
INFi	.003	025***	.039***	0002	.003*
	(1.12)	(-4.91)	(7.63)	(-0.07)	(1.68)
INFj	.003	0009***	.0006**	.0058**	.0009
	(0.19)	(-2.75)	(2.15)	(2.20)	(0.65)
Distij	876***	448**		0738***	
	(-18.27)	(-2.50)		(-18.14)	
ReRlijt	.014	302***	349***	.0033	027
	(0.30)	(-2.78)	(-4.00)	(0.80)	(-0.97)
Fdiinflowijt	0471*	.001 ***	.079*	.0003	.026
-	(-1.63)	(4.73)	(1.66)	(0.14)	(1.34)
Topenijt	012***	612***	013**	0255***	039
	(-3.97)	(-2.90)	(-2.26)	(-6.47)	(-0.97)
Langijt	.313***	382		.031***	
	(3.68)	(-1.29)		(4.43)	
ECOWASijt	258**	.500***	1.071***	.015	.037
-	(-2.23)	(3.05)	(4.33)	(1.46)	(0.40)
Eco.francoijt	-1.33***	612***		093***	
	(-13.96)	(-2.90)		(-10.56)	

**Note:** The parentheses values are represented by t-statistics.\*denotes a significance level at 10%, \*\*denotes a significance level at 5%, and \*\*\* denotes a significance level at 1%.

Thus, evidence from the panel t-test of kao (1999) indicates the presence of a cointegrating relationship among the selected variables specified for the gravity equation.

### INTERPRETATION OF RESULTS

The following subsections provide an explanation and interpretation based on the results. The results shown above apply only to the period of 1983-2013; the main objective is to determine the progress of export flows among member nations within the region. The five models results are jointly presented, and include static and dynamic models. The parentheses in numbers denote the level of significance. The coefficient of lagged exports is found to be statistically significant under DLSDV at 1%, signifying that adjustment plays an important part. Thus, this confirms our view that stresses that the gravity model should be considered dynamically. GDP of I to j under ECOWAS is quite important for the period. The GDP elasticity shows that there is a clear market effect on trade flows within the region. The coefficient of GDPI to GDPj shows a positive sign, and was also found to be statistically significant at 1% and 5%. Thus, the positive sign of the coefficient is consistent with the theoretical explanation, with the exception of GDPi, which is not significant under DOLS and 2SLS, but still carries a positive sign. An increase in the GDPi to j by 1% leads to an increase of 0.15 or more on average. This result is in line with other findings (Frankel et al. 1995; Tinbergen 1962; Aitken 1973; Poyhonen 1963; Bergstrand 1985, 1989, 1990; Aitken and Obutelewicz 1976; Christerson 1994; Thursby and Thursby 1987; Geraci and Prewo 1977, 1982).

Population was introduced as a variable into the model in order to show the impact of the size of the countries involved in trade within the region. Enhancement of division of labor is determined by how large the population is, which might connote a larger domestic market. This will transform into economies of scale and other opportunities, as well as the desire to involve a variety of products. Our findings are mixed, and this is in line with previous empirical findings, including those of: Oguledo and MacPhee (1994), Linnemann (1966), and Blomqvist (1994). Matyas et al. (1997) established that trading populations of nations affected trade flow negatively and remain significant, while Brad and Mendez (1983) revealed in their findings that population size is positively significant. The coefficients of the similarity index variable are negative and significant in two of the estimates, while positive in only one. In the case of dynamic models, the similarity index was negative

and significant under DOLS, while it was insignificant under DSLDV. The variations can be largely described by the heterogeneity of the countries involved in our sample. The more similar the economy of the countries in our sample is, the closer and more imperative their trade relations are. The significance level of the similarity index in POLS and DOLS is weak, which indicates that the development gaps among nations might have a restrictive influence on trade flows. As for the 2SLS model, the similarity index is positive and significant at 5%. Thus, the flow of exports is largely affected by the developmental gap that existed among member nations. Trade among countries is a strong determinant of inter-industry trade. The coefficient of the distance variable maintained a negative and very significant level, both at 1% and 5%. In other words, the greater the distance between countries of the region, the lesser the trade. This is in line with the classical gravity model results; an increase in the distance among countries (i.e., I to j) by 1% results in the decrease on exports 0.8% on average The findings is inline with (Afolabi, Abu Bakar and Azman, 2016). The decrease is constant to all models of estimates.

Moreover, the common language coefficient is positive and significant at the 1% and 5% levels, indicating that two or more countries tend to trade more if they share a similar official language. The coefficient of the exchange rate was negative and significant in two models of our estimates. Thus, the result indicates that an appreciation of the exchange rate will tend to discourage exports from a country I to j. The coefficient is significant at 1% and 5%. This indicates that an appreciation of a real exchange rate by 1% tends to reduce country j exports by 0.3% on average. The coefficient of the real exchange is in line with the hypothesis. Meanwhile, the inflation variable of country I to j shows mixed results, i.e., both negative and positive. An increase in inflation by 1% tends to reduce country j exports by 0.25% on average. This finding is in line with theoretical backing, which claims that a country with high inflation tends to experience a negative impact on export trade.

