Center for Economic Analyses

CEA Journal of Economics

ISSN 1857-5250
UDK 33

Price: 300 MKD (5 EUR)

Volume 13
Issue 2
1-114 pages

Skopje, Macedonia
December 2018

Center for Economic Analyses

CEA Journal of Economics

ISSN 1857-5269
UDK 33
Volume 13, Issue 2
Skopje, December 2018
International Journal
Published since 2006

Contents

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December, 2018

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UDK 338.24.021.8(497-15)]:303.724:339.922(4-672EU)

SLOWDOWN, CREDIBILITY AND EU ANCHORING OF STRUCTURAL REFORMS IN THE WESTERN BALKANS

Fatmir Besimi[1]

Abstract

The EU integration has been an important process of economic, political and social transformation of the Western Balkans and its convergence with the European Union. According to empirical evidence and the international reform indicators in the recent years the pace of structural reforms is slowed down in the Western Balkan countries and the catching-up after the global economic crisis is slower compared to the New Member States of the EU. The aim of this paper is to answer the question of how to accelerate economic growth and convergence with the EU by accelerating structural reforms and their credibility. The empirical analysis shows positive impact of structural reforms and EU integration on convergence with the EU. In order to draw recommendations for policy makers in this analysis, we develop a theoretical model for the political economy of structural reforms for the countries of the Western Balkans in the process of EU accession. The model suggests that in a dynamic world with rational expectations, the credibility of policymakers is crucial in accelerating reforms and joining the EU, especially given the temporal inconsistency and trade-off between short-term costs and long-term benefits as well as the redistributive effect of reforms in the society. We find that the EU can play a role in increasing the credibility and pace of reforms for countries in the Western Balkans through EU anchoring of reforms within policy rule framework or through the influence on the following policy channels within policy discretion framework: increasing the government's reform preferences; reducing the government's populism; reducing public's short-termism (public's reform sensitivity); increasing the credibility of the EU accession process; and reducing the government's credibility gap. In addition, the empirical and theoretical analysis of this research as a recommendation to the European Commission indicates that when designing an EU enlargement strategy consideration should be given to the endogenous convergence, the political economy of structural reforms for EU integration, and the strengthening of the credibility of the process of the EU enlargement in the Western Balkans.

JEL Code: *F02, F15, P16, O47*

Keywords: *Structural reforms, European integration, Political Economy, Credibility, Economic convergence*

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INTRODUCTION

The European Union has contributed to peace and reconciliation, democracy and human rights in Europe. Similarly, European enlargement has played a significant role in integrating and democratizing the transition countries of Central and Eastern Europe. The same we may say for the Western Balkans, where the EU contributed towards peace and stability after decades of conflicts, among others, mainly due to the promise for a better future with political stability and economic prosperity.

Following the global financial crisis and the problems that emerged with the economies of the Eurozone, the issue of structural reforms has re-emerged in the international policy agenda. In the case of transition countries and countries belonging to the EU pre-accession process – such as those of the Western Balkans – the pace and commitment to reforms in these countries has subsided after the crisis (EBRD, 2013; Kovtun et al, 2014; IMF, 2015a). Recent developments in the European Union, with the Eurozone crisis and the rise of Euroscepticism, as well as in the Western Balkans, with the political challenges that emerged recently (Carpenter, 2017), raise questions about the pace and credibility of the EU integration progress in the Western Balkans. A recent paper by the European Parliament's Policy Department makes this clear: "Despite initial success, the current approach to enlargement has reached its limits, as it seems to be slowing down the integration process rather than accelerating it. In the meantime, in addition to the democratic and economic setbacks in the region, renewed tensions are threatening to undermine fragile regional stability. Moreover, the EU's unfinished business in the Balkans opens the door to various political, economic and security alternatives […] The current autopilot mode of enlargement cannot continue." (DGEP, 2015). Indeed, according to international reform indicators, in recent years the pace of structural reforms in the Western Balkan countries has slowed down and catching-up after the global economic crisis is slower compared to the New Member States (IMF, 2015a). The accent on enhancing structural reforms is made on the EU Enlargement strategy documents and the respective progress reports for the Western Balkans (EC, 2015a, 2015b, 2016a and 2016b).

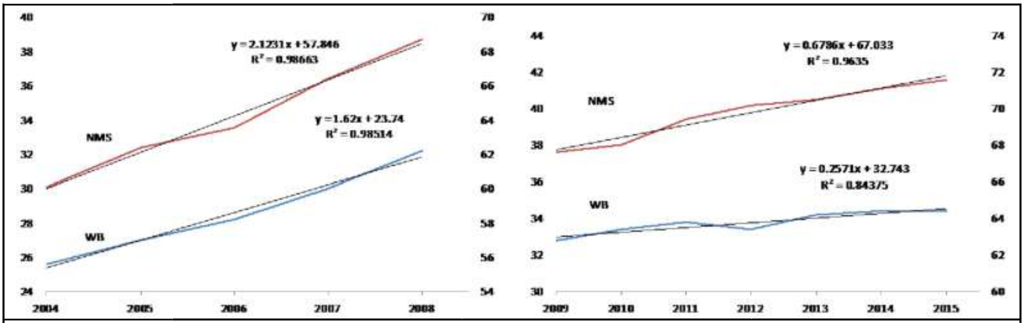
A large literature exists that discusses the problems of institutional transformation and political and economic reforms in the region exactly under the prism of pre-accession conditionality and the so-called 'EU transformative power' (Grabbe, 2006 and 2014; Gateva, 2015; Sanfety et al, 2016). Drawing from earlier contributions concerning the experience of the 2004 Enlargement (Hughes et al, 2004; Schimmelfennig and Sedelmeier, 2005) and building on earlier analyses about the problems of transition in the region (Kuzio, 2001; Anastasakis and Bechev, 2003), this literature attributes the origins of reform delays, or reform failures, in the region on two sets of factors. On the one hand, problems emanating from the side of the EU, including its 'ambivalence' (lack of clarity with regard to the rules of EU accession or of commitment to enlargement – Grabbe, 2014; Börzel and van Hüllen, 2014), its inattention to local institutional conditions and to buying-in local actors and elites (Noutcheva, 2009; Vachudova, 2014), and its reform targets which may be too strict or unrealistic (Uvalic and Cvijanovic, 2018; Noutcheva and Aydin-Düzgit, 2012). On the other hand, problems specific to the region, such as the unresolved ethnic and statehood issues (Borzel, 2016), vested national and sectoral interests (Vachudova, 2014) and the absence of a "robust local demand for change towards Europeanisation" (Noutcheva et al., 2013).

These issues noted, the wider literature recognises that the EU is a significant stimulus for growth and convergence for associated countries. The substantial institutional transformation, fast economic restructuring and sustained income growth of the CEE countries provides ample evidence for this (for recent causality inferential evidence on this see, inter alia, Monastiriotis et al, 2017, and Campos et al., 2018b). In this regard, it is widely acknowledged that the EU has not only an autonomous effect on growth for the associated countries (e.g., through economic integration and membership) but also, if not most importantly, by incentivising structural reforms.

2. Structural reform slowdown and the impact on convergence

In the last 25 years the evidence from both the Western Balkans and Central and Eastern Europe shows that there has been significant convergence with the EU average level of living standards both during the transition period of the 1990s and later through the EU integration process (IMF 2015a and World Bank, 2017). However, in recent years convergence has slowed down, while after the economic crisis catching-up is slower in the Western Balkans compared to the New Member States. To demonstrate this, we plot in Figure 1 the evolution of GDP per capita in the Western Balkans (WB) and New Member States (NMS) expressed as a share of the EU average, comparatively, where the left axis scale is for WB and the right axis scale is for NMS. As can be seen, convergence to the EU average has slowed down across the Western Balkans. What is also important, growth trajectories in the Western Balkans compare unfavourably also in relation to those in the NMS. Over the period 2004-2008 the Western Balkans have followed a flatter growth trend than the NMS and this discrepancy has, if anything, intensified since 2009.

Figure 1. GDP per capita Convergence & Catching-up



Data source: Eurostat, GDP per capita in PPS as a share of EU-28 average

Data source: Eurostat, GDP per capita in PPS as a share of EU-28 average

There is growing literature on the impact of structural factors on convergence, but most often on larger panels of countries. Thus, the IMF (2015b) found a positive relationship of structural reforms with productivity and convergence, while in the rest of the literature (Acemoglu et al., 2005, Aghion et al., 2005, Campos and Coricelli 2002, Che and Spilimbergo 2012, Ciccone and Papaioannou 2009 Dabla-Norris et al. 2016; IMF 2015a and Fung 2009), in addition to the positive correlation they summarize that the reform priorities for maintaining convergence differ in terms of the level of development of the country. Looking at longer time horizons, empirical analyzes reveal that the positive correlation with productivity and economic growth is different according to the type of reform and over time. The results also suggest that the benefits of the reforms tend to become more prominent when the reforms are packaged together.

Following the above, and our previous research (Besimi and Monastiriotis, 2018), we continue with regression analysis of the impact of structural reforms on convergence. To investigate that impact we examined seven panel data regressions as the high correlation in the reform indices requires them to enter the regressions one at a time (similar approach practiced by Dabla-Norris, 2016). Thus the regressions will not account for reform complementarities, so we examined separately the effect of the world governance indicators: VA-voice and accountability; PS - political stability and absence of violence; RQ - regulatory quality; GE - government effectiveness; RL - rule of law; CC - control of corruption; WGI - world governance index. Also, we examined the impact of the EU membership on convergence in order to check about the endogeneity of the integration process. The panel data regression involves 16 countries (Western Balkan and New Member States of the EU). Since, we consider dynamic panel data we also introduce lags of the dependent variable for better specification of the model, as follows:

Table 1. Structural reforms impact on economic convergence

Dynamic Panel Data Regression (Generalized Methods of Moments)							
Dependent variable: GDP15							
Variables/Regressions	VA	PS	RQ	GE	RL	CC	WGI
L.GDP15	1.287***	1.271***	1.317***	1.300***	1.322***	1.323***	1.264***
	(0.0539)	(0.0541)	(0.0559)	(0.0462)	(0.0516)	(0.0428)	(0.0552)
L2.GDP15	-0.340***	-0.334***	-0.354***	-0.361***	-0.370***	-0.367***	-0.337***
	(0.0539)	(0.0514)	(0.0555)	(0.0469)	(0.0475)	(0.0429)	(0.0531)
Structural Reform	1.522***	1.228***	0.560*	1.010***	0.734**	0.671**	1.845***
	(0.3810)	(0.4600)	(0.3170)	(0.3150)	(0.3100)	(0.3200)	(0.4130)
EU	0.520***	0.817***	0.701**	0.929***	0.739***	0.863***	0.565***
	(0.1640)	(0.2060)	(0.2920)	(0.1970)	(0.2260)	(0.2440)	(0.1290)
Constant	1.667***	2.302***	1.424***	2.240***	1.959***	1.843***	2.611***
	(0.2720)	(0.5160)	(0.2420)	(0.4360)	(0.4660)	(0.4450)	(0.4040)
Observations	208	206	207	207	208	208	208
Number of country	16	16	16	16	16	16	16
ar1p	0.00149	0.00117	0.00163	0.00174	0.00213	0.00255	0.00131
ar2p	0.049	0.0488	0.0497	0.0422	0.0504	0.0553	0.0425
chi2p	0	0	0	0	0	0	0
hansenp	0.48	0.402	0.52	0.352	0.315	0.386	0.485
sarganp	0	0	0	0	0	0	0

Robust standard errors in parenthesis (*** p<0.01, ** p<0.05, * p<0.1)

Variables: GDP15 - country's GDP per capita as a share of GDP p.c. of EU-15 average; L.GDP15 and L2.GDP15 - first and second lag of gdp15; VA - voice and accountability; PS - political stability and absence of violence; RQ - regulatory quality; GE - government effectiveness; RL - rule of law; CC - control of corruption; WGI - world governance index; EU - membership in EU.

Countries: EU-15 (Austria; Belgium; Denmark; France; Finland; Germany; Greece; Ireland; Italy; Luxembourg; Netherlands; Portugal; Spain; Sweden; and United Kingdom); NMS (Bulgaria; Croatia; Czech Republic; Estonia; Hungary; Latvia; Lithuania; Poland; Romania; Slovak Republic; and Slovenia); and WB (Albania; Bosnia and Herzegovina; Macedonia; Montenegro; and Serbia).

Years: 1996-2016; Data source: World governance indicators (World Bank); GDP (IMF, WEO).

The results suggest the following three findings: Convergence is persistent and stable long-term process; Structural reforms have positive impact on convergence; and EU membership enhances convergence. First finding indicates that convergence is persistent process with significant impact of lags from the first two years for world governance index. The cumulative effect of the lags (L.GDP15+L2.GDP15<1) indicates that convergence is a stabile process. The second finding indicates that structural reforms' impact on convergence is positive and statistically significant in all reform indicators. The impact of reforms on convergence becomes significant when introducing more lags of the convergence to control for autocorrelation effect. This assumes that the impact of reforms is stronger when we control for the persistence effect. The coefficient in front of the world governance index, suggests that an increase of the index for one score will increase convergence for 1.8 percentage points (similar interpretation will be for all reform indicators). Further, through a simple calculation we can see that the long-run coefficients of structural reform impact on convergence is high, meaning that an improvement of world governance index for one percentage point increases the convergence for 25.3 percentage points in very long-run (1.845/[1-(1.264-0.337)]=25.3). Based on this indication about the stronger long-run impact of structural reforms, we may speculate with the arguments we make later in our theoretical model that policymakers face a trade-off between costs in the short-run and long-term benefits of reforms, due to political impact and distribution effects of reforms for certain interest groups in the society. This may explain also the credibility and time-inconsistency which results with reform gap and delay. The third finding indicates positive impact of EU membership on convergence, namely countries after becoming EU members perform better with the convergence that indicates the endogeneity of EU integration process. This will have also policy implication that will be considered in the following sections of this research and opens the space for considering the role of EU integration in enhancing structural reforms in the western Balkans.

3. Structural reform credibility and EU anchoring

The main hypothesis of the EU enlargement process is that implementation of the convergence criteria and reforms enhance economic growth and catching-up with the EU living standard. This should increase the support by citizens and economic agents for reforms and EU integration of candidates and potential candidate countries. However, in the recent years the evidence shows a delay in structural reforms and slowdown of the EU integration progress in the Western Balkans.

The intention of theoretical analysis in this section is to explain what relies behind this reform slowdown and the role that the European Commission can play in enhancing the credibility of structural reforms and accelerating the EU integration process in the Western Balkan. More specifically, the model intends to explain the political economy of the EU integration for the politically sensitive reforms that have costs for certain interest groups that further has an impact to the support and political power of the political elite. This further implies time-inconsistency due to the trade-off policymakers faces between short-run cost and long-run benefits from reforms. Typically, the main resistance to the adoption and implementation of structural reforms stems from the vested interests of affected groups in society. Besides this, the possible short-term economic and fiscal costs of structural reforms are also sometimes mentioned as a reason for postponing their adoption, suggesting a short-term trade-off between fiscal consolidation and reforms (ECB, 2015). The documented costs include reduced employment, loss of government revenue, undesirable distributional consequences and political instability (Babecky and Havranek, 2014; Campos et al, 2018). The political impact of economic reforms changes the distribution and rents in the society (Acemoglu and Robinson, 2013; Alestin and Rodrik, 1994).

Departing theory for designing our model is the policy choice in a dynamic world with rational expectations taking into consideration the credibility and time-inconsistency of the policymaking (Kydland and Prescott, 1977) and (Barro-Gordon, 1983). In the standard Barro-Gordon model the policy constraint is represented by a simple Phillips Curve relationship connecting output (or, inversely, unemployment) to inflation (more precisely, the deviation of inflation from expected inflation) and the objective function is represented as standard quadratic loss function. In our case, the policy constraint does not concern directly economic outcomes (output, unemployment), but rather political and policy variables – namely, political (or electoral) support for the government and structural reforms.

4.1. The model setting

The model that we design in this section intents to explain the political economy of the reform process during the EU accession of the candidate countries from the Western Balkans. The assumption is based on the context that countries from the region have already made their strategic political decision of joining the EU and they are in the ongoing process of EU accession as candidate or potential candidate countries, while some of them have already started the negotiations with the EU. The model considers three parties in this process: European Commission representing the EU; the government representing the national policymakers; and the public representing the business community, civic sector and citizens. The rationale behind this is that the government negotiates with European Commission the reform agenda for EU accession, while for it's implementation government is interested on the public support, as well.

The government decides on its reform policy/effort on the basis of its objective function that considers both, reforms and support, which we assume – following standard practice and for simplicity – to be a standard quadratic loss function of the form:

$$W = -\frac{1}{2}\alpha(r_t - r^{eu})^2 - \frac{1}{2}\beta(s_t - s^o)^2 \tag{1}$$

where, r is the extend of reforms undertaken by the government, reu is the policy reform objective (the reform package that government negotiates with the EU), s is the (political) support that government have from the public, so is government's support objective, α is a parameter showing the weight the government assigns to reforms, noted as 'reformism' (α≥0), and β is a parameter showing the weight the government assigns to support, noted also as 'populism' (β≥0). The quadratic loss function assumes government neutrality with respect to reform and support, namely government faces similar welfare loss from under- and over-performing reforms, as well as, higher and less support relative to the respective targets. In addition, as you will see in Figure 2, our illustrated model is focused in the region 0≤r≤reu and 0≤s≤so and that makes the interpretation of the objective function more intuitive – any reform or support lower than their respective targets will reduce the welfare. As can be easily inferred, point (s=so, r=reu) represents the 'bliss point', i.e., the point where there is zero loss and thus welfare of the government is maximized (W0=0).

According the default, we will expect that support from the public to be positively correlated with the reforms due to the positive impact of structural reforms on productivity, competitiveness and economic growth in the long-run (explained in the empirical section). A contrary, our model focused on the specific case, where the public is reform sensitive, namely due to sectorial and time variation of reforms, the policymakers face trade-off between short-term costs and long-term benefits and the redistributive effects of reforms. Following the above, the constraint to the government's objective, namely the (political) economy of the reform process in our hypothetical country from the Western Balkan, is represented by the following simple relationship about the behaviour of the public support for reforms:

$$s_t = s^n - \gamma\left(r_t - r^e_{t-1,t}\right) \tag{2}$$

where s and r stand for (political) support and reforms as explained in equation (1), sn is some level of the 'natural' support of government by the public and it is determined exogenously to our model, re is the ex-ante reform expectations held by the public and the European Commission (formed in time t-1) and γ is a parameter showing the sensitivity/reaction of the public support to actual reform deviation from what is expected, which can also be interpreted as a 'short-termism' of the public for reforms given the short-term costs versus long-term benefits in some of the reforms.

According to the above setting of the model, the government optimization of the reform policy will be obtained by substituting equation (2) into equation (1):

$$W = -\frac{1}{2}\alpha(r_t - r^{eu})^2 - \frac{1}{2}\beta\left[s^n - s^o - \gamma\left(r_t - r^e_{t-1,t}\right)\right]^2 \tag{3}$$

Then we differentiate equation (3) with respect to reform (r), namely minimize welfare loss with respect to reforms (r):

$$\frac{\partial W}{\partial r} = -\alpha(r_t - r^{eu}) - \beta\gamma\left[\gamma\left(r_t - r^e_{t-1,t}\right) + s^o - s^n\right] = 0 \tag{4}$$

Solving equation (4) for reforms (r), gives the following solution for the optimal reform policy:

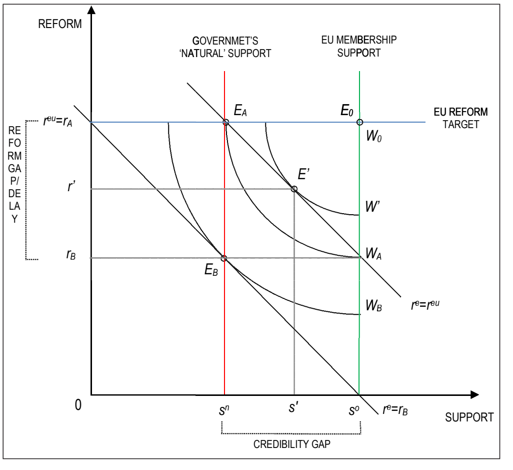
$$r_t = \frac{\alpha}{\alpha+\beta\gamma^2}r^{eu} + \frac{\beta\gamma^2}{\alpha+\beta\gamma^2}r^e_{t-1,t} + \frac{\beta\gamma}{\alpha+\beta\gamma^2}(s^n - s^o) \tag{5}$$

The above equation is important for understanding reform policy of the candidate countries during the EU accession process. Further, this explains reform delays, under-performing or delays in implementation of reforms and also it helps identify the policy transmission channels to enhance or accelerate credible reforms. This is important for the EU as relevant party in EU accession process within it's EU Enlargement Strategy in the Western Balkans. Hence, in addition to the role of national policymakers, the model is expected to provide policy recommendations but also for the European Commission how to play a more effective role in increasing the credibility and accelerating reforms in the candidate countries of the Western Balkans, which also can be further developed for other cases with similar setting.