The difference in income per head based on the absolute level is significant at 1% and 5% across the model estimates. The coefficient can be interpreted in terms of related factor endowments, which was discovered to be relatively similar concerning the level of per capita income. FDI inflow is only significant in three out of the five models, including DOLS at 1% and 10%. The coefficient of FDI is under 2SLS and DOLS, except for POLS, which shows a negative sign. Consequently, ECOWAS trade increases by 0.001% as FDI inflows into the region increases by 1%. It was very interesting to discover that our trade openness was

significant in four out of five estimates, but remain negative. This implies that ECOWAS country's liberal policies impede the flow of goods, thus, a decrease of 0.012% leads to a reduction in the ECOWAS trade flow by 1%. Policies that will improve the free flow of goods within the region need to be implemented. The findings is inline with (Luqman, Abu Bakar and Azman, 2015)

However, it is very important to examine the coefficient of the regional group in order to access the impact of ECOWAS regional grouping preferences. ECO. Franco was introduced to investigate the impact of regional grouping on the member countries, since they are monetarily integrated, and currently use a single currency. The coefficient of the ECO. Franco variable is significant and negative, which indicates that there it is an element of trade diversion possibly among the remaining members. The coefficient of ECOWAS had on the whole unstable results for the pool OLS estimator, which shows that there is an element of trade diversion among members to outsiders. The proliferation of regional grouping has spawned much criticism. Looking forward to other estimates of ECOWAS, regional grouping as a whole shows that there is trade creation within the ECOWAS regional grouping under the 2SLS and PPML estimates. An ECOWAS member country I increases trading activities with country j by 1.07% as ECOWAS trade increases by 1%. The trade's improvement effect is confirmed under ECOWAS accession in two out of the three estimates. In summary, the results of the estimates indicated the significance for controlling the two main sources of endogeneity. These two sources are endogeneity that might be present mainly due to the determination of exports, as well as the I (1) explanatory variable that was determined simultaneously using a gravity model and the omitted factors that were unobservable, which might cause correlation due to endogeneity issues. This was not taken into account in previous studies.

#### CONCLUSIONS

The aim of this article is to explore the formational effect of regional integration agreements on intra-regional trade flows within ECOWAS. With the increasing number of RTAs, since the 1990s, the likely effect of regional trade integrations on trade flow has received increased attention. The expected positive effect of regional trade agreements among signatory nations is mostly captured with dummy variables using a gravity model framework (Greenaway and Milner 2002). However, it is of great importance to note that the implementation of RTAs does not only involve trade creation, but also causes trade diversion. With the expected trade diversion within the groups of ECOWAS nations that use the same currency, it cannot be concluded that the diversion is not with the remaining members of the group.

The extensive use of the gravity model is due to the success recorded in empirical estimates in explaining trade patterns, including its flexibility and simplicity in application. Not all empirical results that use the gravity model are reliable, as they may suffer from the problem of endogeneity bias due to some important explanatory variables. Using a panel cointegration method for estimation using the gravity model also guards against regression that is spurious. The degree of variation in our results advocates that heterogeneity is a significant aspect for gravity modeling.

Lastly, the following recommendations are provided in order to achieve better results in further studies. First, ECOWAS members should design and implement a robust industrial policy in order to expand the industrial capacity of countries and improve competitiveness. Second, a sound trade policy should be put in place in order for countries within ECOWAS to gain more from trade, which involves moving to another stage of integration in order to strengthen their performance. Third, diversification of the economy within ECOWAS should be encouraged. Fourth, a sound macroeconomic policy should be put in place. Fifth, the issue of institutions needs to address the level of development, infrastructure, and growth that must be achieved.

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# THE INFLUENCE OF MACROECONOMIC TRENDS ON THE REPAYMENT OF LOANS BY HOUSEHOLDS: EVIDENCE FROM THE FEDERATION OF BOSNIA AND HERZEGOVINA AND POLICY RECCOMENDATIONS

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## Abstract

This paper explores the influence of macroeconomic indicators, namely GDP growth, the Consumer Price Index and the unemployment rate on the quality of loan repayments by households in the banking market of the Federation of Bosnia and Herzegovina. Potential influence is observed over a period of fourteen years at the level of nonperforming household loans using regression analysis. The authors aim to determine whether macroeconomic forces actually influence loan repayment, and if so how and what can be done by banks to utilize this information in order to reduce future credit losses, and by the government to maintain the stability of the banking sector.