Before technically elaborating the policy scenarios, we will illustrate graphically the above model as follows:

Figure 2.

The Model



The model is designed in a diagram where in vertical axis is the reform (r) and in horizontal axis is the public support (s) as presented in Figure 2. The welfare is represented by the indifference curves (W) of the government's preference for reforms and public support. The maximum welfare is the 'bliss point' with reforms at the level negotiated with the EU (r=reu) and support target by government (s=so). The 'natural' level of support of the government is noted with vertical line (sn) and it's difference from the targeted level of support (so) represents the credibility gap of the government (κ=so-sn). The lack of credibility is the key generator for the inconsistency-problem under the constraint of reform-averse public in short-run. The political constraint (the line with negative slope) represents the trade-off that government faces in the short-run between reforms and public support due to the public's short-termism (view-span) of the reforms' impact on distribution and rents of certain interest groups in the society. The figure illustrates the policy mechanisms for achieveing the equilibrium level of reforms and support for different scenarios: EA=(sn,reu); and EB=(sn,rB).

4.2. Policy scenarios

In order to develop the above model and understand more specifically the policy implications, we will consider two different cases/scenarios with different assumptions about policy commitments by government in a world with rational expectation: Policy rule (ex-ante commitment); and Policy discretion (no commitment ex-ante).

A. Policy rule (ex-ante commitment): Assuming that the government sticks to their ex-ante reform target (r=reu), and since expectations are rational (re=r), thus also public trust the government for the policy target (re=reu). Namely the assumption is:

$$r_{t,A} = r^{eu} = r^{e}_{t-1,t} \tag{6}$$

From equation (6) we obtain equilibrium reform:

$$r_{t,A} = r^{eu} \tag{7}$$

Note that this is not time-consistent solution for reforms, namely by substituting equation (6) into equation (5) we find that the equilibrium reform deviates (there is a reform gap) from the expected target reform ($r \neq re = r^{eu}$). So, ex-post there is an incentive for government to deviate from the announced target ($r = r' < r^{eu}$ in Figure 2).

The equilibrium support we obtain by substituting equation (6) into equation (2):

$$s_{t,A} = s^{n} \tag{8}$$

To calculate the equilibrium welfare we substitute the equilibrium values for reform and support form equations (7) and (8) respectively into equation (1):

$$W_A = -\frac{1}{2}\beta[(s^{o} - s^{n})]^2 \tag{9}$$

which is obviously sub-optimal from the government's point of view as it produces some welfare loss (WA<0), namely, since β≥0 and [·]2≥0 thus WA≤0.

Note that, interestingly, this welfare loss is increasing in correlation with the increase of populism (higher β) and increase of credibility gap (higher difference so-sn).The above equation suggests that under policy scenario of policy rule, the government is better off if they are less populist and if they enjoy higher credibility.

B. Policy discretion (no commitment ex-ante): Assuming as previously that the government is willing to deviate from their ex-ante reform target (r≠reu), but this time the public has rational expectations and anticipates that (so that re=r≠reu). Namely, the assumption is:

$$r_{t,B} = r^{e}_{t-1,t} \neq r^{eu} \tag{10}$$

Substituting equation (10) into equation (5) we obtain equilibrium reform:

$$r_{t,B} = r^{eu} - \frac{\beta\gamma}{\alpha}(s^{o} - s^{n}) \tag{11}$$

Substituting equation (10), namely the assumption for rational expectations (re=r), into equation (2), we obtain equilibrium support:

$$s_{t,B} = s^{n} \tag{12}$$

To calculate the equilibrium welfare we substitute the values for equilibrium reform and equilibrium support from equations (11) and (12) respectively into equation (1):

$$W_B = -\frac{1}{2}\beta\left(\frac{\alpha + \beta\gamma^2}{\alpha}\right)(s^{o} - s^{n})^2 \tag{13}$$

It can easily be seen that welfare loss in this scenario is larger than that of scenario A (meaning that WA>WB). To evaluate and compare the welfare from scenario B (WB) vis-à-vis scenario A (WA), we subtract equation (9) from (13):

$$W_B - W_A = -\frac{1}{2}\left(\frac{\alpha + \beta\gamma^2}{\alpha}\right)(s^o - s^n)^2 \tag{14}$$

Given that α≥0, β≥0 and γ≥0, we have [(α+β^2)/α]>1, thus [(-1/2) (·) [·]2]<0, namely (WB<WA), which means that scenario A is more preferable than scenario B in terms of government's welfare.

As discussed in the original Barro-Gordon model, this outcome for the government's welfare and hence reform policy is determined by the assumption that a European Commission driven by rational expectations will pre-discount the reform gap by the governments (e.g., in their negotiations) and thus will reduce the rewards for accession accordingly. Namely, in Figure 2 it shows that the political constraint line shifts downwards with respect to the expected reforms (from re=reu to re=rB), which determines then the equilibrium level of reforms along the 'natural' support line for the EU accession process, resulting thus with the reform gap (rB<reu).

The above solutions of the model for the policy scenarios, we may summarize in the following table:

Table 2. Comparison of policy scenarios at their equilibrium levels

Scenario	I t	twyRUt	ł zŁwwz	twy-wŁ ł ıwz
R łs	$r_t = r_t^{eu}$	$r_{t.A} = r_t^{eu}$	$r_{t,B} < r'_t < r_t^{eu}$	$r_{t,B} < r_t^{eu}$
U łı	$s_t = s^o$	$s_{t,A} = s^n$	$s^n < s'_t < s^o$	$s_{t,B} = s^n$
W t ł	$W_0 = 0$	$W_A < W_0$	$W_A < W' < W_0$	$W_B < W_A$

From Table 2, we can conclude that the most preferable scenario in terms of government's welfare is the ideal with zero loss, thus welfare is maximized (W0=0). However, the 'bliss point' E0=(so,reu) falls outside the policy constraint and it is thus unattainable as can be easily demonstrated in the case with rational expectations (re=r) by substituting it into equation (2) and getting (s=sn<so). Next, comparing scenarios with policy rule versus policy discretion, as can be seen also from equation (14), the policy rule is more attractive than policy discretion with an equilibrium at higher welfare of the government (WA>WB). At that point, reforms are achieved at the level as negotiated with the EU (rA=reu) with 'natural' support level of government (sA=sn).

Following the above, we should expect the government to choose policy rule against policy discretion. This assumes a full commitment from the government in implementing the reforms (rA=reu). However, this scenario does not have a time-consistent equilibrium, given that the government facing the constraint of public support (equation 2) and support target higher than it's natural level (so>sn), it will have an incentive to delay the reforms (r'<reu), thereby increasing its welfare and moving from point EA to point E' in Figure 1 (W'>WA). However, this holds only in the case of naïve or adaptive expectations, assuming that the government will be able to surprise with reform delay after expectations are set by the public and the EC (during the initial stage of negotiation). We call this as transition equilibrium, since it is unsustainable in the world with rational expectations, as been explained in policy discretion scenario, namely the EC during the initial stage of negotiations will anticipate this behavior of the government, hence incorporate that in it's conditionality scheme by reducing the accession rewards for the country, which further reduces support from s' to sn and the equilibrium is achieved at lower level (rB<r'), and lower welfare for the government (WB<WA). This reflects more closely the reality of the recent slowdown in the reforms and the EU accession process in the

Western Balkan countries. Also, this may explain incentives behind the lack of transparency, the influence to the media and populism that government's practice to influence expectations make them deviate from rational (according to the theory of limited rationality in decision-making this is due to limitation of information, limitation of capacity/knowledge to understand the complexity od implications and limited available time for decision-making: this goes beyond this research and may be of interest for another research: Thaler and Sunstein, 2008).

In order to hold, policy rule scenario assumes full commitment and full credibility of the reform process, namely strong institutional/legal binding of the reform agenda. In our analysis of the EU accession process this means an EU anchoring of the reform agenda for the Western Balkans, which explains also the effect of the endogeneity of the integration process, in other words why countries are better performing once they become members (found also in the empirical analysis in comparing the performance of the new member states of the EU and the candidate countries for the Western Balkan). In terms of the reform performance and the government's welfare this scenario is more favorable than the scenario with policy discretion, while paradoxical, the later reflects more closely the current reality with reform and EU accession delay in the countries from Western Balkan. Following this explanation, the scenario under consideration for policy implications will be the scenario with policy discretion and addressing the research question - how to accelerate and enhance the credibility of the reforms in the Western Balkan during the EU accession process and what role can play the EU?

5. Policy Implications

EU integration process has played important role in convergence of the Western Balkan countries with the European Union. However, the long-lasting process of EU integration affects the pace of the structural reforms thus slowing down the reforms which after the crisis was slower compared to the new member states. This indicates the endogeneity effect of the EU integration process, which seems to have positive impact on convergence. Convergence is a persistent process with positive impact of structural reforms in long-term suggesting faster reform process in order to accelerate the catching-up process of the Western Balkans with the EU living standard. However, the structural reforms impact in long-run creates a space for policymakers to refocus on short-term effects (with fractional negative impact on the support by certain interest groups due to distribution effect of reforms), hence being time-inconsistent in policymaking that considers both structural reforms and political support. Further, to consider is that the political economy can help explain the reform delay, which implies that there should be reflected the political implication of reforms, namely the political cost that policymakers face in short-run by certain interest groups in implementing reforms. A contrary, ignoring the political economy effect while setting the reform package (agreement) between European Commission and the national government's will lead to non-credible reform policy which will result with a reform delay/gap.

Based on the above model, we may say that the ideal scenario with the 'bliss point' at the EU reform target and policymaker's support target is not attainable and scenario with naíve expectations is not realistic. The next scenario that assumes reforms at EU targeted level is the policy rule scenario with ex-ante full commitment by the government for implementing reforms, which is time-inconsistent under lack of credibility. Thus, the most likely scenario is discretionary policy that may explain the reality with the recent slowdown of the reforms and EU accession process in the Western Balkan.

Once we have identified the policy scenario that explains the reform delay, namely scenario B, the next step is to identify the policy implications and recommendations, so we rewrite the optimal reform policy as described in equation (11):

$$r_{t,B} = r^{eu} - \frac{\beta\gamma}{\alpha}(s^{o} - s^{n})$$

From the equation we can identify five policy transmission channels: government's reform preference, 'reformism' (α); government's local support preference, 'populism' (β); public reform sensitivity, 'short-termism' (γ); government's credibility gap (so-sn); and EU reform target (reu), which in this specific case we may interpret as a proxy for EU accession credibility (the rationale is that higher credibility implies the possibility for higher reform targets). Hence, reforms are enhanced ($\uparrow$r): when the government pays more attention to reforms ($\uparrow\alpha$); when the government is less populist ($\downarrow\beta$); when the public is less short-termist ($\downarrow\gamma$); when there is lower credibility gap of the government ($\downarrow$[so-sn]); and when the EU accession credibility is higher, hence reform target is higher ($\uparrow$reu).

From the above presented policy transmission channels we may draw the following policy recommendations for the EU in order to enhance reforms in the Western Balkan:

First, the EU should encourage governments to pay more attention to reforms (α). It should be noted, however, that this will not achieve full compliance; it will simply reduce the discrepancy between the reforms (r) and agreed reforms with the EU (reu). This will be achieved through Europeanization and an increase of national ownership of the EU accession process with credible and fair conditionality model.

Second, the EU should influence to reduce the government's populism (β). As above, this will only reduce the discrepancy between the support (s) and the objective (so) rather than eliminate (unless, that is, the EU successfully manages to bring β to zero). Note, however, that in practical terms, making the government more unresponsive to public demands may not be politically optimal (or even desirable), as it will evidently be (perceived as) undemocratic. This can be achieved through higher transparency and inclusiveness of EU accession process and proactive role of the EU with effective incentive based conditionality model.

Third, the EU should influence reducing the short-termism of the public (γ), namely reducing the public's aversion to reforms. As we mentioned earlier, at the extreme the policy problem can become trivial if the EU succeeds in making the public obtain pro-reform preferences. This can be achieved through a socialization process, transparency and inclusiveness of the public with the reform and EU accession process.

Fourth, the EU should focus on increasing the credibility of EU accession process and negotiate higher level of reforms (reu). Namely, promoting transparent, fair and competitive EU accession process and by communicating more effectively the benefits from accession to the public.

Fifth, the EU should influence reducing the credibility gap of the government (so-sn). This can be achieved through an increase ownership of national authorities about the accession process and the reform agenda, which should be accompanied with the well designed conditionality model with conditions, incentives schemes and monitoring.

The above implies that reform process may leverage from EU accession process. Namely, through different policy transmission channels, European Commission can play a role in increasing the credibility of the reform policy and accelerate the reform process in the Western Balkans. The EU can play a role in anchoring reforms, through a legally binding policy rule or systematic impact through policy channels within the national discretionary policy framework. This assumes an appropriate design of the EU enlargement process and its mechanisms by the European Commission in order to address the above possibilities in a comprehensive framework due to the complexity, complementarity and interconnection of different policy measures and instruments. Taking that into consideration, for simplicity reasons we will summarize in the following groups the policy tools:

First, it is important to have an effective implementation of the comprehensive staged-structured conditionality model: conditions; incentive structure (rewards: accession advancement rewards & financial rewards; and threats: explicit and implicit) and monitoring. This is very important to be merit-based process, so will increase the credibility of the EU accession process and enhance reforms. Second, inclusiveness and transparency of the EU accession process will create the opportunity for discussion, participation and better monitoring of the process. Third, Europeanization and socialization is expected to increase the ownership, hence the support and the credibility of the EU accession and the reform process. Fourth, policies that will increase

EU optimism vs EU scepticism in the EU member states and the Western Balkans are essential for the role of EU accession process in advancing the reform process and its transformation power in the Western Balkans. Fifth, in accordance to the above, the 'New approach' of EU integration for the Western Balkans should consider also political economy implications of the reforms, namely being more flexible into setting-up reforms and conditionality, while being strict in implementation. Sixth, it may also consider transparent and cross-country competitive and comparative process. This will increase the competitive based reform performance process by the governments of the countries of the Western Balkan. Seventh, enhancing regional cooperation and promoting new initiatives will increase EU enlargement optimism and enhance credibility and the pace of reforms (e.g. Berlin process, Regional Economic Area of the Western Balkans). Finally, endogeneity suggests that reforms can leverage form the EU accession process, namely countries are more likely to perform better with reforms as they progress with accession process: candidate status, opening of negotiations and membership.

6. Conclusion

The main hypothesis of the EU enlargement process is that implementation of the convergence criteria and reforms enhance economic growth and catching-up with the EU living standard. This should increase the support by citizens and economic agents for reforms and EU integration of candidates and potential candidate countries. However, in the recent years the evidence shows a delay in structural reforms and slowdown of the EU integration progress in the Western Balkans.

Empirical evidence and literature review suggests that there is e positive impact of structural reforms on convergence, but this impact is changing across the reforms and the time span from short- to long-term. The reform impact is also varying among different level of institutional quality and the development level of the country. Similarly, the results from empirical investigation of this research suggest positive correlation of structural reforms and economic convergence of the Western Balkan countries with the EU average. Further, it suggests that the impact of EU membership is positive on convergence, thus implicitly addressing the endogneneity effect of EU integration process, but also indicating the role that EU can have in increasing the credibility of structural reforms and enhancing the convergence process. The possible policy recommendation from empirical results have to consider that the results do not examine the complementarities of the reforms while in practice reforms are implemented in a package and also the impact of policy reforms may have nonlinear effects that can be contingent on the quality of political and economic institutions.

In addition, in our research we design a theoretical model with an intention to explain the reasons behind the reform gap/delay, while addressing policy implications and recommendations for accelerating reforms in a world with rational expectations. The model prefers policy rule over policy discretion, since in the first scenario there is no reform delay and in the last scenario there is reform delay under the same level of political support for the policymakers. Although paradoxical, the less preferable scenario with policy discretion seems to reflect more closely the reality with the reform slowdown in the Western Balkans. This is mainly a result of the time-inconsistency of the reform policy due to the lack of credibility by policymakers under the political economy constraint of the trade-off between short-term cost and long-term benefits as well as the distribution effect over different interest groups in the society. The policy rule scenario advantage over the discretion implies the effect of the endogeneity of the EU integration process, since once countries become members of the EU, the institutional/legal binding of the reform policy becomes stronger and there is an anchoring of the credibility of the EU for the national policymakers. The scenario that our analysis focuses on is the policy discretion which reflects the current situation with reform delay the accession process. In order to enhance reforms, the model implies five policy channels: increasing reform preference of governments; reduce government's populism; reduce public's short-termism (or reform political sensitivity); increase the credibility and reforms of the EU accession process; and reduce the credibility gap of the national policymakers. In addition, the model suggests that it is important to be considered the political impact of the reform process in policymaking, which assumes that during the negotiations it is relevant to consider the national political constraints (interests) of the governments in order to have credible reform policy, in other words, being flexible in setting the reform agenda while strict in implementation. Further, the policy recommendation suggests: an effective implementation of the comprehensive staged-structured conditionality model (conditions; incentive structure - rewards: accession advancement rewards & financial rewards; and threats: explicit and implicit - and monitoring); inclusiveness and transparency of the EU accession process; Europeanization and socialization is expected to increase the ownership; policies that will increase EU optimism vs EU skepticism; promoting new initiatives of regional cooperation and cross-country competitive and comparative process; and merit-based progress with the accession process will improve the reform performance as countries are more likely to perform better with as they progress within the accession process: candidate status, opening of negotiations and membership.

The above framework we consider to contribute to the policy and academic discussion on the needed structural reforms in the Western Balkans countries and their impact on economic convergence. The avenue for further research is the empirical investigation of the policy channels about reform process and it's optimization by both European Commission and governments (policymakers) of the Western Balkans. Also, policy scenarios in a world with bounded rationality might be of interest for further analysis of policy implications for accelerating reforms and increasing the credibility of the EU integration process.

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UDK 336.748.12(560)]:621.311:338.516.48(100)
339.743(560)]:621.311:338.516.48(100)

THE RELATIONSHIP BETWEEN ENERGY PRICES, CDS, USD CURRENCY AND INFLATION RATE IN TURKEY[2]

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Abstract

Emerging economies are highly dependent on energy commodities in terms of both export for gaining cash inflow and import for meeting internal energy demand. Volatility of energy prices in international markets might spillover on net cash balance of individual countries due to its direct impact on foreign cash in/out flows which could increase overall fragility of countries. Developments in energy prices at international spot commodity markets directly affect Turkey because of its significant reliance on imported energy. Country's financial and macroeconomic indicators respond instantly to developments in external factors such as commodity prices.
To that end, the present paper investigates the impact response analysis between energy prices index quoted under title of "S&P GSCI Energy" derived from spot energy prices in the international markets and inflation, USD currency and sovereign CDS of Turkey by employing VAR model for the period of 2007M4-2017M1. The results show that a shock to energy prices has a negative impact on CDS and USD currency. At the same time, USD currency rate has a significant effect on the CDS and inflation.

Key words: *Standard and Poors Energy Commodity Index, Credit Default Swap (CDS), Exchange Rate, Inflation Rate, Turkey*
Jel Codes: *O43, G31, P24*

2) This article is the revised and extended version of the paper presented in EUREFE'17 which was held by Adnan Menderes University Aydin Faculty of Economics, in Aydin/Turkey, on July 27-29, 2017.

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Introduction

Both developed and developing economies are strongly dependent on energy commodity prices regardless of their position either an importer or exporter. When it comes to developing economies, subject to the vital importance of foreign funds for their financial sustainability, their dependency on energy prices is considered as highly critical. While in the importer role, energy prices in the current spot market determine the size of their individual energy bills which increases their current account deficit; in the exporter role, their fund inflow depends on spot prices by determining the size of the national income from export of energy commodities. Fluctuations in energy commodity prices in the international spot energy markets have direct influence on current account balances of countries and accordingly on their economic fragility.

Financially, fragile means the situation of borrowers indulging in economic activities as entrepreneurs with inadequate resources for the realization of their decisions (Bernanke and Gertler, 1990:88). Accordingly, fragility levels of developing countries highly dependent on global capital markets is measured by credit rating institutions; and considered as an important indicator for foreign investments (Bekkour et al., 2015:73). Financial markets assess country fragility by taking various economic indicators into account. Recent reports published by the established credit grading institutions are closely followed by “investor” members of economies with abundant saving, who are significantly effective on flows of global funds. In this regard, developing countries highly dependent on foreign capital are monitored by prominent credit grading institutions in terms of their macroeconomic indicators for classification based on their individual risk exposure. After Turkey’s nomination among the most fragile five (Morgan Stanley, 2013) and the recent fragile three countries (Barron’s, 2017) of the world, Turkey could be viewed as an economy more sensitive to the developments in the international spot energy commodity markets because of Turkey’s net energy-importer economy. Financial and macroeconomic indicators of Turkey especially current account balance respond to external factors such as variations in energy commodity prices (Aydın and Acar, 2011: 1726).