Key words: influence of macroeconomic trends, nonperforming loans, Federation of Bosnia and Herzegovina

**JEL:** G210, P34.

## I INTRODUCTION

Credit risk management is the function most relevant to the safety of a bank's performance. Usually, the bulk of a bank's activities relate to lending and therefore the correctness of its credit decisions determines the bank's level of exposure to credit risk. Failure by the bank to make the correct credit decision can lead to the customer being placed in a position where he/ she is unable to repay the granted finance. This can result in losses to the bank and trigger risks related to liquidity and the bank's ability to safeguard and repay its customer deposits.

Lending to private individuals (retail lending) was an attractive business for commercial banks in Central and Eastern Europe grew rapidly over the past two decades. Yet a reduction trend in otherwise historically lucrative margins in this business, coupled with the oversupply of retail products to households, has pushed commercial banks to seek ways to reduce costs in order to continue to operate this business, as pointed out by Berger and DeYoung (1997). Risk cost, as a prominent item in the cost structure of commercial banks, is first on the agenda for reduction and therefore implies the need for improved retail risk management.

Furthermore, a slowdown in growth and recession in the CEE caused by the recent financial crisis have

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Associate Professor Department of Economics Sarajevo School of Science and Technology E-mail: adisa.omerbegovic@ssst.edu.ba had a strong effect on households and caused deterioration in private loan repayments, as pointed out by Barisitz (2011). According to the EBRD Transition Report for 2011, nearly one-third of households in CEE reported a decrease in wages and one-sixth reported job losses in 2011. According to the same EBRD report, a consequence of the economic crisis is that the percentage of nonperforming loans in the private individual portfolios of CEE banks has increased by eight times over the period 2008-2011. Thus, bank risk costs have increased rapidly, from 50 base points of interest earnings in 2008 to 350 in 2011. As confirmed by Price Water House research (2011), CEE banks traditionally have less knowledge and skills in terms of household/ private individual loan management than banks in other parts of the world. Therefore, in this environment, CEE banks are under stronger pressure to catch up with modern retail risk mitigation techniques.

Most of the factors that lead to a repayment failure relate directly to the customer: profile, gender, level of education, willingness to repay liabilities (Anderson, 2007; Kocenda and Vojtek, 2012; Mays, 2001). However, repayment failure can also be driven by the macroeconomic situation. Macroeconomic developments influence the repayment of private individual loans indirectly through factors such as job loss, inflation and increases in the cost of living.

The purpose of this paper is to explore the relationship between macroeconomic conditions and overall loan repayment tendencies by households. This relationship will be explored in terms of the Federation of Bosnia and Herzegovina banking market, where the share of nonperforming loans of households at the end 2014 stood at 527.9 million BAM. Share of nonperforming loans of households as part of total loans varied within the range 2% and 12% over the period 2000 to 2014. Figure 1 below shows the development of nonperforming loans and total loans for house-holds throughout this period. It appears that the presence of nonperforming loans was higher at the beginning and latter part of this period, which coincides with the negative economic cycle or recovery from the negative cycle (prior to 2000). Moreover, Figure 1 indicates a drop of NPL share took place in the period from 2005 to 2009, when total household loans had the biggest expansion (thus the share of nonperforming loans in total decreased in relative terms).

The development of nonperforming loans will be shown in relation to the development of the macro economy over the same period in order to determine whether the increase in the share of nonperforming loans follows a pattern influenced by changes in the Gross Domestic Product, Consumer Price Index and the unemployment rate in BiH. The latter are presented in Figure 2.

By determining this relationship this paper aims to make a practical contribution to the banking sector in terms of credit risk and theory. Banks can use the findings of this research to define their future credit behavior based on macroeconomic market forecasts for future years.

This paper is structured in the following manner: section two contains a basic overview of risk associated with lending to households; section three provides a literature review; section four discusses the paper's methodology and data; section five and six provide the results and limitations of this research; section six provides policy recommendations; final conclusions are presented in section seven.



Figure 1: Development of loans and share of nonperforming loans

Source: Banking Agency Federation BiH



Figure 2: Development of macro trends versus share of NPLs

Source: Banking Agency Federation BiH and Raiffeisen Research

## II MANAGING THE RISKS OF LENDING TO HOUSEHOLDS

When lending to retail customers, the bank aims to supply its customers with the funds necessary for their private consumption. These customers have a lack of funds because their current consumption or investment needs exceed their current earnings. They require financing from a bank and are ready to pay a price in the form of interest or fees in order to obtain such financing. On the other hand, the bank aims to place funds obtained from its depositors, parties who have a surplus supply of money, often from private individual savings. Within this transaction the bank aims to earn profit from the difference in margins e.g., the difference between the cost of funding and the rate of placement. Banks typically provide lending products such as consumer or mortgage loans and credit and debit cards. New products arise as financial markets develop, yet those mentioned above are the core products around which the bulk of the business revolves.

Various internal and external factors related to the customer can cause problems with the repayment of a loan. What does a bank analyze when approving loans?

Internal factors are factors specific or internal to the customer, as suggested by Avery (2004). They depend on his/her primary repayment capacity, including the size and stability of personal income, customer reliability (track record and history of servicing obligations, education and personal characteristics such as age and gender) and the purpose of the loan.