The concept of the “Credit Default Swap” (CDS) is a gift from the JP Morgan to the financial world in 1994 (Augustin et al., 2016:2). For purpose of monitoring financial risks in the market, CDS premiums are considered as an alternative tool apart from the sovereign credit scores (Mora-Jensen, 2006:9; Flannery et al., 2010:2095; Başarır and Keten, 2016:369). The CDS has been recognized as a useful tool which differentiates the default risk of bond issuer party from other risks clearly in assessment and pricing of the credit risk (Whetten, et al., 2004). Thus, CDS has been preferred over other credit derivatives (Norden and Weber, 2009:530). The greater the CDS price for a specific country, the higher the cost of foreign debt is (Fontana and Scheicher, 2010; Ericsson et al., 2009).

In the current literature on impacts of energy prices on economic and financial indicators, oil prices have been dominantly taken into consideration due to its significant place among global energy resources (Barsky and Kilian, 2004; Alexandre and De, 2010; Sharma and Thuraisamy, 2013; Kumar and Maheswaran, 2013; Yıldırım et al., 2014; Chen et al., 2015; Mollick and Radhamés, 2010; Ngoma et al., 2016; Kaya and Açdoyuran, 2017). In fact, global energy resources utilized by countries across the world are not only limited with crude oil but as well oil derivatives such as gas, diesel, as well as natural gas, methanol, ethanol, electric, coal, bio-fuels etc. In this sense, although crude oil is still fundamental energy input for country economies, large-scale approach was adopted regarding energy prices by including the impact of fluctuations in prices of other energy resources instead of considering crude oil prices solely. In this line, an energy index which takes energy-derived contracts on aforesaid commodities traded globally in the US Dollar currency across spot energy markets was taken into account. An example of these indexes, the S&P GSCI Energy Index quoted as one of the sub-indexes of the S&P GSCI, is referred as a public reliable benchmark for investors to assess energy commodity market. This index takes weighted averages of energy commodities around the world into a calculation. In this sense, the S&P GSCI Energy index is calculated primarily on a world production-weighted basis and includes principal physical energy commodities that are the subject of active, liquid futures markets (Standard and Poors, 2017).

Developments in energy prices at international spot commodity markets directly affect Turkey because of its significant reliance on imported energy. An unexpected increase in energy prices and USD exchange rate is negatively affecting production costs, which can trigger inflation upward. Energy price fluctuations especially influence on currency rates of countries with high financial fragility by escalating global risk perception. An increase in energy prices is expected to elevate energy expenditures and cast an adverse impact on macroeconomic indicators by increasing domestic energy bill and consequent pressure on inflation. On the other hand, a decrease in energy prices is expected to bring an advantaged position for Turkey in terms of both energy expenditures and current balance. Fluctuations in oil prices introduce a conflict of interest among economic superpowers around the World. Especially, the decline in oil prices has led to increasing the financial stress of oil importing countries due to the spillover effects of financial crises in oil-exporting countries (Kaya and Açdoyuran, 2017:151). So to what extent this has an effect on Turkey's credit risk perception? To find the answer to this question, it will be appropriate to examine the effect of energy prices on foreign exchange and inflation rates as well as the CDS risk premium.

To that end, the present study analyzed the relationship between energy commodity index referred as "S&P GSCI Energy" quoted by the Standard and Poors and inflation, USD currency rates and sovereign CDS risk premium of Turkey by employing VAR model for the period of 2007M4 - 2017M1. Within this framework, in Section 2 and 3, empirical studies from the relevant literature were summary presented. In Section 3 and 4, an empirical analysis was conducted and finally, acquired results and suggestions were exhibited.

2. LITERATURE REVIEW

In numbers of studies on the potential effect of energy prices on macroeconomic indicators and equity markets, oil prices have been investigated predominantly due to its extensive consumption as a primary energy resource. In terms of the relationship between energy prices and foreign exchange rate, for a pre-crisis period of 2000 – 2005, Zhang et al. (2008:380) used cointegration, VAR model, ARCH-type models and Granger causality test to explore mean, volatility and risk spillover effects with respect to the influence of US Dollar on the international crude oil price. Authors report significant long-term equilibrium cointegrating relationship between the two markets. The US dollar's depreciation over the years is shown as the key factor driving up the international crude oil price. In spite of apparent volatility and clustering for the two market prices, their volatility spillover effect is reported as insignificant. US Dollar and energy markets' risk spillover effect is found to be quite limited. Similarly, based on the study employed VAR method on oil price and US dollar quotations around the World, Grisse (2010) also report that higher oil prices depreciate the US Dollar both in the short run and over longer horizons; US short-term interest rates explain much of the long-run variation in oil prices and Dollar exchange rate.

In the same way, Mollick and Radhamés (2010:402) by employing the VAR method and adding oil prices into the monetary model of exchange rates, report that oil prices significantly explain movements in the value of the U.S. dollar (USD) against major currencies from the 1970s to 2008. Authors also report that increases in real oil prices lead to a significant depreciation of the USD against net oil exporter currencies, such as Canada, Mexico, and Russia whereas the currencies of oil importers, such as Japan, depreciate relative to the USD.

Ferraro et al. (2011) tried to predict foreign exchange rates for Canada by using oil prices and US Dollar currency rate for the period of 1984 and 2010. Their empirical results suggest that oil prices can predict the Canadian-US dollar nominal exchange rate at a daily frequency.

A similar relationship was also investigated for India by Kumar and Maheswaran (2013:72). Researchers examined the return, volatility, upside risk and downside risk spillover effects from crude oil prices and the US$/INR exchange rate to the major Indian industrial sectors on the basis of Hong's (2001) approach by utilizing from the generalised autoregressive conditional heteroskedasticity (GARCH) class of models grounded on the generalized error distribution (GED) to estimate extreme upside and downside Value-at-Risk (VaR). Researchers reveal significant volatility and return spillover effect from the crude oil market to the Energy. They also exhibit evidence of significant volatility spillover from crude oil prices and US$/INR exchange rate to the Energy sectors. In addition, two-way downside risk spillover between crude oil prices and the US$/INR exchange rate was reported.

Ngoma, Normaz, and Zulkornain (2016:535) investigated the long-term relationship between real oil prices and exchange rates in five prominent oil-exporter African countries of Egypt, Ghana, Nigeria, South Africa and Tunisia by employing symmetric and asymmetric cointegration tests and an error-correction modeling technique. Authors present evidence for the long-term co-movements between real oil prices and real exchange rates, which suggests the symmetric adjustment of the real exchange rates to the long-term equilibrium values in Egypt, South Africa, and Tunisia, caused by changes in real oil prices. Furthermore, authors provide evidence for persistence and asymmetric adjustments of the real exchange rates to the long-run equilibrium path after an increase in oil price shocks in Ghana and Nigeria. Moreover, short-term analysis of the relationship yields evidence for real exchange rate appreciations in Nigeria, South Africa and Tunisia and real exchange rate fluctuations in Egypt and Ghana.

In spite of the abundance of studies investigating aforesaid relationships, there is limited literature available studying the relationship between CDS and energy prices. Alexandre and De (2010:8) analyze the impact of oil price on sovereign bond risk premiums issued by seventeen emerging economies for the period of 1998 to 2008. A panel analysis was utilized to determine the global impact of oil prices on the risk perceptions of investors. Authors report a new estimator for the oil price to take into account the effect of the price variance and that the oil price influences the risk premiums of sovereign bonds.

In terms of the relationship between energy price and CDS risk premium, Duffie, Pedersen, and Singleton (2003:124) analized the relationship between credit spreads on sovereign bonds, reserves of the Russian Central bank and oil price for oil exporter Russia by using VAR model with monthly data for period February 1994 to July 1998. Authors address that positive shocks to oil prices are estimated to state a reduction in the spread.

Sharma and Thuraisamy (2013:52) tested whether oil price uncertainty predicts credit default swap (CDS) returns for eight Asian countries by employing Westerlund and Narayan's (2011) predictability test. Whereas "in-sample" evidence reveals that oil price uncertainty predicts CDS returns for three Asian countries, "out-of-sample" evidence suggests that oil price uncertainty predicts CDS returns for six countries.

Aizenman, Hutchison, and Jinjarak (2013:40) analyzed dynamics of CDS spreads for fifty countries by using dynamic panel analysis for period 2005-2010. They found that only inflation is systematically and robustly correlated with CDS spreads (higher inflation leads to higher spreads). Similarly, Doshi, Jacobs, and Zurita (2017:51) estimated a model with three global and four local covariates using CDS spreads (5 years maturity) and twenty-five countries. According to cross-sectional relation results, there was a positive relationship between CDS spreads and inflation. High inflation rates cause high CDS spread.

By oriented on the after-crisis period, 2006 to 2016, Bouri et al. (2017:158) investigated the volatility transmission from commodities to CDS spreads of emerging and frontier markets by using GARCH-based model. Using daily data for seventeen emerging and six frontier countries, authors report a significant volatility spillover from commodity markets to sovereign CDS spreads of emerging and frontier markets. Authors report that this effect is strong for the majority of the countries included in the sample, but different results seen by country and along different time. 10 out of 17 emerging market CDS are affected by commodity price volatility and four out of six frontier markets experience a significant volatility spillover. Particular commodity sectors such as energy and precious metals are found to be the main driver of the transmission of volatility and findings indicated a strong effect of volatility. Energy and precious metal commodities are addressed as large contributors to sovereign spreads volatility across the most countries.

Kaya and Açdoyuran (2017:151) established the financial distress index for Turkey and investigated its correlation with oil prices by means of the ARDL approach. As for the short term, authors report negative correlation, for the long term, they report a statistically significant, negative but low level of relationship (-0.1%) between financial distress and oil prices. The correlation between oil prices and financial distress is reported as that 32% of short-term instability would return to equilibrium on the long term.

In terms of the relationship between inflation and energy price, current literature reflects different approaches based on various characteristics of countries such as macroeconomic indicators, country size, their energy dependency and export mixture or time period. Öksüzler and İpek (2011:21) studied effects of oil price changes on Turkey's macroeconomic variables of growth and inflation by utilizing vector autoregressive model (VAR) on monthly data from the period of 1987:1 to 2010:9. According to the Granger analysis results based on the VAR model, authors conclude that there is one-way causality running from oil prices to economic growth and no causality between oil prices and inflation; and that a positive oil price shock increase both the growth of GDP and inflation.

The study of Cong and Shaochuan (2013) investigated the relationship between energy price shocks and macroeconomic indicators of China by multivariate vector autoregression. Authors report 5-month lag effect of energy price shocks on inflation and that rising energy price affects the Chinese macroeconomic indicators while it pushes up the inflation rate. Authors nominate China in a risky position in terms of cost-push inflation. Similarly, in another study conducted on South Asian economies of India and Pakistan, Rehman (2014:45) reports that oil prices have cost side effects on inflation and emphasizes the strong causality between the international oil prices and inflation for India and Pakistan.

By approaching from a different angle, Verbrugge and Higgins (2015) studied the impact of energy price changes on inflation expectations of American household through comprehensive survey method. Authors conclude that energy prices have a greater influence on the long-term inflation expectations. In parallel, Sussman (2015) stressed in the World Economic Forum that data from the US, the Eurozone, the UK show that oil prices have a strong correlation with inflation expectations for the medium term, as measured by five-year breakeven inflation rates.

For the extensive period covering 1980 to 2010, Sek et al. (2015:632) grouped countries based on their energy dependency levels and investigated effects of oil price changes on their inflation rates and exchange rates besides other variables by employing (ARDL) format. Whereas high-oil dependent countries were Singapore, Philippines, Greece, Belgium, Italy, Pakistan, India, Portugal and Spain, the ones with low-dependency to oil were Norway, Denmark, UK, Canada, Mexica, Malaysia, Brazil, Ecuador, Bulgaria, and Venezuela. Researchers reveal that oil price change has a direct effect on domestic inflation in low-oil dependent group but indirect effect on domestic inflation in the high-oil dependent group through changes in the exporter's production cost.

Parker (2017), in its study on the impact of energy prices on global inflation in the ECB Working Paper, used a comprehensive dataset of consumer prices for 223 countries for the period 1980-2012 in order to determine the role of global factors causing common movements in consumer price inflation. The author reports that while global factors including energy prices explain a large share of the variance of national inflation rates for developed countries, but not for median and low-income countries. Furthermore, by employing the dynamic hierarchical factor model suggested by Moench et al. (2013:1813), the author showed the significance of global factors such as energy price in particular for countries with higher GDP per capita, greater financial development and greater central bank transparency, the greater share of global factors in explaining national inflation variance.

As one of the countries strongly dependent of energy import and foreign investment, Turkey's highly sensitive position against fluctuations in energy prices and this sensitivity's influence on relevant risk perception of lenders necessitated empirical investigation of the relationship between energy prices and CDS premium.

The scarcity of the available literature on this relationship in Turkey reinforces the significance of the present study. In the econometric analysis section of this study, the study of Duffie et al. (2013:124) was considered as reference points and the VAR analysis method which does not require economic theory foundation.

3. DATA AND METHODS

3.1. Data Set

This study analyzes the relationship between Turkey's sovereign CDS of 5 year maturity (CDS) and, crude oil prices believed to represent overall global spot prices FOB (free on board) dollars per barrel, inflation (ITO TEFE, 1968=100, π) and USD currency (official quotations of the Turkish Central Bank, USD) rates by means of the VAR model for the period of 2007M4-2017M1. Since the reliable data can be reached from 2007, the analysis start date was determined as 2007M4. Study data was acquired from websites of U.S. Energy Information Administration (www.eia.gov), Bloomberg (www.bloomberg.com) and Central Bank of Republic of Turkey (www.evds.tcmb.gov.tr). Logarithms of energy price index (, inflation index (π) and CDS values were included in the analyses to have figures at a measurable level.

3.2. Methods

The stationarity of series was analyzed by means of the (Augmented) Dickey-Fuller (ADF) (1979) and Philips-Perron (1988) (PP) unit root test. Whereas the ADF test follows the AR process, the PP test follows the moving averages process. The relationship between series was investigated by the VAR (Vector Autoregressive) model developed by Sims (1980), which analyzes all variables based on their classification in internal or external groups. And also using the lagged dependent variables in VAR model can help improve forecasting based on given values by then the forecast is constituted (Kumar et al., 1995).

Generalized VAR model of k number of variables was given below (Tarı, 2011:452-453);

Where a vector of a model variable, c is is a vector of intercept terms, is parameter matrix and is a vector of error terms.

Since parameters of the VAR model could not be interpreted directly, our findings were reported by utilizing generalized impulse-response functions and variance decomposition analyses.

4. FINDINGS

4.1. Unit Root Analysis

An important assumption of the classical regression model that time series should be stationary and that error terms have a zero mean and a finite variance (Enders, 2010:195-96). In this context, the stationary of variables was analyzed by using Augmented Dickey-Fuller (ADF) (1979) and Philips-Perron (PP) (1988) unit root tests. Unit root test results are reported in Table 1.

Table 1: Results of the ADF and PP Unit Root Tests

Variables	ADF Test Statistics Intercept	ADF Test Statistics Intercept and Trend	1% Critical Value Intercept	1% Critical Value Intercept and Trend	PP Test Statistics Intercept	PP Test Statistics Intercept and Trend	1% Critical Value Intercept	1% Critical Value Intercept and Trend
	-2.574638	-2.916993	-3.487550	-4.039075	-2.201357	-2.558948	-3.487046	-4.038365
CDS	-2.660891	-2.648322	-3.487046	-4.038365	-2.698953	-2.686469	-3.487046	-4.038365
USD	2.765185	0.200879	-3.487046	-4.038365	2.573857	0.200879	-3.487046	-4.038365
π	0.313495	-2.714111	-3.487550	-4.039075	0.182103	-2.302971	-3.487046	-4.038365
Δ***								
-6.571982	-6.563197	-3.487550	-4.039075	-6.516274	-6.508957	-3.487550	-4.039075	
ΔCDS***	-11.72454	-11.67428	-3.487550	-4.039075	-11.75191	-11.70027	-3.487550	-4.039075
ΔUSD***	-8.627815	-9.138428	-3.487550	-4.039075	-8.623253	-9.139377	-3.487550	-4.039075
Δπ***	-6.113055	-6.111485	-3.487550	-4.039075	-6.105377	-6.100360	-3.487550	-4.039075

Not: Δ and *** denotes the first difference of variables and significance at the 1% levels, respectively.

Stationarity analysis of series was conducted by two different models of “intercept” and “intercept and trend”. For both test models, optimum lag length was determined as [0] for all variables. According to Table 1, level values of series are not stationary, but after their first difference is taken, they became stationary. It was concluded that time series were 1st degree integrated I(1) series.

4.2. The VAR Model

The VAR model is applied to the stationary series. Using stationary series and a standard VAR model, the optimum lag length was estimated and the respective results were exhibited in Table 2.

Table 2: Optimum Lag Length Test Results

Lag Length	LR	FPE	AIC	SC	HQ
0	NA	9.14e-08	-4.856398	-4.754691*	-4.815194
1	70.67801	6.09e-08*	-5.262625*	-4.754089	-5.056602*
2	17.25485	6.92e-08	-5.136563	-4.221197	-4.765721
3	29.46228	6.83e-08	-5.152632	-3.830437	-4.616972
4	19.92912	7.44e-08	-5.074010	-3.344985	-4.373531
5	26.43243*	7.44e-08	-5.084781	-2.948927	-4.219484
6	16.90341	8.30e-08	-4.991056	-2.448372	-3.960940
7	18.55064	9.02e-08	-4.930705	-1.981192	-3.735771
8	6.117371	1.16e-07	-4.709173	-1.352831	-3.349420
9	21.34639	1.19e-07	-4.720084	-0.956912	-3.195512
10	18.09979	1.28e-07	-4.699690	-0.529689	-3.010300
11	23.52548	1.25e-07	-4.790734	-0.213904	-2.936526
12	22.99054	1.21e-07	-4.901052	0.082608	-2.882025
13	20.26541	1.22e-07	-4.990720	0.399769	-2.806875

Not: * denotes the optimum lag lengts determined by the information criterion.

Since acquired times series are montly data, the maximum lag lenth was set as 13; the lag length minimizing the criterions of Likelihood Ratio (LR), Final Prediction Error (FPE), Akaike (AIC), Schwarz (SC) and Hannan Quinn (HQ) was tried to be determined. Table 2 suggests the optimum lag length for the LR criterions as 5, for the FPE, AIC and HQ criterions as 1, and for the SC criterion as 0. Accordingly, it is the most appropriate to select the most lag length (*) as the optimum value. But, when obtained lag lengths are applied autocorrelation and heteroscedasticity, it is seen that the optimum lag length which does not include autocorrelation and heteroscedasticity is 5 which is estimated according to the LR criterion. The analysis results of the optimum lag lenth of 5 are exhibited in Table 3 and 4.

Table 3: The Autocorrelation Test for the Lag Length of 5

Lag Lenth	LM-Statistics	Probability Value	Lag Lenth	LM-Statistics	Probability Value
1	16.63497	0.4096	7	10.88951	0.8163
2	15.48018	0.4898	8	27.51552	0.0361
3	9.372239	0.8973	9	17.24026	0.3702
4	14.65692	0.5499	10	20.40396	0.2026
5	9.725418	0.8806	11	14.55826	0.5572
6	21.51143	0.1597	12	20.52019	0.1977

Not: The probability value greater than 0.05 suggest that there is no autocorrelation issue at 5% statistical significance level.

Table 4: Heteroscedasticity Test for the Model with 5 Lags

Chi-Square Statistics	Degree of Freedom	Probability
422.9869	400	0.2058

Not: The probability value greater than 0.05 suggest that there is no autocorrelation issue at 5% statistical significance level.

According to these results, the estimation of the VAR model was structured with 5 lags. Since it is not possible to assess estimation results of the VAR model, results of the impulse-response functions and variance decompositions are taken into consideration for further analysis.

4.3. Variance Decomposition Analysis

Variance decompositions are employed to explain causes of changes in each variable whether from itself or other variables. Obtained distribution charts are assessed based on the value at the first period in which price shocks lose their impacts. The results of CDS variance decomposition approach are reported in Table 5.

According to Table 5, the share of the USD in the variance distribution of inflation increases with the long-term. An approximately 35% portion of inflation is explained by its own shocks; 26 % is explained by energy prices; 29% is explained by USD and 10% is explained by the CDS risk premium in 30th period. This result shows that inflation has similar sensitiveness to USD and energy prices.

In the medium term, the contribution of energy prices to USD is an approximately 16% and 60% portion of USD is being explained by its own shocks. Inflation and CDS risk premium have an impact on USD by 15 % and 9%, respectively. The finding that USD has an almost equal sensitivity toward variables of energy prices and inflation is considered as an evidence that USD responds to both internal and external shocks at almost the same degree.

According to Table 5, it is observed that CDS is experiencing significant momentary and immediate reaction to inflation and USD in the short term. the share of the USD and inflation in the variance distribution of CDS increases with the long-term. In the short term, According to middle term, inflation and USD explain in average 12% and 8% portion of CDS risk premium by their own shocks. The contribution of crude oil prices to CDS risk premium is 4%. 45% portion of CDS risk premium contributed by its own shocks.