<u>External factors</u> are factors that are nonspecific to the customer. These relate to the environment in

which a customer lives and works. These factors can cause deterioration in performance or influence internal risk factors such as a deterioration in employer status (Are the high risks of bankruptcy or recession in an industry potential causes of job loss?) or the risk of increased inflation (Is the expected inflation going to cause the customer's available income to fall below the loan capacity level?).

Movements in the macroeconomic environment can usually be observed through a number of factors. Those most relevant to a private individual's borrowing constraints are movement in GDP, the rate of unemployment, the exchange rate, the consumer price index and interest rates. When approaching a bank in order to gain approval a customer will usually be employed and have sufficiently low living costs compared to income to be able to cover the loan annuity. For this reason it does not make sense to investigate the direct influence of macroeconomic trends by regressing factors such as GDP and CPI together with customer features in order to determine the likelihood of repayment failure. However, after the loan is approved and during its maturity, which for consumer loans in BiH usually range from two to ten years, the macroeconomic situation can affect the customer. If the macroeconomic situation worsens then the customer may be exposed to the risk of job loss or wage reduction and an increased cost of living. These factors can lead to a suspension of repayment or cause the customer to default. In other words, this loan would change from regular payment and performance to what the banks refer to as a nonperforming loan. This implies that it would be prudent to observe macroeconomic trends over a certain period in relation to the portfolio of individual loans already approved, rather than during the application process itself, as suggested by Nkusu (2011).

In the past banks in the Federation of BiH have focused solely on a customer's internal factors when deciding on a loan. A limited analysis of employer risks was occasionally performed at the individual loan level; however, banks never analyzed the macroeconomic indicators of influence for their household's loan portfolios. The legislation did not oblige the banks to factor future macroeconomic changes into their credit policy or to conduct stress testing. As a result, the banks were completely neglecting the effect of a macroeconomic downturn to the households' loan portfolio performance when approving loans. Not only did they ignore the potential threats, but they increased their offer of loans to households through cheaper products, in higher amounts and with more flexible conditions throughout the crisis period. For example, the highest consumer loan amount offered in 2008 was 10,000 BAM, whereas in 2014 it was 60,000 BAM. This behavior of the banks is further visible when observing the total level of household indebtedness in the Federation compared to indebtedness in the EU over the crisis period. According to FBIH statistics, the European Central Bank (ECB) and Eurostat, the average indebtedness of a Federation citizen in 2014 was 2.74 times his/her salary, while the same ratio for the EU was 1.40.. Figure 3 below also shows that while EU average indebtedness stagnated during the crisis period (even dropping since 2011) indebtedness in the Federation continued to grow significantly.

This paper will try to determine the influence of macroeconomic factors by comparing overall macroeconomic changes in the market with the level of nonperforming loans in the banking sector. Furthermore, since it is clear that this influence was neglected as the share of nonperforming loans increased, this paper will, where possible, draw conclusions on its influence. Banks can use this to improve their loan approval process, reduce their share of nonperforming loans and increase stability in the banking sector.

## III LITERATURE REVIEW

The literature review of this subject is split into two groups. The first covers a number of authors who have researched the impact of macroeconomic indicators on the development of nonperforming loans, while the second covers authors that have researched the opposite phenomenon: the impact nonperforming loans have on the economy. Given the fact that this research study is seeking answers for the banking sector, and that it therefore aims at obtaining conclusions in order to improve NPL reduction I banks, it focuses on the first group. Research in this group is either generic or multi-country/country-specific. This section provides an overview of the most recent studies in order to support the relevance attached to macroeconomic factors in this paper.

## Generic and Multi-country Research

Bech, Jakubik and Piloiu (2013) researched data from seventy-five countries in order to determine the relationship between macroeconomic indicators and the level of nonperforming loans. They concluded that negative GDP growth has a strong impact on increases in nonperforming loans. They also established





Source: Statistical Agency for BiH and EuroStat

that a decline in stock prices has a statistically significant impact on the growth of nonperforming loans, but only in the countries where the stock market is fairly large. They also claim that in those CEE countries where capital markets are undeveloped movement in the exchange rate had an impact on the level of nonperforming loans.

Nir Klein (2013) conducted dynamic panel analysis into ten of the largest banks in sixteen countries of the CESEE over the period 1998-2013. He concluded that increases in nonperforming loans were triggered by the unemployment rate, increased inflation and currency depreciation.

Moinescu (2012) researched data on CEE countries from 2003 to 2011. He concluded, amongst other things, that the variables with the strongest impact on increases in nonperforming loans were drops in GDP and an increase in the output gap. Interest rates, inflation and exchange rates also showed statistical relevance, but only had a small impact.

Glen and Valez (2011) analyzed data from the major developing countries (which at that time represented 85% of the developed world GDP) for the period 1996 to 2008. They tested the relationship between impaired loans, as proxy for nonperforming loans, and the macro economy, and concluded that the main driver of nonperforming loans was GDP. They also concluded that interest rates only had a second order effect.

These are some of the latest studies on this topic, yet earlier studies also provide evidence to support the same conclusions. Earlier studies claim that one or more of the following factors have a strong impact on nonperforming loans: GDP, the unemployment rate, the exchange rate and inflation. This evidence can be found in studies such as Espinoza and Prasad (2010), Dash (2010), Pesola (2005), Drehnam (2005), Fofack (2005), Boss (2002), Rajan and Dhal (2003), Shu (2002) and Arpa (2001).

## Country Specific Research

Baholli, Dika and Xhabija (2015) analyzed the relationship between macroeconomic trends and the level of nonperforming loans in Albania and Italy over the period from 2007 to 2014. They concluded that positive GDP growth leads to a decrease in nonperforming loans; more specifically a 1% increase in GDP leads to a decrease of 1.42% and 1.32% in nonperforming loans in Albania and Italy, respectively. Furthermore, they found that increased interest rates and credit within the economy also lead to an increase in nonperforming loans. Milens (2013) researched Lithuania and the EU countries, comparing nonperforming loans and six macroeconomic indicators in all of them. He claims that a tight dependency exists between nonperforming loans and macroeconomic downturns caused by the reduced ability of debtors to service their debts.

Festic and Beko (2008) analyzed the same topic in Hungary and Poland during the period from 1995 to 2006. In Hungary, they claimed that growth in GDP, increases in savings and increases in real wages had the strongest impact on decreases in nonperforming loans. They confirmed the same influence of GDP in Poland, but claimed that increased savings resulted in an increase in nonperforming loans, while other factors did not show a strong impact.

Similar evidence is to be found in the paper of Louzis, Voouldis and Metaxas (2010), who examined the Greek banking sector and claimed a strong link between the expansion of nonperforming loans and GDP, the unemployment rate and interest rates. When analyzing the Italian banking sector, Quagliariello (2007) confirmed that the expansion of nonperforming loans is strongly affected by business cycles within the economy. Furthermore, research conducted by Salas and Saurina (2002) as well as Baboucek and Jancar (2005) into the Spanish and Czech banking sectors, respectively, showed the strongest link between growth in GDP and the expansion of nonperforming loans.

## IV METHODOLOGY AND DATA

To determine the relationship between private individual loan repayments and macroeconomic trends a regression methodology was used, as in the research mentioned in the previous section. Regression takes dependent variables and determines their effect on an independent variable. The dependent variables in this model will be factors reflecting the macroeconomic situation:

- GDP growth,
- Consumer Price Index, and
- Unemployment rate in the Federation.

These three variables were the most frequently used variables in the research conducted by other authors, both for generic and country specific research. The literature review showed that other researchers used additional dependent variables, such as stock market prices, interest rates and exchange rates. However, we found that these variables are not applicable to this analysis of the Federation of BiH, either due to specifics of the economy or the absence of official data. On the one hand, the currency of BiH, the Convertible Mark (BAM), remains pegged to the Euro for a number of years and this prevents movement in the exchange rate. The banking sector lends only in BAM and EUR, which, considering pegging, limits the currency risk. There is only one bank which provided lending in a different currency: CHF, which had a movement vis a vis EUR clearly affecting some households in BiH. However, in the absence of full official data and based on unofficial data from the bank, this effect was considered insignificant for inclusion in the analysis. On the other hand, the capital market is rather undeveloped and therefore stock market prices are not perceived as an efficient indicator of the business cycle.

Finally, interest rates do not reflect the business cycle properly as they are distorted by fierce competition within the banking sector. The interest rates level is not managed by the Central Bank of BiH, but unilaterally determined and transferred to the market by foreign banks dominating the banking sector in BiH. Although BiH has had two country rating deteriorations in the past five years that resulted in a rise in the cost of funding for foreign owned banks this has not been taken into consideration when setting final interest rates for customers. This is because the cramped banking market pushes for a reduction in interest rates irrespective of the cost of the funding movement. Although CB data does not provide for an exact weighted average value of interest rates in the sector, a basic overview supports the earlier claim that regardless of logical reasons to increase the interest rate, banks have been decreasing it during the crisis years.

We found these three factors to be unreliable in Federation BiH research. The findings of other researchers, as presented in the literature review, speak in favor of analysis not being distorted by the absence of these factors. Therefore we decided to use real GDP growth, CPI and the unemployment rate as the main dependent variables.

The independent variable will be a change in the rate of nonperforming loans for private individuals in the Federation banking sector (as the share of nonperforming loans in total loans). The data is sourced from the annual reports of the Federation Banking Agency, the Central Bank of Bosnia and Herzegovina as well as the Federal Agency for Statistics, available for the period of 2000 to 2014. During this period the share of nonperforming loans in total loans varied from less than 2% to almost 12%. This analysis will attempt to determine whether this variation was driven by macroeconomic factors.