Table 5: Variance Decompositions Results of CDS

Variable	Period			USD	CDS
	1	0.000000	0.000000	0.000000	100.0000
	2	0.032680	0.261305	0.000783	99.70523
	3	0.378830	0.644483	0.375048	98.60164
	4	0.367653	1.768706	3.262102	94.60154
	5	1.575938	6.704181	3.661596	88.05828
	6	3.771527	7.542016	5.387329	83.29913
	7	3.959458	8.934203	5.382538	81.72380
	8	3.832406	11.87256	5.357758	78.93727
	9	3.931049	11.93934	5.347682	78.78193
	10	3.987869	11.94954	5.904447	78.15814
	11	4.055455	11.96016	6.438674	77.54571
CDS	12	4.031094	11.98211	6.864628	77.12217
	13	4.023331	11.95895	7.100942	76.91677
	14	4.010898	12.12318	7.292890	76.57303
	15	3.991297	12.18928	7.588886	76.23054
	16	3.987676	12.25008	7.708020	76.05422
	17	3.990261	12.26780	7.808385	75.93355
	18	3.988526	12.28664	7.857846	75.86699
	19	3.984331	12.30711	7.908218	75.80034
	20	3.983445	12.30489	7.952429	75.75924
	25	3.991126	12.28737	8.064297	75.65721
	30	3.990336	12.28067	8.149100	75.57989
	35	3.988236	12.28243	8.187942	75.54139

4.4. Generalized Impulse-Response Functions

Impulse-Response functions were structured for 30-period length by analytic method and generalized impact. In this analysis, the required confidence intervals of impulse-response functions are obtained by using Monte Carlo simulations (for standard errors). Since model variables are highly sensitive to economic shocks, each variable was applied generalized impact and obtained results were exhibited in Figure 1. In assessments of the obtained charts, the response of the variable against its impact was assessed first. The response to other variables towards the first augmenter or dimmer shock was observed.

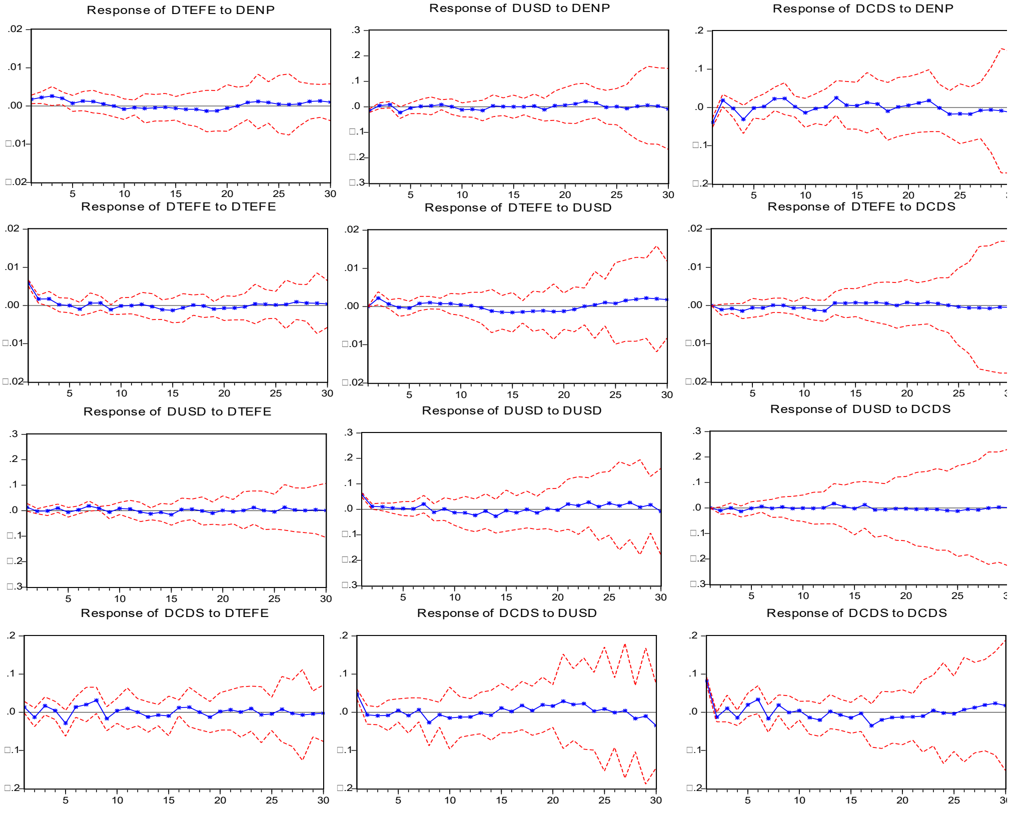
According to Figure 1, a decrease in energy price index would result in production costs associated with energy prices and this situation would reduce inflation rate after a five period. The first reaction of USD to this development is an increase. A negative correlation was revealed between energy price index and USD which both are considered as an investment tool. In terms of the impact on CDS, it could be seen that the first impact tends to increase, but persisting decrease pushed CDS risk premium downward after two periods. Owing to intensive energy dependency of Turkey, CDS decreases as a respond to decreasing energy prices. Energy price shocks lose their impact in 26 periods in average; that is, the impact of the first shock persists about two years.

The decrease in inflation is not found to be influent on the international variables of energy price index and USD on the basis of study findings. CDS responded to decrease in inflation with similar attitude due to the positive impact of such development on Turkey's economy. But, it maintained fluctuation subject to other macroeconomic factors; and its impact persisted about 20 periods.

In terms of the USD variable in the present study, when significance domestic production in substitution of energy import is taken into consideration, inflation responds by decreasing after a period. Inflation is negatively correlated with both energy price index and CDS. USD shocks have a longer impact on the Turkish economy and they last about 30 periods on average.

The most significant impulse-response impact of CDS was determined with the USD because a decrease in CDS risk premium would result in an increase in the foreign capital entry to Turkey, which depreciates USD against TL.

Figure 1: Impulse-Response Function Charts



5. CONCLUSION

Any positive or negative shock in energy prices influences energy importers as well as exporters significantly. However, developing economies of net energy-importer countries such as Turkey strictly dependent on energy import because of the scarcity of substitute energy commodity is highly sensitive to international energy price fluctuations. Therefore, any energy price shock could potentially influent on the credibility of these countries and the investors' risk perceptions towards these countries, on their currency and inflation rates. Analysis results of the present study suggest that Turkey's inflation and CDS risk premium responds positively against decreasing shocks in energy prices. However, USD currency rate responds negatively and this lasts about two years. It was also determined that Turkey could not exploit the decrease in energy prices by using as leverage to reduce its production cost because of the increase in USD.

In parallel to other findings reported in the literature, it was found that inflation in Turkey is influenced significantly by fluctuations in global energy prices and USD currency; and that USD is influenced mostly by global energy price shocks. CDS risk premium is variably influenced by multiple macroeconomic indicators. Yet, about 55% of changes in CDS premium is caused by the variables other than itself. When aggregate change impact is considered for Turkey, fluctuations in the energy price index are found significantly important. Excessive sensitivity against fluctuations in energy price intensifies the general perception of economic risk and fragility relevant with a certain country. Turkey lacks adequate national saving and is a country highly dependent on foreign capital. Therefore, negative consequences on CDS premium, a tool for measuring the credibility of a country, would be obstacles before foreign capital entry.

In an attempt to measure the impact of energy prices on certain economic indicators, the present study oriented on a global energy price index in the relevant analyses. It is emphasized that strengthening a position of alternative energy resources against mostly traded conventional energy resources of crude oil and technology's advanced role for individual countries to substitute an energy resource with another more efficiently for less costs are required to be taken into consideration.

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UDC 314.116:314.15]:303.724 (40672EU)

MIGRATION AND ITS IMPACT ON THE DEMOGRAPHIC TRANSITION IN THE COUNTRIES OF THE EUROPEAN UNION

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Abstract

Demographic transition is defined as shift from high birth and death rates and increasing population to very low birth and death rates and decreasing population, as a country progresses from a pre-industrial to an industrialized economic system and significant increase in the urbanization. It is consisted of five stages.

The analysis provides revised information about the stages of demographic transition for each of the twenty eight EU countries, and also examines whether the transition model is still compatible with the current demographic situation. The countries are classified in five groups according to their demographic similarity. Panel regression models are used to test the statistical significance of the demographic trends from the demographic transition model. While confirming the demographic transition model or describing the variations from the theory, the analysis should give guidance for further population development and its implications on the economy and the society.

Also, there is an insight given on the impact of the migration on demographic transition and European population, since immigrants tend to have a massive impact on population in Europe in the past decades. While some countries benefit from constant influx of immigrants, others face severe consequences in form of ageing population, fertility decline, weaker economy and labor shortage.

Keywords: *electronic banking, profitability, electronic financial services*
JEL classification: *J11, J13, J15, C23*

1. Introduction:

Demographic transition is defined as a transition from one model of reproduction to another model of reproduction, where reproduction model is represented by the relationship between the birth rates and the death rates of a population. The model goes through different stages, it begins with high birth and death rates, low natural increase and low population, and slowly, in a period of two hundred years it changes to model with low birth and death rates, low or stagnant natural increase and eventually fall in population. This model is based on data from Western European countries.

The purpose of this paper is to give a fresh insight of the present situation regarding the demographic transition in the European countries. The analysis provides information about the stages of demographic transition for each of the 28 countries, and also sexamine whether the transition model is still compatible with the current situation. It is assumed that most of the countries are in the stages of late transition or post-transition where the population is stagnant or decreasing. Decreasing population with low birth rates means also ageing population, with severe implications on the economy (deficit of workers in different sectors, lower economic growth and burden on the health and pension systems). The paper should confirm the demographic model or describe the variations from the theory and give guidance for further population development, which directly influences the economic growth.

Demographic transition

Demographic transition model was initiated by Thomson (1929). It refers to populations of the developed countries of Western Europe, for period of nearly two hundred years. Regarding the population growth, he grouped all countries of the world in to three groups: Group A-countries with declining birth rate, low death rates, low rates of natural increase and decreasing population; Group B-birth rates are high, death rates are declining more rapidly, so natural increase is rising and Group C-high birth and death rates and population growth. The basis of the demographic transition theory is that the countries will develop from Group C to Group B and finally to Group A, or starting with high birth and death rates and low population (pre-transitional stage), primary there will be decline in death rates, following with the decline in birth rates and growth in population (demographic transition) so finally there are low birth and death rates and population stagnation or decrease (post-transitional stage), due to the process of immense industrialization and urbanization.

Figure
Stages of Demographic transition

Note: The author Max Roser licensed this visualization under a CC BY-SA license.

Source: Roser and Ortiz-Ospina (2018)

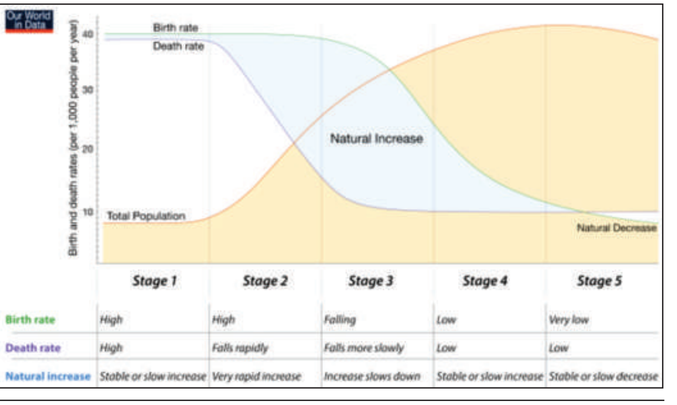


Figure 1 represents the model of demographic transition and its five stages. The first stage has high birth and death rates, with very low natural increase and low population. High mortality rate is due to the low sanitation and health conditions, lack of food and clean water. This is described as pre-industrial society.

In the second stage the death rate starts to decline, due to the improved health conditions and access to food. The birth rate, on the other hand, remains high, because families are not aware yet of the lower mortality, and they remain to produce more children, so normally, natural increase is high. Population is beginning to have a dramatic rise, due to the imbalance between the birth and the death rates.

The third stage is characterized by the process of industrialization and urbanization, where people start to move to bigger cities where industries need workers. The production moves from manual to machine production, thus more products become available, like food and clothes. People earn wages, improve their living standards, and the mortality rate continues to decrease. Population increases rapidly. In this stage, the birth rate starts do decrease, since people become aware of the decrease in mortality. Also, women start to get more educated and families tend to invest in their children education. Natural increase is high.

In the fourth stage death rates are very low and stagnant, while the birth rates continue to decrease. The natural increase is declining, while the population rises reaching its peak. In this stage the governments in some countries start to realize the potential threat of the declining population to their economies. Also, there is a possibility of a great pressure and burden on the pension and health system, due to the rising population born in stage two, that is ageing, and decreasing young population and work force.

The last, fifth stage, represents lower birth rates than death rates, which points out to natural decrease and further decline in population. In this stage the population ageing and the pressure on the health and pension systems is even more pronounced, sometimes even threatening their financial sustainability.

The model described is the idealized picture of demographic transition. Not every country can find itself in one of the transition stages. The idea of this analysis is to reveal the current demographic situation in each of the 28 European Union countries, and detect to which extent the model applies to each country. Also, economic and other effects of the demographic transition are to be discussed.

Literature review

Demographic transition and its implications has been subject in many research. For example, the role of the demographic transition in the process of urbanization was analyzed by Dyson (2011). He describes the urbanization as the inevitable outcome of the demographic transition. Reher (2011) speaks about economic and social implication of the demographic transition. He refers especially to migrations and says that if present trends continue, within a fairly short time most of the countries exporting labor will begin to suffer labor shortages of their own, as cohorts of decreasing size reach working age. It is a sad irony of history that while for these countries the demographic transition (fertility decline) began 60–80 or even more years after it did in many of the historic transitions, the period of labor shortage will begin only 20–30 years later. The gap between the earlier and the more recent transitions is indeed being narrowed, but only at the expense of a reduction in the time available to the newcomers for economic growth and social consolidation. The author managed to predict the current situation in Europe, as presented further in this analysis.

Population ageing was considered as an inevitable consequence of the demographic transition from relatively high fertility to the low fertility which all European countries have now experienced (Mirkin and Weiberger, 2001; Frątczak 2002; Reher 2004).

Długosz and Zbigniew (2006) summarized that population ageing leads to socio-economic consequences such as the rising cost of public pensions and increased demand for health and social care (Golini 2001; Bongaarts 2004). Higher dependency ratio affects the budget position of the government and the level of public savings. It increases consumption relative to output, and lowers the national saving rate, thereby slowing down capital formation. Furthermore, the decline in the share of population in the working age implies a fall in labor supply (Kence and Sayan 2001).

Empirical analysis

The analysis includes data for birth rates, death rates and total population, for 28 European countries, for the period 1960-2016. Data source is the World Development Indicators from the World Bank. Crude birth rate indicates the number of live births occurring during the year, per 1,000 population estimated at midyear. Crude death rate indicates the number of deaths occurring during the year, per 1,000 population estimated at midyear (subtracting the crude death rate from the crude birth rate provides the rate of natural increase, which is equal to the rate of population change in the absence of migration). Total population is based on the de facto definition of population, which counts all residents regardless of their legal status or citizenship. The values shown are midyear estimates. Population, birth rate and death rate per country are presented in figures 2-6. Population in millions is presented on the left vertical axis and birth and death rates are presented on the right vertical axis.

The movements of the variables reveals certain similarities between countries. Depending on whether the birth rate, the death rate and population are increasing or decreasing, and if the natural decrease is positive or negative, five groups of countries were formed. The groups start with Group 1 that has countries with the most unfavorable demographic situation to Group 5 where countries have most promising demographic trends. The groups are presented in table 1.

To confirm these findings with statistical analysis, a panel regression model was used for each group, described in the following equation:

where is the dependent variable (population), is the intercept term, is a vector of parameters to be estimated on the explanatory variables, and is a vector of observations on the explanatory variables (birth rate and death rate), and it stands for cross-sectional unit (number of countries), while and it stands for time period (Brooks, 2014).

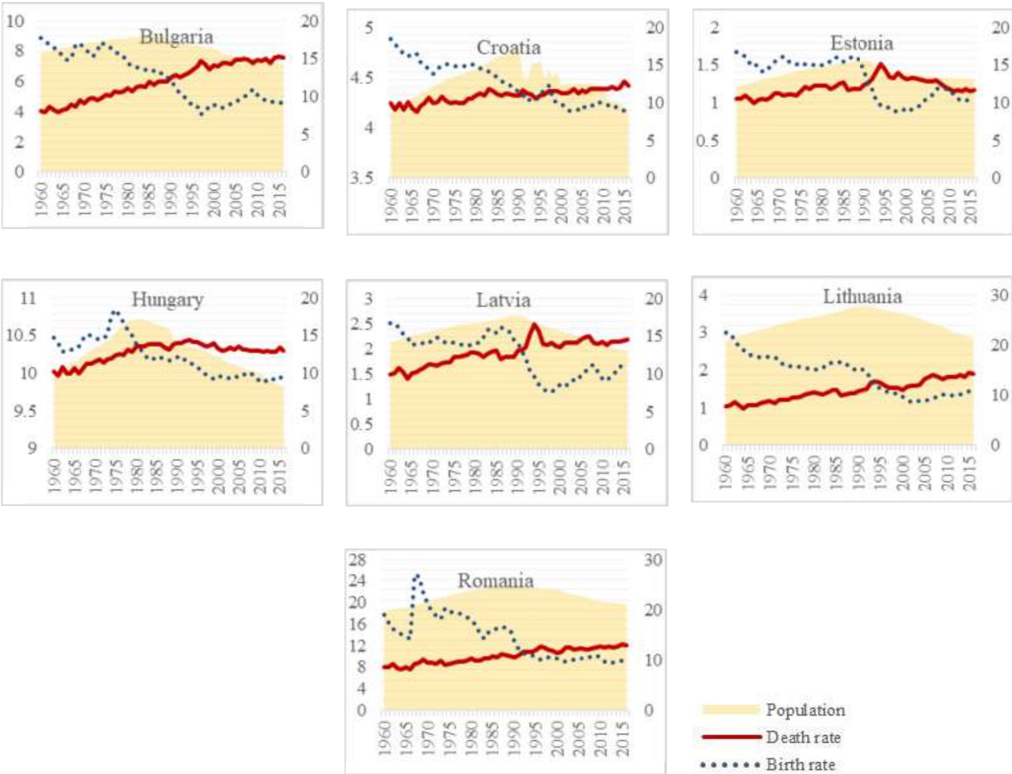
Table 1 Classification of countries

Variable	Group 1 Bulgaria, Croatia, Estonia, Hungary Latvia, Lithuania, Romania	Group 2 Greece, Finland, Italy, Poland, Slovak Rep. Slovenia, Spain	Group 3 Austria, Czech Rep. Germany, Portugal, UK	Group 4 Belgium, Denmark Malta Netherlands Sweden	Group 5 Cyprus, France Ireland Luxembourg
Death rate (current status)	Increasing	Increasing/Stagnant	Decreasing	Decreasing/Stagnant	Decreasing/Stagnant
Birth rate (current status)	Decreasing	Decreasing/Stagnant	Decreasing	Fluctuates	Decreasing
Natural increase (current status)	Negative	Stagnant	Negative	Positive	Positive and constant
Population (current status)	Decreasing	Fluctuates	Increasing	Increasing	Increasing
Stage of DT (current status)	Stage 5	Stage 5	Stage 5	Stage 4	Stage 3 to Stage 4

Source: classification by authors.

Group 1 is consisted of Bulgaria, Croatia, Estonia, Hungary, Latvia, Lithuania and Romania. Starting from 1960 to the eighties and nineties, there are relatively good demographic trends, the birth rate is decreasing, as is population, while the death rate is increasing. Even with the decreasing birth rate the natural increase is high.