### V RESULTS

The first iteration of analysis included regressing three independent variables (GDP, CPI and the unemployment rate) separately for the volume of nonperforming loans. In addition, all three variables were jointly regressed to the volume of nonperforming loans. However, the analysis surprisingly showed that these three factors had little impact on the level of nonperforming loans. This conclusion stems from the fact that all of the regression models showed a very weak relationship to the change rate for non-performing loans (when observed via R squared of the model and through the individual and joint significance of variables). Following the first attempt, the second iteration of analysis was conducted, this time to determine whether a nonlinear relationship existed. An attempt was made to define the log/ln, ln/log and log/ log model for each of the variables, first individually and then jointly. In the third iteration an attempt was made to model the quadratic relationship between all of the variables; however, the models again showed low stability and weak connections (manifested by low R squares, and the joint or individual insignificance of variables) or strong collinearity, which disturbed the model stability. Finally, various attempts to build models showed only one fairly strong relationship: between the logarithm of GDP growth and the volume of nonperforming loans. The final model, preferred by us, is shown below, with details presented in Appendix 1.

NPL = -358624.3 -175673.9\*log (GDP Growth)

This model showed fairly high explanatory power, with an R square of 0.60 and an individual T test value of the log GDP growth at 0.002. The model demonstrated a negative relationship between GDP and the level of nonperforming loans, implying that nonperforming loans will decrease within a positive economic cycle and increase in a negative economic cycle. This is consistent with other research.

An interpretation of this model is that if GDP growth increases by 1%, then the volume of nonperforming loans will decrease by 1.756 million BAM. Given the fact the dependant variable (in this case GDP growth) is expressed in the form of a percentage rather than an absolute value it is more difficult to interpret the model relationship. A range of GDP growth percentages was developed and regression formulas applied to them in order to gain a better understanding. It showed the direction in which nonperforming loans volume from 2014 would develop dependent on GDP growth, as presented below in both Figures 4 and 5.

#### Figure 4: Regression results for relation of NPL and GDP growth

GDP Growth in %	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
NPL increase/reduction index	109	99	93	89	85	83	81	79	77	75

Source: Results of main regression model from this research

Figure 5: Simulated development of NPL (base 2014) driven by GDP growth



Source: Results of main regression model from this research

This data suggests a number of possible interpretations. First, should GDP growth stay at a level of 0.5% then the level of nonperforming loans will actually increase by 9%. At a GDP growth rate of 1%, nonperforming loans will maintain approximately the same level. However, at a GDP growth rate above the level of 1% there would be a gradual decrease in the level of nonperforming loans in the sector. For example, at 1.5% GDP growth nonperforming loans would reduce to 93% of their current level, while at a GDP growth rate of 3% the level of nonperforming loans would reduce to 83% of their current level. To conclude, the absence of GDP growth above 1% would result in high nonperforming loans (either stable high or increasing), whereas only GDP growth above 1% can bring relief to the Federation BiH economy from a high NPL burden by triggering their reduction, according to this regression model. As far as the two other variables are concerned, we were not able to determine any relationship regarding the level of nonperforming loans, since a stable statistical relationship could not be established. In other words, in the absence of more concrete proof we can state that the macroeconomic parameters of CPI and the unemployment rate have not affected the level of nonperforming loans in the

Federation of BiH over the past fifteen years, based on the limited available data used for these particular models.

The data sample was also split into two time series, one ranging from the beginning of the period to 2006, the second ranging from 2007 to the end of the period. Regressions were conducted separately on these two samples. For the first sample, no stable model was identified in any form (simple, neither square nor log regression combinations of all variables). For the second sample, only one acceptable model was identified. This model again showed the same link - the significant effect of GDP growth on the share of NPL among households. The actual results were very close to the preferred final model; namely, R square was 66% (versus 60%), and the relation detected showed that if GDP growth would increase by 1% the volume of nonperforming loans would decrease by 1.586 million BAM (versus 1.756 million BAM). This testing indicates that the later period, from 2007 onwards (the period of the crisis), is more explanatory than the period of the positive economic cycle. The results of this test, by confirming empirical figures, also speak in favor of the robustness of the preferred model.

## **VI LIMITATIONS**

This analysis has several limitations. First, the observation period of the past fourteen years is rather short. Unfortunately, this was the only reliable data available and therefore offers the best possible platform from which to draw conclusions. Attempts to collect official data for earlier periods and even quarters within a year failed because in earlier years the regulation for parts of the data was not aligned and therefore the data is not comparable.

Second, in the early years of the observation period banking regulation was not so strict as to assure unified recognition of nonperforming loans; there is also the possibility, although small, that part of the recognition took place after some delay. For example, loans that actually defaulted in 2006 were only reported in 2007. Nevertheless, regulation is now a sufficiently strict to ensure that all defaulted loans are recognized and therefore the analysis reflects the true situation.