Figure 2 Group 1



Source: World Development Indicators, World Bank; authors' presentation

At beginning these movements correspond to stage four of the demographic transition. After this periods there are dramatic changes in these trends. The death rate continues to increase, birth rate accelerates its decline, and there is serious natural decrease and fall in population. These countries are in the Stage 5 of the demographic transition, with declining population and severe demographic ageing. Panel regression with fixed effects was performed (*p - value* for Hausman test equals 0,0002). The results from panel regression are following (*p - values* in brackets):

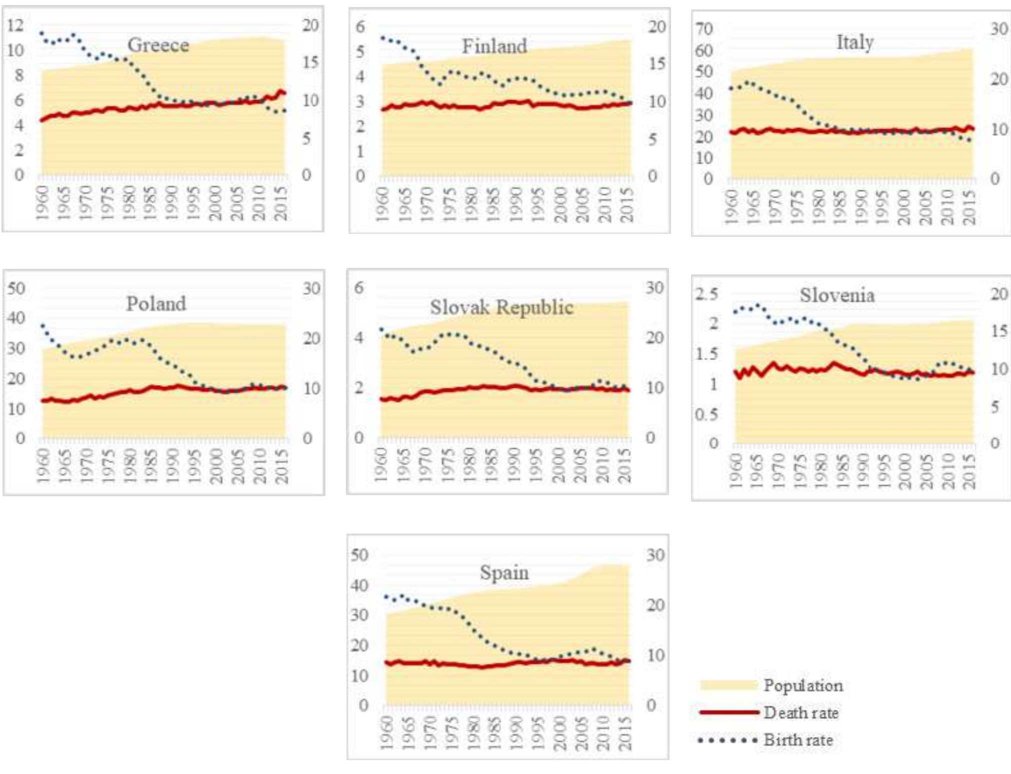
$$\Delta(log(population))_{7,57} = \underset{(0,0915)}{0,008879} + \underset{(0,0000)}{0,001293} birth\ rate_{7,57} - \underset{(0,0000)}{0,002174} death\ rate_{7,57}$$

The results confirm that the birth rate and the death rate have statistically significant influence on the population. The positive sign of the estimated parameter for the birth rate indicates positive relationship between the birth rate and the population, or as can be seen from figure 2, they are both declining. There is an inverse relationship between the death rate and the population, because the death rate is increasing and the population is decreasing.

Group 2 includes Greece, Finland, Italy, Poland, Slovak Republic, Slovenia and Spain. In the first two to three decades, the birth rate decreases slowly, the death rate has small rise so the trend is almost stagnant, producing substantial natural increase and rise in population, all of these are traits to stage four of the demographic transition.

After this period trends change having slight increase or stagnant death rate, decreasing or stagnant birth rate, zero natural increase and population that fluctuates (it grows until some period in 2000's or 2010's and then starts to decrease), which signifies the stage five of demographic transition.

Figure 3 Group 2



Source: World Development Indicators, World Bank; authors' presentation

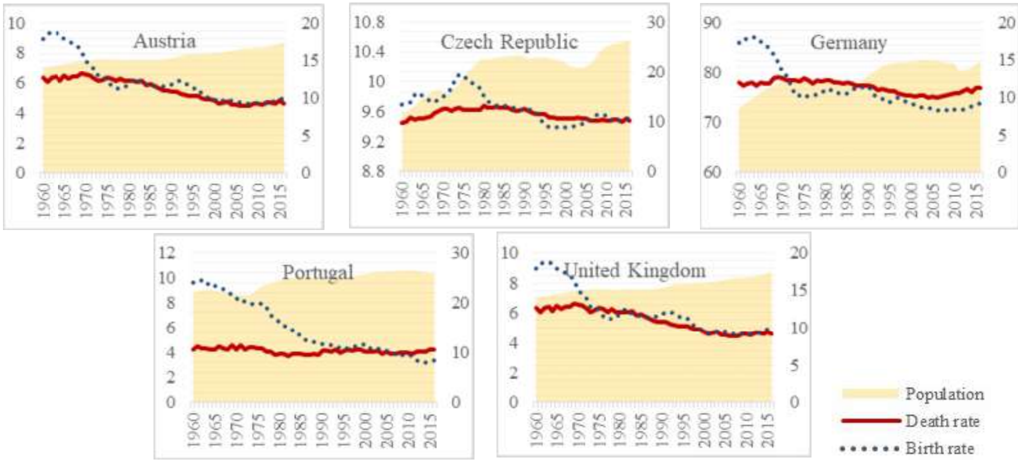
To confirm these findings, another panel regression with random effects was performed (Hausman test *p - value* 0,6631):

$$log(population)_{7,57} = \underset{(0,0000)}{16,19404} - \underset{(0,0000)}{0,016989} birth\ rate_{7,57} + \underset{(0,0000)}{0,0036113} death\ rate_{7,57}$$

The regression results indicate that there is statistically significant relationship between population and birth rate, that is inverse, and also significant relationship between population and death rate, that is positive. While population is increasing, the birth rate decreases, while the death rate also increases at a small pace.

Group 3 accounts for Austria, Czech Republic, Germany, Portugal and United Kingdom. In the first three decades these countries seem to be at the end of the stage four of demographic transition, with decrasing birth rate, stagnat or decreasing death rate, low natural increase and rise in population. After these three decades, the changes imply continuing decrease in birth rate, decrase in death rate, natural decrease and yet rise in population. Everything signifies stage five of the demographic transition, exept the growth of the population. The countries and their trends are presented in Figure 3.

Figure 4 Group 3



Source: World Development Indicators, World Bank; authors' presentation

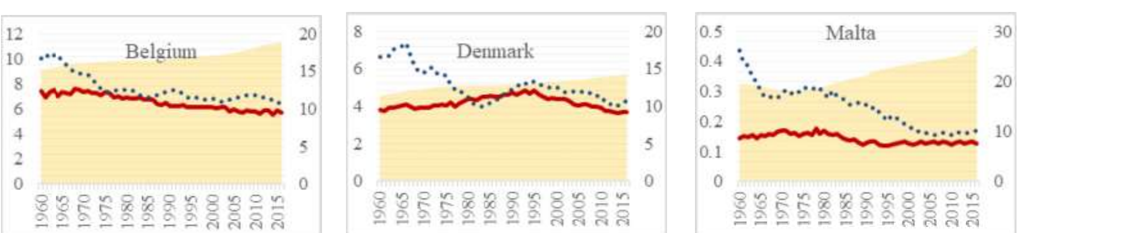
To test whether the relationship between birth rate, death rate and population is significant, a panel regression with random effects is estimated (Hausman test p - *value* 0,8656). The results are presented in the following equation:

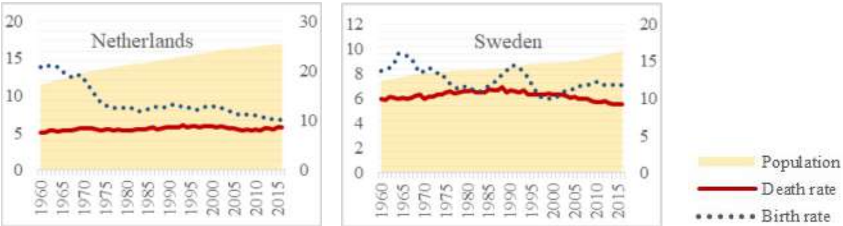
$$\begin{aligned} log(population)_{7,57} \\ &= 17{,}12134 - 0{,}008816 birth\ rate_{7,57} - 0{,}015948 death\ rate_{7,57} \\ &\quad (0{,}0000) \qquad (0{,}0000) \qquad\qquad (0{,}0000) \end{aligned}$$

The relationships prove to be statistically significant. The population and the birth rate have inverse relationship, which can be confirmed from their trends (decrease in the birth rate and increase in the population). The same relationship can be established between the death rate and the population, where the death rate is continuously decreasing, while the population is increasing.

Group 4 includes Belgium, Denmark, Malta, Netherlands and Sweden. These countries have trends that do not change dramatically through the decades. The population continuously grows, the birth rate mostly declines, but also fluctuates, while the death rate is stagnant or slightly decreases. Even with the fluctuations of the birth rate, these countries continue to maintain natural increase for the observed period. The countries and their demographic trends are presented in Figure 5.

Figure 5 Group 4





Source: World Development Indicators, World Bank; authors' presentation

To confirm these findings panel regression with fixed effects was estimated (Hausman test *p - value* 0,0000). The results are presented in the following equation:

$$\Delta(log(population))_{7,57} = 0{,}02713 + 0{,}000335 birth\ rate_{7,57} - 0{,}002713 death\ rate_{7,57}$$
$$(0{,}0000) \qquad (0{,}0011) \qquad (0{,}0000)$$

There is a positive and statistically significant relationship between population and birth rate. Even though at some periods the birth rate decreases, while population continuously increases, fluctuations and growth of the birth rate seem to determine the positive relationship in the estimated equation. There is negative and statistically significant relationship between population and the death rate, so when the population shows growth, the death rate is declining. With slight exceptions, the natural increase maintains through the decades. The trends of these countries correspond to stage four of the demographic transition. These countries have better demographic situation than previous groups of countries. Yet, there is a possibility of zero or natural decrease in the following decades, signifying entrance in stage five, if some precautionary measures are not applied.

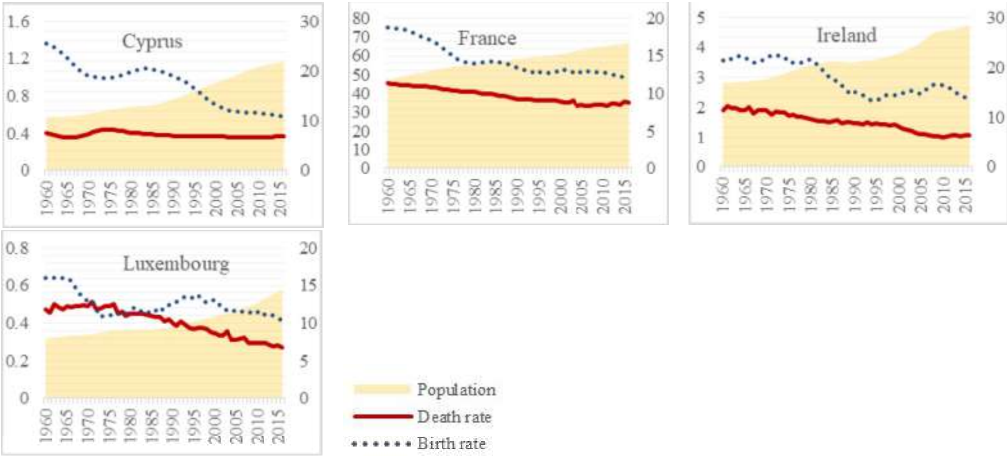
Group 5 is the last group including Cyprus, France, Ireland and Luxembourg. These countries have the best demographic trends comparing to other analyzed countries. Here, the population is constantly increasing, the death rate and the birth rate are decreasing, yet the birth rate is significantly beyond the death rate, providing continuous and substantial natural increase. These trends correspond to the late stage 3 or early stage 4 of the demographic transition.

Panel regression with random effects was estimated (Hausman test to confirm the statistical significance of the presented relationships. The equation is following:

$$log(population)_{7,57} = 15{,}86716 - 0{,}034242 birth\ rate_{7,57} - 0{,}053454 death\ rate_{7,57}$$
$$(0{,}0000) \qquad (0{,}0000) \qquad (0{,}0000)$$

There is an inverse and statistically significant relationship between population and the birth rate. With population constantly increasing, the birth rate is constantly decreasing. The same relationship can be described between population and the death rate.

Figure 6 Group 5



Source: World Development Indicators, World Bank; authors' presentation

Discussion of the results

The aim of this research was to identify the stages of demographic transition for the countries from the European Union. According to the main demographic trends of demographic transition, the birth rate, the death rate and the population, the countries were classified in five groups because of their demographic similarity. The order of classification is not accidental. The first group includes countries with most concerning demographic situation, while the fifth group has the most favorable demographic situation compared to other groups. Chronologically, the first group is in the latest stage of demographic transition, while the fifth group is almost two stages behind group one.

As was presented, Group 1 has serious demographic problems concerning its population. With substantive natural decrease that continues to grow from year to year, and with declining population, these countries are facing severe demographic ageing, with serious social and economic consequences that come with it. Bulgaria is ranked fourth in the world for its rate of population ageing (Pitheckoff, 2017). There is a National Demographic Strategy of the Republic of Bulgaria 2006-2020 (European Commission, 2018) which addresses the issue of demographic ageing by a set of measures in order to improve the current situation by rising the birth rate, prevent emigration, to elaborate an immigration policy etc. Murgić et al. (2009) state that Croatia is considered a very old country regarding its population, with one of the highest percentage concerning aging in Europe. This raises challenges for national health and economy system, as for reforms of the pension system. Any delay in these crucial reforms slows the economic development. The situation is only worsened by emigration. Pavlić (2018) states that according to CIA data, Croatia is among seven European countries with negative net migration rates. Its statistics are worse than those of Bosnia and Herzegovina and Macedonia, whicha have negative migration rate, as well as Serbia with zero migration rate.

Pavlić (2018) wrote that Croatia will not be able to compensate for the shortage of workers by importing them from abroad since it cannot compete with developed countries and their higher wages and better labor markets. As long as the legal system and the situation in society are not changed, it will be difficult to keep young Croats in the country and attract foreigners. Low salaries and attitude towards workers must change. According to social scientist Drago Čengić, people today have more information than before when they make a decision on possible economic migration. This situation implies for all countries in Group 1 and it is the main problem that needs to be addressed by their governments.

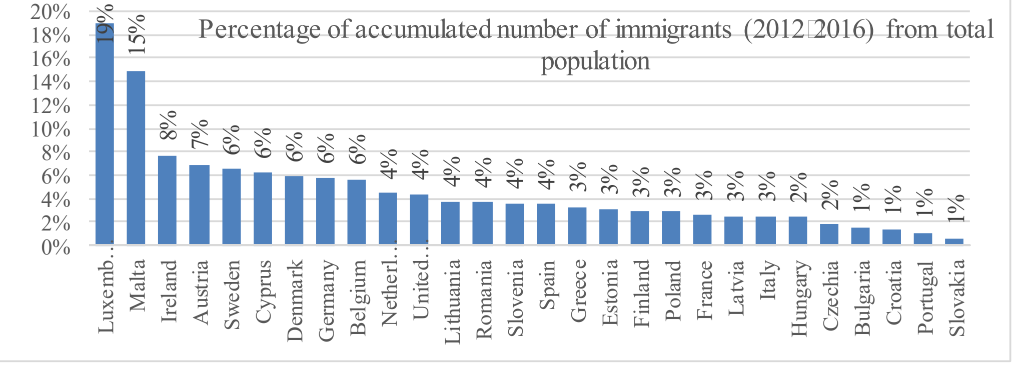
Estonian Public Broadcasting (2015) refers to Estonia, Latvia and Lithuania as the most vulnerable countries in the world to an unprecedented pace of ageing population that is forecast to slow economic growth over the next 20 years. The three Baltic states will face greater challenges in providing for their older populations because their ageing statistics are rising rapidly and their per capita GDPs are much lower than the EU average, which will not only constrain growth in the long term but adds to fiscal pressures. Baltic States governments have attempted to implement a range of pension reforms to offset the fiscal pressures of this ageing trend, but according to the European Commission, much more needs to be done in order to put social security funds on a sustainable footing. Data from Eurostat indicates that the percentage of the total population that is elderly in the three states is set to increase to between 25 percent and 29 percent in 2060, from around 18 percent in 2013. This is expected to place a fiscal burden on the Baltic region. These three countries share a number of credit strengths, including very high institutional strength, resilient government balance sheets and a robust recovery from the global financial crisis. These strengths are balanced by volatile economic growth, heightened geopolitical concerns and their demographic challenges.

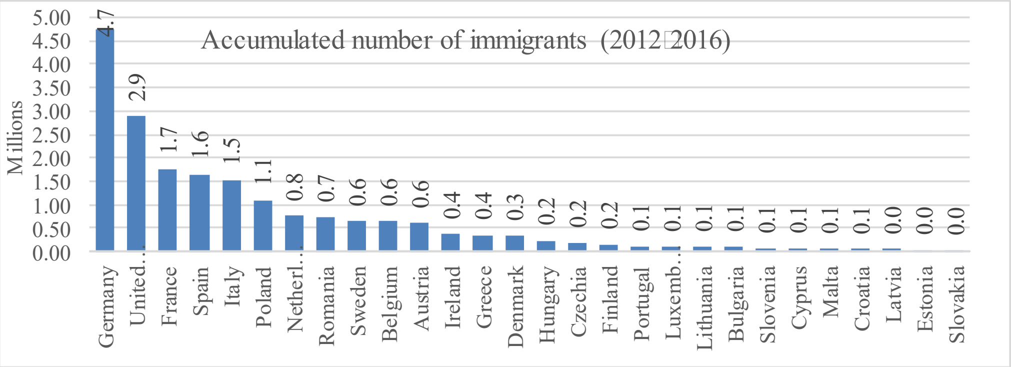
Konrad Adenauer Foundation (2013) states that in 2011 the Estonian population decline of 5,5 percent was significantly lower than the 13 percent decline in Latvia or the 8,5 percent in Lithuania; amongst other explanations, this might be due to the specific nature of Estonian emigration: It is rather based on the pendulum phenomenon – mainly to Finland – whereas Latvians and Lithuanians leave for more distant locations in a more permanent manner. According to demography experts the decline in population is related to emigration.

Population ageing in Hungary is analyzed by Hablicsek (2004), where the common issues about pension system reforms are discussed and also Roma and other immigrant subpopulations are mentioned as they modify the tempo of ageing in Hungary. Asandului (2012) confirms the demographic ageing process in Romania with its economic and social consequences, with effects on the fiscal budget, the labor market as on the economic growth.

These countries show serious demographic ageing. Birth rate is declining and it is unlikely that some government measures could increase this rate. On the other hand there is migration which could substitute the loss of fertility, yet as presented in Figure 7, these countries have very low percentage of immigrants (in the past four years from 2012-2015 Lithuania has 3,78% immigrants as percentage of total population, Romania 3,69%, Estonia 3,11%, Latvia 2,54%, Hungary 2,44%, Bulgaria 1,48% and Croatia 1,33% - for comparison Slovakia has the lowest percentage-0,56% while Luxembourg has the highest 19%).

Figure 7 Immigration in countries from European Union





Source: Eurostat; authors' presentation

Countries in Group 2 differ from countries in other groups because of their death rate. While in Group 3, 4 and 5 death rate is decreasing or it is stagnant, in Group 2 death rate is increasing or it is stagnant for some period. In Group 1 the death rate is also increasing, but the difference from this group is the population. In Group 1 it is decreasing, while in Group 2 it fluctuates. It is only a matter of years when these countries will have the similar situation as countries in Group 1. For this analysis, the authors decided to classify them in a separate group.

Population in Greece was increasing until 2012 where trend of declining population has begun. Study which analyzes the demographic future of Europe, notes that in the period 2011-2016 Greece lost almost 3% of its population, due to the birth of fewer children and emigration attributed to the economic crisis. The country now has one of the most ageing populations in Europe (Kokkinidis (2017). The reason for population decline is the birth rate. The financial crisis had serious impact on the Greek economy, which is still recovering, with general government gross debt of 176% of gross domestic product in 2017 (Eurostat, 2018). After a decade of belt tightening, the country is facing a new crisis, low birth rates (Flood, 2017). Even with the influx of 356.472 immigrants from 2012-2016, or 3,31% of Greek population (Figure 7), the country is not able to increase its population. In this study the authors decided to classify Greece in Group 2. If the trend of declining population continues, in few years classification in Group 1 would be appropriate.

Finland has the slowest population growth in the Nordic countries, according to its Ministry of Social Affairs and Health. Also, Finland has the lowest net migration rate (from 2012 to 2016, 158.377 immigrants or 2,88% of its population has entered the country (Figure 7)). The main reasons for population growth were due largely to immigration. According to web portal Uutiset immigration boosts Finnish population to 5,5 million.

Italian population was showing increase until 2015 where a decline has started. According to the web portal The Local Italy's population growth rate is almost at zero mainly due to a dwindling birth rate. Italy has one of the oldest populations in the world and births among immigrant families also continued to fall, although they still made up close to 15 percent of the overall birth rate. High rate of immigration (from 2012 to 2016, 1.516.758 immigrants or 2,5% of its population has entered the country (Figure 7)) is just about filling the gaps: the foreign-born population increased taking the number of foreigners resident in Italy up to 8,2 % of all residents, and yet emigration in Italy is also increasing. Status of Italy is similar to status of Greece, after number of years, or a decade this country would be classified in Group 1.

Despite the economic success story of the past decade where this country has doubled its gross domestic product and it was the only EU member state to avoid a recession after the financial crisis and its growth of the decade should be better that the euro zone countries, population in Poland is showing a slow decrease from 2002. The country has been exporting labor at a brisk rate since joining the EU in 2004, and faces the threat of decades of falling worker numbers amid urgent calls for it to lower barriers to new migrants entering the country. Immigrants from neighboring countries (Ukraine) provide the most predicable stream of newcomers and yet are not offsetting the drain (The Irish Times, 2015). From 2012 to 2016 Poland has received

1.086.581 immigrants or 2,86% of its population. Unlike other European countries that have expanded their working-age population and offset negative demographics with immigration, the EU's sixth-largest economy has kept its entrances broadly closed, preferring to encourage short-term labor rather than permanent migration. Marcin Piatkowski, chief economist at the World Bank in Warsaw says that Poland's immigration policy is "reactive, not proactive", and that "It is focused on defending Poland from immigrants, rather than attracting them . . . It is not in line with the aspirations and challenges Poland has and will face . . . We need people to come here, pay taxes, pay our pensions, become citizens and contribute to the growth in the country," (The Irish Times, 2015).

Slovak Republic has good demographic situation compared to the other countries of this group. There is a positive natural increase and the population is showing constant increase. Yet, the number of people in post-productive age is increasing, signifying ageing of population. According to the web portal Spectator Slovakia's population would drop 14 percent if immigration were unregulated. Slovakia has the lowest number of immigrants out of all EU. Only 30.608 immigrants or 0,56% of its population were recorded for period 2012-2016 (Figure 7).

Slovenia also has good demographic trends. Its population is constantly increasing, and it has positive natural increase. According to the Statistical Office of Republic of Slovenia, population of Slovenia is projected to increase until around 2025 and then slowly decrease. In the future more residents are expected to immigrate to Slovenia than emigrate from it. Total fertility rate is projected to mostly gradually increase and despite assumed greater fertility, the population of Slovenia is expected to age. Slovenia has received 74.782 immigrants or 3,62% of its population in period 2012-2016 (Figure 7). People who immigrated to Slovenia are mostly citizens from former Yugoslavia.

In the past four years Spain is showing fluctuation in its population. Spain's population rose for the second straight year in 2017, after having fallen between 2012 and 2015 in the midst of an economic downturn, as an increase in foreigners offset a fall in the number of Spaniards. Natural increase was positive until 2015 when the birth rate and the death rate were almost equal. Immigration in Spain was 3,54% from total population from 2012 to 2016 or 1.647.139 immigrants. According to agency Reuters Spain's population grows due to immigration. The figures come as Europe grapples with a rising influx of migrants, mostly from North Africa and war-torn countries such as Syria, after Mediterranean arrivals spiked in 2015.

Countries from Group 3 have interesting demographic situation, they have zero or negative natural increase, and yet the population grows. The reason for this increase can be found in the immigration. A headline in Austrian medium The Local says that growing immigration will "keep Austria young". Statistics Austria reports that the work force would drop considerably in the long term. Austrian birth rate is also rising in 2016. According to Figure 7 Austria has received 605.517 immigrants from 2012 to 2016, or about 6,93% of its population. The situation is similar in Czech Republic. Radio Praha reports that the migrants are the biggest factor for rise in Czech population - from 2012-2016, 188.043 immigrants (1,78% of the its population). In 2016 the birth rate was higher than the death rate and it was also the highest birth rate in six years, so both immigration and births are reasons for population growth.

According to the web portal The Local Germany managed to increase its population by immigration, despite the negative natural increase. Without positive net migration, the German population would have been shrinking for years. From 2012-2016, 4.743.481 immigrants entered Germany, which is 5,76% of its population (Figure 7). In 2016 most of the immigrants were Romanians, followed by Syrians and Poles. According to web portal Financial Times, Germany leads way as EU population rises. Germany and Sweden are posting impressive growth rates following an influx of refugees. Germany remains the continent's most populated state. Growing populations are good news for Europe's western economy, many of which countries are suffering from ageing demographics. Also, for first time in years, in 2016 Germany marked increase in the birth rate.

Portugal, unfortunately, does not have such a promising situation as Germany or Austria. In the last few years the population has started to decrease, and there is a trend of negative natural increase. From 2012-2016, 111.497 immigrants entered the country, which is about 1,08% of the total population, yet is the lowest percentage in EU (after Slovakia) (See Figure 7), which apparently is not sufficient for increasing population. Financial Times states that the combination of Portugal's plummeting birth rate, a deep recession and a wave of emigration is turning the country into a society of one-child families. Probably this would be the same fate for other countries of this group, if there were no sufficient immigration. Portugal government tries to work on measures to increase the birth rate, since low fertility threatens Portugal with "definite impoverishment" leaving the country "unsustainable" in terms of economic growth, social security and the welfare state" (Financial Times, 2015).

According the The Migration Observatory web portal more than half (55%) of the increase in the UK population between 1991 and 2016 was due to the direct contribution of net migration. Migration impacts on both factors–it affects the number of women of childbearing age and, if migrant women have different fertility patterns, the total fertility rate of the population as a whole. The UK population is projected to rise both because of positive natural change and because of positive net migration. From 2012-2017, 2.876.522 immigrants entered UK, or 4,39% of its population. Yet, there is a threat for population growth in the years to come. According to the web portal Quartz UK population growth rate Britain recorded the lowest population growth rate since mid-2004, with the "largest single driver" being the drop in migration. The nation's official data agency also identified Brexit as one of the main reasons for migration falling off a cliff. Since the Brexit vote, Britain has become a far less attractive place for immigrants. A steep decline in EU migration was noted where the annual number of EU citizens coming to the UK for work reasons has fallen by about a third since the referendum. Fall in net migration was the main reason that the rate of growth of population is the slowest for period of 13 years.

Group 4 is consisted of countries with good demographic situation. While the death rate and the birth rate are decreasing, the natural increase remains positive, and the population is constantly increasing. Web portal Focus on Belgium reports the Belgian population grew in 2016, and this increase is primarily due to two demographic factors: first, a positive ratio of births to deaths was recorded in 2016, which represents ¼ of the recorded population growth, and second, immigration was stronger than emigration, which accounted for ¾ of the year's growth. Eurostat reports that when it comes to how fast a country's population is growing, Belgium is one of Europe's frontrunners and it is only beaten by Luxembourg, Sweden and Malta. The increase can mostly be explained by the arrival of new immigrants 643.041 immigrants or 5,67% of total population for period 2012-2016 (Figure 7)). However, the number of births in the country is also well above the number of deaths.

The situation is almost identical in Denmark, as in Belgium, with a higher number of immigrants, 335.984, or 5,87% of population for period 2012-2016, that sustain the population growth. Also, the birth rate contributes to this growth.

Netherlands also has the same trends. According to the Central Bireau for Statistics, the relatively high population growth is due to migration. On 1 January 2017, the population in the Netherlands stood at almost 17.1 million, i.e. 110 thousand more than on 1 January 2016. Migration contributed most to the population growth. Net migration was + 88 thousand. Natural population growth was + 22 thousand. Syrian refugees contribute most to population growth, while people with German, Indonesian or Dutch background fell down in number.

Same situation can be recorded for Sweden. The Local reports Sweden is growing faster than ever and high immigration has sent population figures soaring. Sweden has received 643.115 immigrants or 6,93% of its population for period 2012-2016. The crisis in Syria has the biggest effect on population numbers. Except for immigration, the birth rate also continues to rise and contributes to the population increase.

Malta is a country with increase in its population, mostly due to immigration. This country has the second largest percentage of immigration (as percent of its total population), 14,84%, or 67.594 immigrants from 2012-2016 (first is Luxembourg with 19%) (Figure 7). Despite the immigration, positive natural increase and increasing birth rate are contributing to the population growth. Web portal Times of Malta (2018) reports that increase in Malta population is more than 15 times that of EU, with almost 16.000 more living in Malta in 2017 compared to 2016. This resulted with average economic growth of 6,4%, outstripping the EU average. Yet, there are consequences: the country will lack in necessary space and infrastructure for the increased economic growth, the current number of foreign workers (around 43,000) had surpassed the size of the entire public sector and Malta maybe facing “sociocultural ruin” if the influx of foreign workers is not carefully managed as part of a long-term economic plan.

Countries in Group 4 are most similar, making this group most cohesive in its demographic development.

The last is Group 5 and according to its demographic trends, these countries have the most promising demographic development in the EU. This Group is similar to Group 4, with difference in the natural increase, which is much higher in Group 5. According to Eurostat, Ireland – with a natural change of its population of +6,6 per mille – remained in 2017 the EU member state where births most outnumbered deaths, ahead of Cyprus at +3.8 per mille, Luxembourg at +3.2 per mille, France at +2.5 per mille, Sweden at +2.3 per mille and the United Kingdom at +2.2 per mille. The top four countries are part of this Group.

According to Eurostat, Cyprus recorded 10,7 live births and 7,0 deaths in 2017, which constitute a 3,8 per mille positive natural change in population, second in the EU only to Ireland. Also, immigration play important role in population growth as in period 2012-2016, 72.411 immigrants or 6,48% of the population entered in Cyprus.

France has growing population, and according to the web portal South EU Summit France’s birth rate continues to fall for the third year in a row, but an influx of immigrants are increasing the country’s overall population and strengthening its long-term economy. The principle reason for population increase is immigration, rather than an increase in French births (in period 2012-2016, 1.748.902 immigrants or 2,62% of the population entered France). Though Germany is currently Europe's largest country by population, demographic trends indicate that France will overtake its neighbor before 2060. While Berlin will experience changes due to a loss in population and ageing, its current monetary policies will continue to provide a modicum of prosperity in the future (Worldview.Stratfor, 2015). Apparently, people will be France’s advantage over Germany.

Ireland has growing population and positive natural increase. Population growth in Ireland was more than five times the EU average in 2017 according to the web portal Irish Examiner. Excluding the impact of immigration, Ireland had the highest rate of natural increase (an excess of births over deaths) in its population in the EU last year, at a time when many other countries experienced a decline. Immigration to Ireland was 366.359 immigrants or 7,7% of total population from 2012-2016 (Figure 7).

Luxembourg’s population is growing and the migration is the main cause of the demographic growth, says web portal Luxembourg Public. The birth rate is remaining stable, yet migration remains the main cause of the demographic growth in Luxembourg (from 2012 to 2016 110.599 immigrants or 19% of its population (highest percentage in European Union) have entered the country).

Conclusion

The theory of demographic transition proved to be a valid theory of demographic development in many countries for many years. Having information about the demographic trends in Europe today, one would expect a country to be in stage four or stage five of the demographic transition. Yet, as presented, the trends show deviations from the predicted trends in the demographic transition model and this is because this theory makes and “oversight” and does not include a very important movement-migration. It is migration today that is changing the last stage of demographic transition, and also it is changing the whole demographic picture of Europe. Migrations today are greater than ever before in Europe, in their intensity, longevity and size.

There are diverse demographic trends in EU countries regarding demographic transition today. Some countries are following the predicted stages and do not show significant variations from the model. Countries in Group 1 are a perfect example for trends typical for stage five of the demographic transition, with negative natural increase and decreasing population. Countries from Group 2, Group 3 and Group 4 show match with the models’ stage four only in the first decades. Later, when the natural increase is zero, the population should decline, while it shows growth, mostly because of the immigration, and thus varies from typical stage five. Countries from Group 5 have a constant natural increase, especially in the last decades. If analyzed, this trend corresponds to stage three of demographic transition, stage historically characterized by industrialization and urbanization. These countries are way beyond these processes, so this positive and constant natural increase is mainly due to the immigration, reduced mortality and slow decline in the birth rate.

It can be concluded that when regarding some of the countries in Europe (like countries from Groups 2,3 and 4), migrations are changing the demographic transition, creating a new stage for some countries, stage where the population is rising, while the birth rate and the death rate are slowly declining or are stagnant, creating zero natural increase. Countries from Group 5 have never entered and they even may not enter late stage four or stage five, again because of the constant influx of immigrants and steady birth rate.

So, today, the European Union has two blocks of countries. One are countries with growing population that are attracting large number of immigrants, such as those from Groups 2, 3 and 4 (Western and some Southern European countries) and the other block are countries with decreasing population due to high emigration, low birth rates and increasing death rates, such as countries from Group 1 (East European countries).While immigrations and birth rates are key to population growth, emigrations and high death rates are reasons for demographic ageing and population decline. Thus as presented countries like Luxembourg, Cyprus, Malta, Spain, Austria, Sweden, Ireland, Belgium, Germany and Italy owe their population increase to migration. Declining population due to migration can be found in Lithuania, Latvia, Romania, Estonia, Croatia, Bulgaria, Poland, Slovakia, Slovenia and Portugal. Yet, is not always migrations that increase the population, there is also natural increase like in Ireland, Cyprus, Luxembourg, France, Malta, Netherlands, UK, Finland, Sweden and Belgium.

Did Europe really needed immigrants? Yes. The population equation is pretty simple, births increase it, and deaths decreased it, and if people decide not to have as much as children as needed for a country to reproduce its work force, immigration is the solution. And it is the solution to a greater economic, demographic and social problem - demographic ageing. Ageing population can be devastating in long term. The work force is reduced, and so is the total output, while on the other hand greater demands are laid on the health and pension system. Later, a decline in the living standard is only a matter of time. So what are the benefits from increased population by immigrants? First, it is the increase in labor force and productive capacity, labor shortages in different parts of the public and private sector seize to exist or are significantly reduced, tax revenues will increase, with increased population density economies of scale and efficiency will occur, effect of the ageing population will start to lessen, the economy will be stronger with increase of the real gross domestic product.

It is clear that immigrants are having immense impact on European population. Despite the negative natural increase in the European Union, the population increased due to net migration according to Eurostat. Yet, not all countries follow this trend. The highest population growth in 2018 is in Malta, Luxembourg, Sweden, Ireland and Cyprus, while the highest population fall in 2018 is in Lithuania, Croatia, Latvia, Bulgaria and Romania. The divide is largely caused by migration. Countries that have been receiving immigrants in the past decades are now having steady population growth. Poland, Slovakia and Slovenia had restrictive immigration policies that have reduced the growth of their population. Yet countries in Eastern Europe that are not attractive to immigrants are suffering from demographic ageing.

While Western Europe has provided itself with enough people (with births or/and immigration) to keep its economy strong, the problem in Eastern Europe remains and continues to put further pressure on the economy, the health and pension system, on the private and public production and consumption and on the country's' functioning in general. The top ten countries with the fastest shrinking populations are all in Eastern Europe (with a few in Central and Northern Europe), according to UN projections. Emigration is one of the main reasons behind the decline. Eastern Europeans migrated to Western Europe, enticed by the prospect of higher earnings and better welfare systems. With the population declining via emigration, the countries remain with ageing population and decline in the birth rates. The measures that some of the governments took to reverse these negative trends had poor results (Romei, 2016), so the problem remains, with all its gravity, while there yet has been no efficient strategy to defuse the shocks of the emigration, reduced fertility and ageing population.

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UDC 336.76:338.439]:334.732:631.115.8(497.5)"2013/2017"

THE VALUE OF FOOD SECTOR ON CROATIAN CAPITAL MARKET IF THE AGROKOR CRISIS DID NOT HAPPEN: SYNTHETIC CONTROL METHOD APPROACH

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Abstract

This paper explores the effects of the economic-political crisis of the biggest company-concern in Croatia, Agrokor, on the value of the food sector stock index on Zagreb Stock Exchange. Synthetic Control Methodology was applied on sector monthly data for the period February 2013 – December 2017. The results indicate that the controversies around Agrokor potentially had negative effects on the value of food industry stocks on the Croatian market. This can be interpreted that investors did not anticipate some events regarding the Agrokor concern and holding of certain stocks has fore surely affected the value of some portfolios.

Keywords: *Agrokor crisis, stock market, synthetic control methodology, stock index*

JEL Classification: *C53, G14, D53*

1. INTRODUCTION

One of the biggest economic and political events in the past several years in Croatia is the still ongoing problem with the concern Agrokor. Agrokor is the biggest concern in the Croatia, employing now 52.500 people (Agrokor 2018) in Croatia and Balkan region as well. Although, there were some controversies several years ago when Agrokor was overtaking Slovenia's Mercator (due to Agrokor's high indebtedness), major problems have come to surface since beginning of 2017. Credit agency Moodys lowered Agrokor's rating from B2 to B3 in early January 2017. This got public's attention and started an avalanche of other events as well. Since many of these events had negative connotations in the public eye, this was spilled over to the investment sentiment and attention as well. Stocks from companies which were under the Agrokor roof were traded on Croatian stock market, Zagreb Stock Exchange (ZSE). Several of those stocks constituted the food sector index, one of five official sector indices on ZSE. However, due to many controversies regarding this concern, the value of its stocks started to drop significantly in March and April 2017. At the end of the April 2017, all of those stocks were withdrawn from trading on ZSE. They are still suspended from trading even today. The value of the food index dropped in the mentioned period as well, due to everyone selling the Agrokor's stocks because of the economic uncertainty.

Thus, the purpose of this paper is to evaluate what would be the value of the food sector index on the Croatian stock market if these events did not happen at all. In that way, one can measure the effects of particular economic and/or political event on the stock prices on a market. Moreover, if we find significant effects of such events on a stock price, some questions arise. They regard the Efficient Market Hypothesis (Fama, 1970). If it holds on a stock market, all relevant information is already embedded in stock prices. This means that if the investors did anticipated some event in a correct way, the event should not have a meaningful impact on stock prices themselves. This research is going to test this on exact chain of events regarding the mentioned concern, by observing the effects on the food sector index on ZSE, as already mentioned. Only the food sector is observed due to the nature of this concern. It mostly consists of retail, meat producer, agricultural industrial companies, etc. Two main hypothesis of the study are as follows. Investors on ZSE did not expected/anticipated such events regarding Agrokor, because the value of the food sector index would not have dropped so much so suddenly. The second one refers to: Economic and political events regarding the concern Agrokor have negatively affected the food sector index on ZSE. The contribution of this study is in the novel approach of evaluating the aforementioned effects on the stock market. Moreover, up until writing this research, we did not find any paper which tries to evaluate those effects in Croatia. Thus, the results in this study can be viewed as a starting point for future more detailed research within this field.

In order to empirically evaluate the aforementioned effects (chronological events will be described in the empirical part of the paper), Synthetic Control Methodology (SCM henceforward) will be used. This methodology was developed in order to answer questions to "what if" scenarios. Main assumption is that one of the observed units (country, firm, stock, etc.) at one point in time is submitted to a treatment. SCM estimates the values of the output of that unit if the treatment would not have happened, based upon the values of outcomes of other units in the analysis which were not subjected to the treatment. The SCM methodology can be used to test if the treatment did not happened, what the outcome of a variable of interested would be. In that way, this methodology is suitable to measure the effects of the Agrokor concern crisis on the food sector on ZSE. This is a relatively newer methodology applied in economics and finance. Thus, it is expected to gain more attention in the near future, due to its merits compared to some other methodologies. The rest of this research is structured as follows. Second section deals with empirical papers which have observed similar questions and applied the SCM methodology in their research. Third section describes the SCM methodology used in this study. The fourth section gives empirical results and interpretations, whilst last section (fifth) concludes the paper.

2. Literature review

Since the SCM methodology is relatively new in the field of economics, the majority of the literature evaluates macroeconomic, political events or events such as terrorism, natural disasters, etc. Almost no research can be found in the field of finance, since this is one of the first studies to employ SCM in this field in a way provided in this paper. Majority of the existing studies which evaluate some event and its effects on stock prices or returns utilize the event study methodology (ESM). Since in this paper we observe only one sector and its reactions to the Agrokor event, the ESM methodology could not have been employed. ESM is usually applied on a sample of stocks which all are affected by an event. However, since existing research in finance does explore some events somewhat in a similar manner as in this paper, we give a brief overview of them as well. Thus, there are two main groups of existing research related to this one. The first group applies the SCM methodology and the second one is more focused in the field of finance (with ESM methodology).

The SCM methodology, although a newer methodology in field of economics and finance, has been already applied in many different scenarios. One group of papers estimated the effects of entering the European Union on some macroeconomic variables, such as GDP per capita, productivity, inequality, wages, etc.. Here we include: Campos et al. (2016), in which entrance to EU of 17 countries was evaluated and its effects on productivity; Bouvet (2015) observed the effect on the income inequality in several old EU members if they did not enter the Eurozone; Žudel and Melioris (2016) effects of adopting the Euro in Slovakia, in which positive effects were found on GDP per capita; Wassmann (2016) observed effects on GDP per capita for several selected EU countries when the enlargement of other countries was in place; leaving the EU was examined in Born et al. (2017), regarding the Brexit vote in 2016; possibilities due to the negotiation with EU (regarding Turkey, see Aytug et al., 2016). Other group includes estimating the effects of terrorism, war and similar political risks and bad events. Some of the research here is Abadie and Gardeazabal (2003) who observed terrorism effects in 1960s in Basque Country compared to the rest of the Spain; effect on GDP of civil wars in Algeria, Peru, Nepal and Uganda in Bove et al. (2014); armed conflict in 20 countries in Costalli et al. (2017); terrorist attacks in 2004 in Madrid and their effects on elections in Spain was observed in Montalvo (2011); ETA attacks during the 1990s in Basque and the effects on elections was estimated in Balcells and Torrats-Espinosa (2018); political risks in Chinese provinces and effects on GDP in Yu and Wang (2013); Pinotti (2012) focused on organized crime in Southern Italy. Natural disasters and events have been explored as well: Italian regions and effects on GDP due to earthquakes (Barone and Moretti, 2014); the 1995 earthquake in Japan (DuPont and Noy, 2012); positive events such as resource discoveries in 1950s on GDP per capita and distinction between developed and developing countries (in Smith, 2015). Many other applications can be found in Firpo and Possebom (2017).