Third, the findings answered the question of "how much nonperforming loans would decrease if GDP growth were to range from 0 to 5 per cent," but not the question of "how much nonperforming loans would increase if GDP growth ranged from 0 to 5 per cent." In other words, specific arithmetic results are claimed for positive economic cycles rather than negative ones. This stems from the fact that the model determined the relationship for the logarithm of GDP, but efforts to calculate the logarithm of a negative number (negative GDP growth) would result in a complex as opposed to a real number. This is mitigated by the fact that one can clearly conclude from the findings that 1% GDP growth is the breakeven point, whereas any growth weaker than this would cause an increase in nonperforming loans. Although not quantified, this information may be sufficient for banks to readjust their credit policies for GDP growth forecasts below 1%.

Finally, unlike similar research studies, this study did not consider the effect of the movement of interest rates or stock prices on NPL, either due to the absence of proper data or the specifics of the economy.

It is highly likely that these limitations have caused the relationship between the variables to be less apparent and less strong; however, this was addressed by using logarithm modelling, where a stronger link was determined and the best possible final model generated in accordance with the available data.

## VII POLICY RECCOMENDATIONS

The analysis shows that the unemployment rate and CPI movement do not affect the level of

nonperforming loans in the sector. Yet GDP growth is shown to have a fairly strong influence on the level of nonperforming loans. This effect is mathematically negative (positive for the economy): the more GDP growth advances in the economy the more strongly the level of nonperforming loans is reduced. It should be noted that this general premise is valid for GDP growth above the 1% rate, where nonperforming loans appear to maintain approximately the same level. However, if GDP growth were to stay at a level of 0.5% then the level of nonperforming loans would actually increase by 9%. Further lower levels of GDP growth (zero or negative) would cause the level of nonperforming loans to increase. This means that the destiny of loan repayments does not depend solely on good customer assessment by banks. Even the most promising customers can be adversely affected by external macroeconomic factors that influence the destiny of the loan after approval and therefore the profitability of the bank. Having said this, the question is: what can banks or government do to control the level of nonperforming loans from this point onward?

## Proactive Bank Measures

The primary responsibility to implement policy adjustments according to these findings is on banks. They have to ensure that their risk management includes observation of future macroeconomic forecasts and their expected influence on loan repayment, rather than customer features alone. More concretely, knowing the relationship of factors presented in this paper, banks need to forecast macroeconomic trends. This forecast should be twofold: a baseline midterm forecast (three years) that incorporates basic official country expectations of economic trends and more conservative stress test forecasts for the long term (a term to be equal to the average maturity of consumer loans on the market), where extreme stress events in the economy would be incorporated. These forecasts should provide banks with a range of likely, expected and up to worst case impact estimates for the business cycle for their level of nonperforming loans and hence their earnings and capital.

The first layer of consideration for these forecasts by the banks should be the decision on whether to reduce or expand their portfolio, depending on business cycle expectations, through a statement of change strategy within their credit policy. If the macroeconomic forecast and stress tests suggest negative trends (i.e., negative GDP growth in the future period) then, based on the findings of this paper, the banks can calculate the exact expected increase in nonperforming loan stock along with the expected losses.

The banks can set up their credit policy in two directions to mitigate this problem. One direction would be to reduce the overall lending potential in order to avoid an increase in nonperforming loans and the respective losses or maintain them at the desired acceptable level. As part of the reduction, banks can approach this generally by making decisions on the overall level of the portfolio (i.e., an overall reduction by 5% in one year) or selective through prioritization (i.e., maintain the portfolio at the same level, but change the structure in favor of less risky customers). For example, banks could be selective or restrictive in terms of the industries that are more susceptible to the effects of negative GDP trends, or more restrictive towards sections of the households that are more likely to lose income. By doing this, banks would reduce losses stemming from nonperforming loans. An alternative direction would be to not reduce lending potential but to increase the cost of loans. This would require risk-based costing wherein all customers or the riskier customers are charged higher prices. The purpose of this increased pricing would be for banks to generate higher revenue in order to cover increased losses from nonperforming loans. Banks can do this in two ways. One would be to not increase specific prices at the approval stage in the coming years, but rather to insert a clause in the contract that would allow for unilateral upward interest rate changes for the customer in the event that stress events occur in the economy. In this way the banks would later be able to increase pricing for overall existing portfolios. The other way would be to determine which customers are riskier and immediately designate higher pricing for their products, which would mean that they would be charged more than other customers at the loan approval stage. The bank should keep in mind its desired competitiveness in the market and consumer protection legislation when choosing between these two options.

The second layer of consideration for these forecasts, once the general credit policies are defined, is the business of daily risk management. Here banks have to make sure that their credit policies are implemented diligently so that they result in the desired restrictions. This implies the need for careful analysis of the debtor and implementation of steps to alleviate risks from daily underwriting. This includes detailed consideration of job and future employment requirements for co-debtors, the appropriate assignment of risk based pricing to the right customers, and keeping caps on the maximum debt to income ratio for customers.