Other group of papers employs what is called the event study methodology, in order to estimate the effects of any type of events on the stock return series. However, this methodology and test values are based upon a group of stocks which have undergone a treatment. Details on this methodology can be seen in MacKinlay (1997). Thus, usual questions which are tested within this methodology refer to stock prices/returns reactions to mergers and acquisitions, dividend announcements, announcements of stock market index composition changes or political and economic events which are thought to be relevant for the stock market. Some of the studies here include Miletić (2011), where dividend announcements on the Croatian stock market were observed (2007-2009) and found to be significant for investors; political events such as national elections in 27 OECD countries were the focus in Bialkowski et al. (2008); positive and negative political news in Nepal has been estimated in Dangol (2008). Elections in Greece as political events have been evaluated in Koulakiotis et al. (2016). The aforementioned Brexit was observed within this methodology as well: Burdekin et al. (2017) estimated stock market reactions to the Brexit event on EU markets (e.g. Croatia was included in the study as well, and the effects were negative on the voting day and day afterwards). Other applications can be found in Duso et al. (2010).

As it can be seen from these two groups of papers, a gap exists between them. One group focuses on one country/county/other unit of interest (or several of them) with the SCM methodology, whilst the other utilizes a somewhat similar methodology in order to test for effects of an event. Research questions and events truly can be almost anything in both approaches, due to the nature of the event whose effects wanted to be estimated and evaluated. Moreover, as it can be seen from this short overview, none of the existing research is closely linked to this one. Thus, this imposes more difficulties in the empirical part of this research in order to correctly choose adequate variables and units of observation. Finally, we did not go into detailed results of the previous research, again due to not finding those closely related to this study. As it can be seen, more work has to be done in future in order to fill the gaps in the literature.

3. Methodology

Evaluating treatment effects on one observed unit within a sample of similar units has firstly been developed in the field of economics in Abadie and Gardezabal (2003) and Abadie et al. (2010, 2015). The Synthetic Control Method assumes that one unit has been subjected to the intervention (treatment) at date T_0. The goal is to evaluate treatment effects on that unit compared to the non-treated ones. Assume the researcher has data on J units (sector indices) and the first unit was subjected to the intervention only. Denote with $y_{i,t}^N$ outcome of the variable of interest for unit i in time t, where $i \in \{1, 2, \ldots, J\}$ and $t \in \{1, 2, \ldots, T\}$. If a unit is subjected to a treatment, denote the outcome variable with $y_{i,t}^I$, with the treatment date T_0 being such that $1 \leq T_0 < T$. It is obvious that $y_{i,t}^I \equiv y_{i,t}^N$ holds for $t \in \{1, 2, \ldots, T_0\}$. The effect of the treatment on the fist unit at date T_{0+1} up until T is calculated as $\alpha_{1,t} = y_{1,t}^I - y_{1,t}^N$. Thus, in order to estimate $\alpha_{1,t}$, one has to estimate $y_{1,t}^N$ first. In Abadie et al. (2010, 2015) it is assumed that each $y_{1,t}^N$ follows a factor model $y_{i,t}^N = \gamma_t + \theta_t' Z_i + \lambda_t' \mu_i + \varepsilon_{i,t}$, where γ_t is common factor with unknown constant factor loadings, θ_t is vector of unknown parameters, Z_i vector of observed covariates not affected by the intervention, λ_t vector of unobserved common factors, μ_i vector of unknown factor loadings and $\varepsilon_{i,t}$ is vector of white noise processes.

The name synthetic in the SCM comes from constructing a synthetic value of $y_{1,t}^N$ based upon other J-1 units which were not submittet to the intervention. Thus, denote with $\boldsymbol{w}$ vector of weights for those remaining units int he analysis, such that $w_i \geq 0$ and $\sum_{i=2}^{J} w_i = 1$; with $\boldsymbol{K}$ the vector of linear combination coefficients before the intervention such that it holds: $\bar{y}_i^K = \sum_{s=1}^{T_0} k_s y_{i,s}$, i.e. the i-th unit outcome y is the linear combination of pre-intervention outcomes. Next, $\vartheta_1 = (Z_1', \bar{y}_1^{K_1}, \bar{y}_1^{K_2}, \ldots, \bar{y}_1^{K_M})$ is a vector of pre-intervention characteristics of the first unit (subjected to the treatment) and ϑ_0 is a matrix of all pre-intervention characteristics of all other J-1 units in the analysis. The goal is to minimize the following distance:

$$\arg\min_{w} \left\| \boldsymbol{X}_1 - \boldsymbol{X}_0 \boldsymbol{w} \right\|_V \text{ s.t. } w_i \geq 0 \text{ and } \sum_{i=2}^{J} w_i = 1, \qquad (1)$$

i.e. to minimize the distance between X_1 and the synthetic X_0w, where V is the distance matrix. This matrix is chosen based upon: (i) previous knowledge of researcher on the relative importance of each variable in the model or (ii) let the data pick the best values in V^* in order to truly minimize the distance between real values and the constructed/synthetic ones. This other approach is advised in the literature (see Abadie and Gardezabal, 2003). Thus, model (1) is optimized in two steps: in the first step, inner problem is solved in order to obtain values of V^*. In the second step, model (1) is optimized with V^* and $w^*(V^*)$ is found. In that way, the mean squared error in the pre-intervention period is minimized.

Inference of SCM models is being developed only in last several years. First group of papers which employ this methodology followed the advice in Abadie et al. (2010, 2015), regarding the graphical representations of the treated first unit and repeated procedure on other units – placebos. Moreover, if we have enough data in the pre-intervention period, we can optimize model (1) based upon one part of that period and minimize the mean squared error for the second subsample (see Cavallo et al. 2013 for details). Adhikari and Alm (2016) define a fit index which can be used (it is a ratio between mean squared error of the observed model and the benchmark mean squared error with no predictors in the analysis). Goodness of pre-treatment fit can be calculated as well, something similar to the coefficient of determination in regression (ses Ferman et al. 2017). The second group of papers is emerging in the last 2-3 years, in which the placebo tests are getting higher recognition. These are, in essence, permutation tests in which all of the units are evaluated as the treated first one, the whole procedure is repeated on all of the units and then the inference is being constructed based upon bootstrapping – in space placebo. Based upon those permutations, null hypothesis of no intervention effects can be made, with the *p*-value being constructed based upon the probability that the treatment effects of other placebos are greater than the treatment effect of the first unit: $p-v=P\left(\left|\hat{\alpha}_{j,t}^{pl}\right|\geq\hat{\alpha}_{1,t}\right)$, where where $\hat{\alpha}_{j,t}^{pl}$ is the effect of the treatment on remaining $J-1$ units (Abadie et al. 2015).

However, Firpo and Possebom (2017) show that not all of the first unit treatment effects have to be different in each post-treatment date, so the *p*-value can be constructed based upon the ratios of the mean squared errors of the placebos and the fist treated unit as follows: $p-v=P\left(RMSE_{j,t}^{pl}\geq RMSE_{1,t}\right)$. When we construct the *p*-values, the confidence intervals of estimated treated effects can be constructed as well. More details on SCM methodology can be found in Ando and Savje (2013), Firpo and Possebom (2017), Ferman and Pinto (2017a, b), Ferman et al. (2017), Galiani and Quistorff (2017) and their references as well.

4. Empirical results

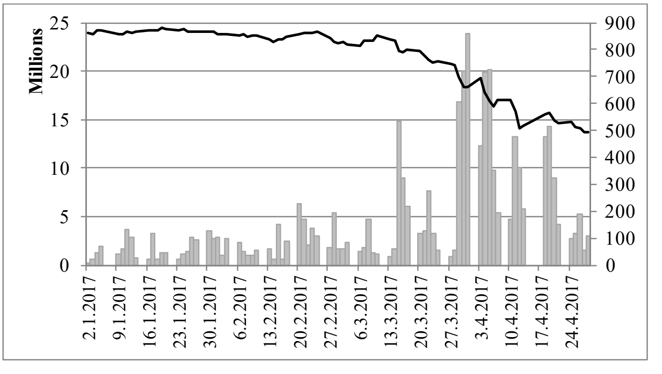
4.1. Data description and some key points about Agrokor problems

The following data was collected for the empirical part of the analysis from ZSE (2018): daily values and turnovers (in HRK) of sector indices: food, construction, industry, tourism and transportation (abbreviations in the rest of the paper as follows: FOOD, KONS, IND, TUR and TRAN) for the period February 1st 2013 – 31st December 2017. The chosen time span was due to sector indices being introduced and calculated on ZSE from February 2013. Moreover, based upon the values of each of the sector, compounded returns were calculated for every day. Next, in order to obtain monthly data, daily returns were averaged for each month separately. Other following measures were calculated as well: standard deviation, coefficient of asymmetry and coefficient of skewness for each return distribution each month. Thus, we choose only the characteristics of monthly return distributions for each sector and the addition of the total market turnover for each sector in each month. The reasoning is twofold. Firstly, the problems of potential hairdressing of financial statements of the firms (especially regarding the Agrokor concern) could have affected the results in a wrong way. Moreover, since we use the sector indices in the analysis, questions arise how to aggregate individual results from financial statements. And secondly, the Modern and Postmodern Portfolio Theory base their analysis on the investor's utility function which depends upon the first m moments of the return distributions. Early work as Arditti (1967) shows that investors prefer positive skewness of returns (due to decreasing absolute risk aversion); and Müller and Machina (1987:351) theorem: "An expected utility maximizer with continuous von Neumann-Morgenstern utility function U(.) will rank probability distributions on the basis of their first m absolute moments if and only if U(.) is a polynomial of at most degree m." Details on the importance of first four moments of the return distribution can be found in Škrinjarić (2013, 2014) or Gardijan and Škrinjarić (2015). Other market based measures such as the CAPM beta are not used, due to many previous empirical research on ZSE which found them to be questionable on a market such as the Croatian one (see Perković, 2011; Tomić, 2013 or Odobašić et al., 2014). All of the calculations were made in environment R.

Before the empirical analysis, let us state some of the facts regarding all of the happening with the concern Agrokor, to have a better understanding of the problems which have been accumulating over the years. The accelerated expansion of the concern Agrokor over the last decade to Bosnia and Herzegovina, Hungary and Serbia was followed by even greater expansion of its debts. Growth rate of Agrokor, as well as operating profit growth rate, was lower compared to the borrowing rate. Moreover, entrance of other small retailer industries, such as Kaufland and Lidl, into the Croatian market was getting increased market shares over the years. This affected the business of Agrokor as well. Public attention was caught in 2014 when Slovenia's Mercator was overtaken by Agrokor, due to Agrokor's great indebtedness. More details on other economic and political events which were accumulating slowly over the years are given in Klepo et al. (2017) for those interested. However, major events which started to get a lot of attention were the following ones. Firstly, at the end of 2016, the Croatian Bank for Reconstruction and Development granted new loans to Agrokor. This was due to Agrokor not being able to pay back the matured debts. At the beginning of January 2017 the credit agency Moodys lowered Agrokor's credit ranking from B2 to B3 as a result. Another lowering of the credit rating was again in February 2017. Thus, beginning of 2017 is observed as a starting point when problems started to get public and were getting more and more attention from the public as well.

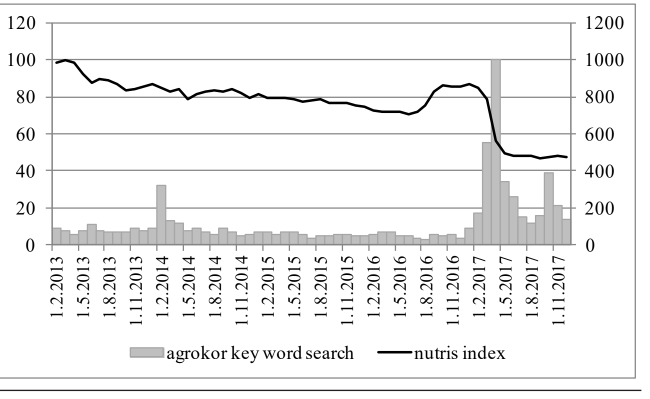
A chain of mostly political event started to unfold. Croatian parliament appointed new extraordinary commissioner of the Agrokor. Next, new legislation regarding specifically Agrokor was considered and brought very rapidly in order to solve some of the piling up problems. In March 2017, several meetings between the Croatian government and Agrokor's management occurred; and due to animosities in the Parliament, the president of the Croatian Parliament B. Petrov gave a resignation, with him submitting a criminal charge against Agrokor's Management at the end of March last year. Afterwards, emails regarding communication between some people from the Government and Agrokor got to the public. From those emails it was obvious that some relevant people knew for years what was going on. Prices of several stocks which are listed on ZSE dropped in March and April 2017 significantly (more than 90% for majority of stocks), with the food sector index experiencing a sharp drop as well, and turnover in that sector experienced a rise in those two months (see figure 1.). At the end of April 2017, all of those stocks were withdrawn from trading on ZSE and were delisted from the food index sector as well. Interest of the public for these issues has risen, as mentioned, from January 2017, which is visible on figure 2. The problems are still ongoing even today. Thus, it is expected that we will find significant results in the empirical analysis. More details from a political economy standpoint on Agrokor and crony capitalism can be found in Ivanković (2017), from a legal standpoint in Rubinić and Bodul (2018) and total situation from economic, political and legal point in Klepo et al. (2017) or Grubišić-Šeba (2018a, b).

Figure 1.
Value of food index on ZSE (black line, right axis) and turnover in mil HRK (left axis), Jan-Apr 2017



Source: ZSE (2018)

Figure 2.
Google search volume of keyword Agrokor (normalized values, left axis) and value of food index (right axis), total observed sample



Source: ZSE (2018), Google trends (2018)

4.2. Results from the estimation

The whole time sample was divided into two subsamples, based upon the treatment date T0, which was determined to be January 2017. For the pre-treatment period, the model (1) was optimized based upon the returns, standard deviations, skewness, kurtosis and turnover. The treated unit is the food sector (FOOD), and the variable of interest was the value of the FOOD index. Based upon other 4 sector indices and their characteristics, the results from the model (1) are shown in table 1, where average values of the predictor variable in the pre-treatment period are compared between the treated (real) value of FOOD sector and the constructed synthetic one. The biggest difference occurs in the values of the coefficient of kurtosis. Moreover, last column of table 1 depicts the optimal values of each predictor in constructing the synthetic FOOD index value. It can be seen that greatest values are given to the turnover, skewness and return series. This means that this is the optimal combination of weights to the predictor variables in order to achieve the optimal value in model (1); where the optimal mean squared error value for this model resulted with value 0.303. The result of the second step of the optimization process is shown in table 2, where optimal weights for each of the non treated sectors are given. The construction sector had the greatest weight in the linear combination of the synthetic FOOD index in the pre-treatment period. On the other hand, tourism sector did not enter the construction of the synthetic value of the FOOD index. Interpretation of the optimal values depends upon the study of interest. Here, we can say that if the investor wants to make forecasts on the FOOD sector, he can make them based upon the structure of the weights in tables 1 and 2.

Table 1. Optimization results of model (1) for the pre-treatment period

Variable	Treated value	Synthetic value	V^*
Return	0.000	0.000	23.3%
Standard deviation	0.007	0.014	3.5%
Skewness	0.079	0.096	26.1%
Kurtosis	0.344	0.905	3.4%
Turnover (mil HRK)	17.882	16.616	43.8%

Source: author's calculation

Table 2. Optimal weights of non treated sectors in the synthetic FOOD index

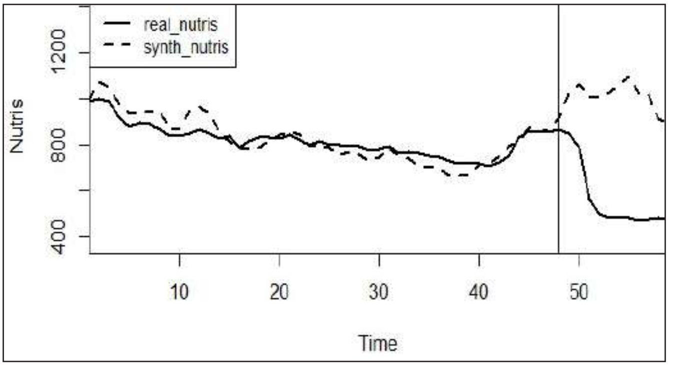
Sector	Tourism	Industry	Construction	Transportation
w^*	0	35.9%	44.5%	19.6%

Source: author's calculation

Next, the values of the real FOOD index were compared to the constructed synthetic one, on figure 3. It can be seen that the model was fairly good, due to close resemblance between the two series in the pre-treatment period. Moreover, the difference is obvious after the treatment date T0, which is marked with a vertical line. The result can be interpreted twofold. Firstly, if the investors did anticipated all or some of the events regarding concern Agrokor, the sharp drop of the value of the FOOD index (real_nutris) would not have happened. Secondly, the value of this sector, based upon the results, would have been much greater compared to the real value. Although, there would be a drop in the value at the end of 2017, the losses would not have been as they really were.

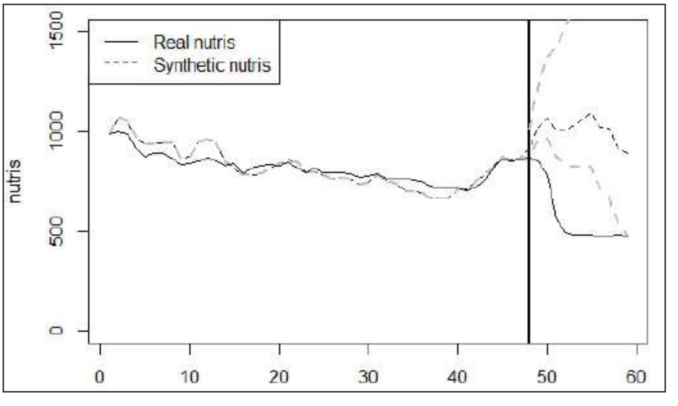
It remains to test the inference whether the difference between the two series is significant or not. For this question, we follow the procedure described in Firbo and Possebom (2017a), in order to calculate confidence intervals based upon the p-values calculated from the ratios of the mean squared predicted errors as described in the methodology section. These confidence intervals are constructed and shown on figure 4. Since we have only 5 sectors in total, the permutation test allows us to calculate 1-(1/5)100% confidence intervals, which gives us 80%. Thus, the gray dashed lines denote the 80% confidence interval set. It is visible that for the whole post-treatment period, the real value of the FOOD index lies beneath the lower bound of the confidence interval; meaning that the difference is significant and the effects of Agrokor concern crisis are statistically significant in the observed period.

Figure 3.
Values of real and synthetic FOOD index, for the whole period



Source: author's calculation

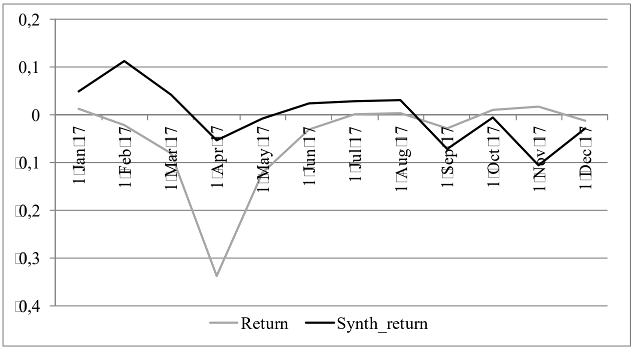
Figure 4. Comparison of real and synthetic FOOD index, confidence interval bands constructed as in Firpo and Possebom (2017a)



Source: author's calculation

Finally, some descriptive statistics has been calculated for the real and synthetic sector values. The return series in the post-treatment period are shown in figure 5. The major effects can be seen in the March, April and May of 2017, when the drop of the FOOD sector was the greatest. Detailed results are shown in table 3, where bolded values denote better results when comparing the two series based upon the statistics in the first column. It can be seen that when comparing all of the values, the actual return series on the FOOD sector were worst compared to the synthetic return series. The average return was actually loss, as well as the median value; due to greater volatility in the post-treatment period, the standard deviation was greater and the skewness was, as expected, more negative. Similar interpretations can be made for other measures as well. In the end, one can conclude that based upon the results given in the analysis, both hypothesis from the beginning of the research were confirmed.