## Proactive Government Measures

The secondary responsibility to adjust policy based on these findings is on the government to proactively address consideration of macroeconomic trends in nonperforming loans reduction or prevention. The government's interest in being proactive on this topic lies in ensuring the stability of the banking sector and in the fact that if left unaddressed the high level of nonperforming loans is likely to boomerang back to the economy by slowing down the economic recovery.

The first measure that can be taken by government is transparent communication on macroeconomic forecasts to ensure that there is only one recommended source for forecast expectations. Since most of the banks in the Federation lack experience and skills in observing the impact of economic trends, in order to allow for this shift in approach government should continue to provide technical assistance to banks for the development of stress tests. Government should also strengthen supervision over the banking sector in general and more specifically in the area of consideration of macroeconomic trends. This should be done in such a way that supervisors impose the obligation on banks to develop stress tests that include at minimum the three factors observed in this analysis and to adjust their lending plans accordingly, as suggested by Borio (2001). Government could also control unreasonable credit growth or foreign currency lending via the supervisor, if it is suspected that this will develop in the wrong direction. Finally, when there is a high share of nonperforming loans government could provide tax and regulatory incentives in order to encourage the banking sector to clean up its stocks of nonperforming loans. Examples of such incentives could include loan write offs to be fully income tax deductible, the sale of distressed portfolios not burdened by high tax rates, more flexibility in terms of acceptance of various nonperforming loan stock clean up activities and lower supervision fees for those banks with the largest nonperforming stock decrease on a year to year basis.

## **VIII CONCLUSION**

The level of nonperforming loans to the households is sensitive and influenced by macroeconomic developments in any country. This relationship is manifested indirectly via the level of unemployment in the country and the cost of living. An increase in the unemployment rate leads to job losses for bank customers, and as a consequence they default on their loans. Increases in the cost of living in an environment of flat wages and no savings or rollover options could reduce available income for loan annuity repayment on a monthly basis, and this might also lead to increased numbers of customers being unable to repay their loans.

This paper deals with the influence of macroeconomic factors on the level of nonperforming loans in the market of the Federation of Bosnia and Herzegovina. The macroeconomic factors analyzed were GDP movement, CPI and the unemployment rate and covered the period from 2000 to 2014. The method used was regression.

The analysis shows that the unemployment rate and CPI movement do not affect the level of nonperforming loans in the banking sector of the Federation of BiH. Yet GDP growth is shown to have a fairly strong influence on the level of nonperforming loans. This is in line with findings of similar research, as presented in the literature review of this paper. This effect is mathematically negative (positive for the economy): the more GDP growth advances in the economy the more strongly the level of nonperforming loans is reduced. . This means that the destiny of loan repayments does not depend solely on good customer assessment by the banks. Even the most promising customers can be adversely affected by external macroeconomic factors that influence the destiny of the loan after approval and therefore the profitability of the bank. Having said this, the question is: what can banks or government do to control the level of nonperforming loans from this point onward?

Banks have to ensure that their risk management includes observation of future macroeconomic forecasts, given the relationship between the factors presented in this paper. Banks should make the decision on whether to reduce or expand their portfolio based on these forecasts, reviewing business cycle expectations and incorporating these into their credit policy. If forecasts suggest negative economic trends, credit policy should result in some of the following measures: the reduction of overall lending potential or selective lending through prioritization (i.e., maintain the portfolio at the same level but change the structure in favor of less risky customers or industries, increase the cost of loans, or exercise prudent risk management practices in daily activities).

Government should also proactively address consideration of macroeconomic trends in nonperforming loans reduction or prevention. Government interest in being proactive on this topic lays in ensuring the stability of the banking sector and in the fact that if left unaddressed the high level of nonperforming loans is likely to boomerang back to the economy by slowing down economic recovery. Measures that could be taken by government include the following: transparent communication on macroeconomic forecasts to ensure that there is only one true source for forecast expectations, technical assistance to banks for the development of stress tests, improved supervision over the banking sector by imposing an obligation on banks to develop stress tests and to adjust their lending plans accordingly, the control of unreasonable credit growth or foreign currency lending, and tax and regulatory incentives in order to encourage the banking sector to clean up its stocks of nonperforming loans.

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## APPENDIX 1 REGRESSION RESULTS FOR PREFERED MODEL

Relation of GDP growth logarithm and level of household NPLs:

F(1,11))	16.77
Prob > F	0.0018
R-squared	0.6039
Adj R-squared	0.5679
Root MSE	1.2e+05

NPL	Coefficient	Standard Error	t P> t		[95% Confidence Interval]		
Log GDP Growth	-175673.9	42899.76	-4.09	0.002	-270095.6 -81252.17		
_cons	-358624.3	147961.8	-2.42	0.034	-684285.9 -32962.67		

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