Figure 5. Comparison of real and synthetic returns on FOOD sector, post-treatment period



Source: author's calculation

Table 3. Comparison of characteristics of real and synthetic returns on FOOD sector, treatment period

Descriptive statistics	Return	Synth_return
Mean	–0.04868	0.002059
Median	–0.01659	0.010117
Standard deviation	0.099843	0.059738
Kurtosis	7.214462	0.093824
Skewness	–2.57711	–0.09058
Minimum	–0.33796	–0.10493
Maximum	0.017582	0.113649

Source: author's calculation

5. Conclusion

Different events which occur in an economy can affect the stock market and investors' portfolios as well. If the value of stocks on a market experience significant swings, the validity of the Efficient Market Hypothesis is questioned. This paper tried to explore the effects of the economic and political events regarding the concern Agrokor on the value of food sector on Zagreb Stock Exchange by using SCM methodology approach. Since significant (negative) effects were found in this study, it can be concluded that such methodology can be used in future as well: when other events start to unfold regarding a company, investors could anticipate how this could affect stock prices or returns. In that way, well-timed decisions regarding investment portfolios can be made in order to achieve investment goals regarding portfolio risk or/and return.

Contribution of the study lies upon quantifying the effects of the Agrokor crisis concern on the food sector index on Zagreb Stock Exchange, by using only market data. Since results indicate that effects are significant, this gives hope that SCM methodology can be used in future research as well in order to evaluate potential effects of other positive or negative events on stock prices; not only on the Croatian market, but other markets as well. However, the shortfalls of the study were as follows. We used only the market available data, due to problems of hairdressing the financial statements. Investors usually perform (or should perform) in depth analysis before making investment decisions. Thus, other variables should be taken into consideration when conducting any type of analysis. Future work is going to include finding what other relevant factors could be when carrying out similar analysis regarding financial data.

Other opened questions remain for future work as well. They include evaluating the effects of other meaningful events on the Croatian and other similar stock markets; on the individual stock levels as well; trying to connect the SCM methodology with the event study methodology in order to get more insightful information. There is hope that this work fulfilled a part of the gap in the literature, and that future research will focus more on the remaining questions from this research.

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UDC 338.121:69(569.5)"2002/2015"
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THE EFFECT OF CONSTRUCTION SECTOR ON THE ECONOMIC GROWTH OF JORDAN

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Abstract

The purpose of this study is to investigate the relationship between construction activity and economic growth in Jordan. The study performs an ordinary least square (OLS) regression analysis by using annual data during the period 2002-2015. The analysis indicates a significant relationship between the construction sector and economic growth in Jordan. The study result that the GDP in Jordan is dependent on construction. This required that the government should give the construction sector in Jordan more attention because of the importance of this sector in the economic growth.

1. Introduction

Construction is an important part of the development and modernization process. While it is closely correlated with economic growth, however it is not necessary that construction activity will induce economic growth and employment opportunities given tax exemption and incentives.

The role of construction in economic development has been addressed by various writers and international bodies, many of whom have focused in developing countries [Turin (1973), World Bank (1984). Turin, using cross-country comparisons, both found an association between construction investment and economic growth. That finding was consistent with the classical approach in growth theory in which capital formation is the main engine of economic growth and development.

The World Bank and its affiliates in the Structural Adjustment Program seem to follow the view that investment should accompany economic growth. This study argues that the relationship between the share of construction in GDP and GDP per capita seems to be consistent only with a downturn economy.

In this paper we will try to test the relationship between construction activity and economic growth in Jordan. First, we will describe the construction activity in Jordan including construction contribution to economic growth, tax revenues. Second, we will perform simple regression analysis to verify the economic growth test.

In Jordan economy, construction sector has been the focus of economic researchers for its important role in the national economy. However the literature focuses to a large degree on the estimation of the production function of the construction sector Bani- Hani and Shamia (1989) and Al-Galodi (1996). A study conducted by Bashier Al-Abdulrazaq (2003) to investigate the impact of the Jordanian government on construction activities. The study showed a positive but statistically insignificant impact of government investment in construction on construction sector of Jordan.

It's cleared from above that even the construction sector is important for the economy of Jordan, there is no study, to the best of our knowledge, has been done to investigate the relationship between construction sector and economic growth. Thus, the purpose of this paper is to investigate empirically the effect of construction sector in Jordan economic growth during the period 2002-2015. The paper will be organized as fallows. In section 2 the literature review about the study topic will be summarized. An overview of construction contribution to economic growth in Jordan is presented in section 3. The Relationship between GDP and the Construction Sector is presented in section 4. The study Empirical Results and Discussions are presented in section 5.

2. Literature Review

Construction is an important sector that participates heavily in the economic growth of both developed and developing economies Existing research's that have been dealt with the construction sector important in the economy can be classified into three main types. The first type of these studies has dealt with the impact of construction sector and economic growth. The most mentioned examples of these studies are the work of Drewer (1980) and Bon (1992). The second type of these studies has devoted to investigate the causality relationship between construction and economic growth, such as the work of Hille Brandt (2000) and lean (2001). The third segment of studies has conducted to examine the role construction in the overall national economy. The most noted one of these studies are the work of Bon and Yashiro (1996) and Pietroforte and Gregori (2003).

A study conducted by Isil Erol Unal (2015) to investigate the causal relationship between construction investment and growth in Turkey from 1998 Q1 to 2014 Q2. The authors employed three variables, real GDP growth, construction industry growth and real interest rate to investigate the causal relationships between construction growth and GDP growth .The paper concludes that economic growth in Turkey has proceeded construction activities with two four quarters lags, but no vice versa.

Another study made by Okoye Ngwa, and Ezeokili (2016) to investigate the impact of economic fluctuations on the growth and performance of construction sector in Nigerian economy during the period 2010 to 2015 shows that growth rate of construction sector is more volatile compared to that of GDP as a whole. Mahalia Jackman (2010) conducted a study in order to investigate the relationship between residential construction and economic growth for Barbados. The study shoes that there has been bi-directional causality exists between residential construction and economic growth.

Byoungki Kim (2006) argued that even though the relationship between infrastructure and economic growth is still frequently debated, the developing countries should learn from the experience of infrastructure development in Korea and Japan. According to Byungki Kim “infrastructure development is essential for attainment of the objectives of development policy in developing countries such as sustainable development equitable distribution of income and preservation of environment”.

Construction contribution to Economic growth:

The contribution of the construction sector in economic growth amounted to 5% of GDP during 2014-2016, this compared to 16%, 14% contribution of manufacturing and transportation.

Table (1): Contribution of the Main Economic Sectors to the GDP

Sector	The Sectors Contribution (%)		
	2014	2015	First Three Quarters 2016
Agriculture	3.3	3.3	3.0
Mining And Quarrying	1.5	1.7	1.3
Manufacturing	16.7	16.5	16.2
Electricity And Water	2.1	2.3	2.4
Construction	4.9	4.7	4.5
Wholesale & Retail Trade, Restaurants & Hotels	10.1	9.9	10.4
Transport, Storage & Communications	14.4	14.5	14.6
Finance, Insurance, And Business Services	20.0	20.2	20.7
Community, Social And Personal Services	4.4	4.4	4.5
Producers Of Government Services	11.4	11.4	10.8
Producers Of Private Non-Profit Services To Households	0.5	0.5	0.5
Domestic Services Of Households	0.5	0.5	0.5
Imputed Bank Service Charge	5.5-	5.5-	5.3-
Net Taxes On Products	15.7	15.6	16.0
Total	100	100	100

* Source: Department of statistics

Construction contribution to economic growth is less than the industrial and transportation sectors due the fact that construction activity is a short-term however, the use of technology is limited compared to industry and transportation. Furthermore, construction is also characterized by a great number of migrant workers and the extent of subcontracting this a phoneme in Jordan as the construction sector employ Egyptians and most recently Syrians.

3.1 Revenue from Real-Estate in Jordan

The total amount of revenues according to Lands & Survey Department reached JD 52.3 million during first two months of 2017, by a decrease of 2% of the revenues at the same period of 2016. The taxes and fees exemptions for the same period reached almost JD 12.6 million, at 6% less than the same period of 2016.

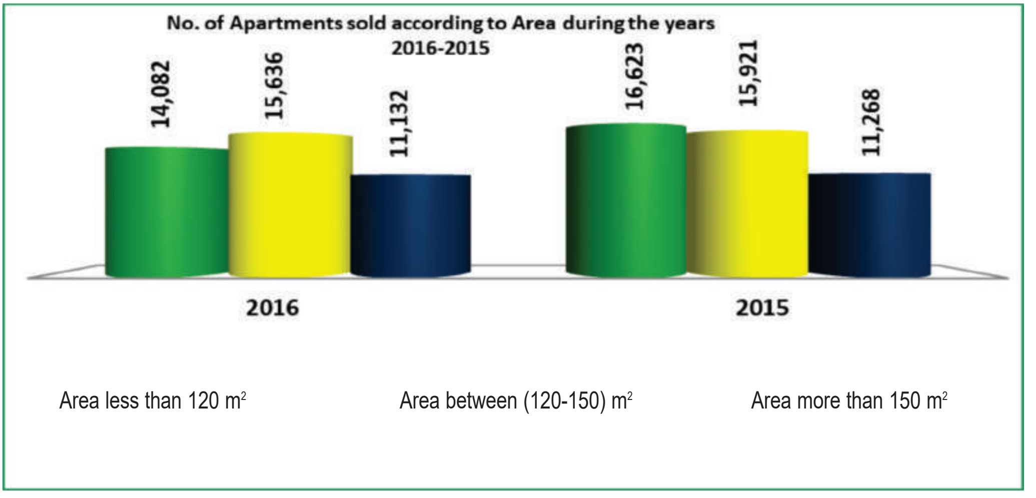
North Amman LRD came in the first place with revenues of JD10.3 million. It was followed by Amman LRD JD 8.5 million then the West Amman LRD at JD 6.1 million.

The real-estates sale transaction during first two months of 2017 increased 5%, apartments' sales increased 1%, whereas an increase of 7% on sales of lands compared the same period of 2016.

The total revenues of Lands & Survey Department in 2016 reached JD 332.95 million, by a 12% decrease compared to the previous year. The exemptions of taxes and fees for aforementioned year reached almost JD

105.4 million, by a 12% decrease compared to its predecessor. North Amman LRD provided the highest revenues at JD 62.3 million, followed by Amman LRD with JD 43.1 million, and West Amman LRD JD 40.8 million.

Graph (1): Number of Apartments sold



As shown in the graph, the total number of property sale for non-Jordanians in 2016 reached (3,657) transactions, (2,655) transactions were on apartments, and (1,002) transaction on lands, by 11% decrease compared to the previous year.

Iraqi nationality ranked first with total of 1,530 transactions. Saudi Arabian came second with a total of 694 transactions, Kuwaiti nationality ranked third by a total of 269 transactions.

3.2 Real-Estates Contribution to Domestic Revenues

The government revenues from real-estates sector decline to JD 331 million in 2016 compared to JD 370.9 million in 2015. That also yielded a decline in the total domestic revenue. This result is driven by the regional circumstances that started with the Arab Spring.

Table (2) Total revenue from real-estates Sector (JD million)

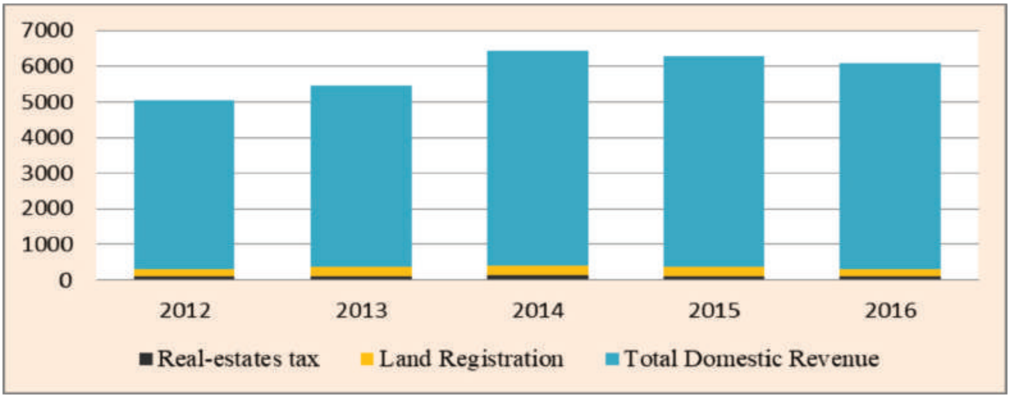
	2012	2013	2014	2015	2016*
Real-estates tax	102.8	112.7	132.1	124.7	116.7
In % of total domestic revenue	2.2	2.2	2.2	2.1	2.0
Land Registration	212.4	237.4	274.7	246.2	214..6
In % of total domestic revenue	4.5	4.6	4.6	4.2	3.7
Total Domestic Revenue	4726.9	5119.8	6031.1	5910.1	5780.9

Source: General Government finance bulletin

*Preliminary

The percentage of total real-estates revenue did not exceed 7% of the total domestic revenue during the years (2012-2016).

Graph (2) Total Domestic Revenue



3. The Relationship between GDP and the Construction Sector

Literature review proved a significant relationship between construction activity and economic growth. As an investment sector, construction has the potential to impact positively on short-run growth. Construction can thus be regarded as a major component of investment.

According to the Keynesian theory, just like any other sector, the increased spending in the construction sector stimulates economic growth. The construction sector deals mainly with the provision of capital infrastructure which has an impact on economic growth. The delivery of such infrastructure creates significant employment opportunities for the population which in turn generate further investments in other economic sectors through the multiplier effect.

Table (3) shows the slowdown of average growth of construction sector in the last three years, but maintaining the same contribution to the GDP.

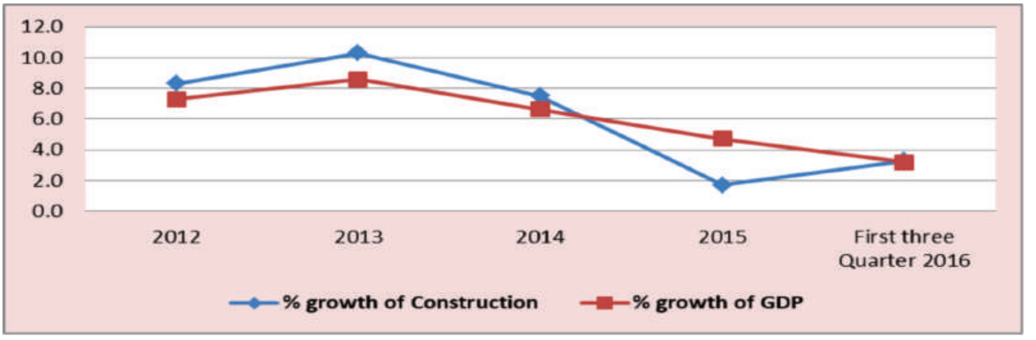
Table (3) The Real-estates Sector Contribution of GDP (JD Million)

	2013	2014	2015	First three quarter 2016
Construction	1060.6	1140.0	1159.6	872.4
Average growth	10.3	7.5	1.7	3.3
Nominal GDP	23851.6	25437.1	26637.4	20166.5
Average growth	8.6	6.6	4.7	3.2
In % Construction of GDP	4.4	4.5	4.4	4.3

* Source: Department of statistics

The correlation between economic growth and growth of construction activity is positive as indicated below.

Graph (3): Average growth



4. Empirical Results and Discussions

There is a minimum required level of investment in construction in developing countries (measured in terms of construction value added as a percentage of GDP) in order to achieve, in the long-term, sustainable growth in the economy.

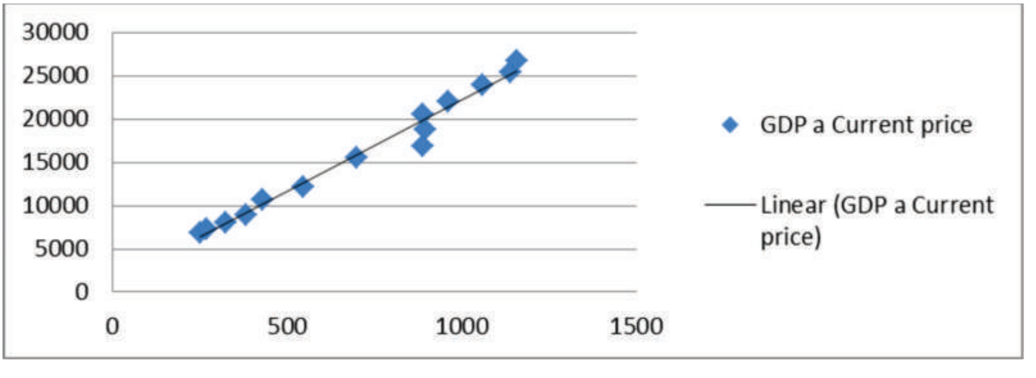
We will conduct two approaches to test the relationship between the construction sector and economic growth. First is simple OLS analysis and Second the Co-integration analysis.

Dalmini (2012) mobilizes research three economic growth theories in trying to explain the relationship between the construction sector and economic growth, namely: Harrod–Domar model, Solow growth model and Endogenous growth model. Central to the research is to ascertain how national governments stimulate economic growth, with a view to enabling policy-makers to make better use of the construction sector.

5.1 OLS Analysis: GDP and the Construction Sector

To verify the relationship between economic growth and construction we will perform an ordinary least square regression analysis utilizing a proxy of construction activity to GDP (Con) and the GDP during 2002-2015. The analysis indicates a significant relationship between the construction sector and economic growth relationship. The OLS elasticity is almost 5% meaning an increase of 1% in construction activity will induce a 5% increase in economic growth.

This significant outcome proves that GDP is dependent on construction sector in Jordan. This relationship can be witness in the scatter diagram which reveals a significant linear relationship between real GDP and construction activity.



5.2 Augmented Dickey Fuller (ADF) Test:

In this study, the Augmented Dickey Fuller (ADF) unit root test was used to test for the time series properties of model variables.

The null hypothesis is that the variable under investigation has a unit root against the alternative that it does not. The decision rule is to reject the null hypothesis if the ADF statistic value exceeds the critical value at a chosen level of significance (in absolute term). These results are presented in table (4) below.

Table (4.2) Unit Root Test using Augmented Dickey Fuller Test

	LEVEL		First difference	
Variable	Without Intercept and Trend	With Intercept and Trend (5%)	Without Intercept and Trend	With Intercept and Trend (5%)
GDP	-1.958088	-3.644963	-1.958088	-3.632896
	(0.8085)	(0.5460)	(0.5975)	(0.0727)
CON	-1.957204	-3.632896	-1.957204	-3.644963
	(0.9107)	(0.4540)	(0.0490)	(0.1216)

The results of table (4.2) above show that all the variables are non-stationary in level form since their ADF values are less than the critical values at 5%, the null hypothesis of a unit root was accepted for all the variables but was rejected in 1st difference. Thus, we conclude that the variables under investigation are integrated of order one. Since the variable are integrated of the same order. And therefore, examine their co-integrating relationship using Johansen co- integration procedure.

5.3 Co-integration Test Result

A necessary but insufficient condition for co-integrating test is that each of the variables be integrated of the same order. The Johansen co-integration test uses two statistics test namely: the trace test and the likelihood Eigen-value test. The first row in each of the table test the hypotheses of no co-integrating relation, the second row test the hypothesis of one co-integrating relation and so on, against the alternative of full rank of co-integration. The results are presented in table (4.3) below. Table 3: Co-integrating Test Result between the Variables: GDP and CON.

Table (4.3.1) Co-integration Test Result

Hypothesized Number of Co integrating Equations	Trace Statistic	5% Critical Value	Probability
None*	24.96350	15.49471	0.0014
At Most 1	2.151172	3.841466	0.1425

Trace test indicates 1 co integrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Table (4.3.2) Co-integration Test Result

Hypothesized Number of Co integrating Equations	Max-Eigen Statistic	5% Critical Value	Probability
None*	22.81233	14.26460	0.0018
At Most 1	2.151172	3.841466	0.1425

Max-eigenvalue test indicates 1 co integrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

The Trace Test and The Maximum Eigenvalue Test indicate the existence of 1 co- integrating equation at the 5% significance level. This co-integrating equation means that one linear combination exists between the variables

Interpretation of co-integrating results from table (3) above, the likelihood statistics indicates the presence of one co integrating equation at 5% significance level which implies that GDP and CON are co-integrated. This shows that there is a long-run relationship between CON and GDP in Jordan.

5. Conclusions and recommendations.

The analysis indicates a significant relationship between the construction sector and economic growth relationship. The OLS elasticity is almost 5% meaning an increase of 1% in construction activity will induce a 5% increase in economic growth. This significant outcome proves that GDP is dependent on construction sector in Jordan. This relationship can be witness in the scatter diagram which reveals a significant linear relationship between real GDP and construction activity.

This result implies that the government of Jordan should give more attention to construction sector in order to increase economic growth and to reduce the high level of unemployment in the Jordanian economy.

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Appendix I

<u>Variables</u>

9u Dependant variable = Y = GDP

9u Independent variable = X = Construction

<u>Hypotheses</u>

9u H0: Y ≠ X (no a relationship between GDP and Construction)

9u H1: Y= X (there is a relationship between GDP and Construction)

Data

Years	CONS0	GDP0
1992	217.1	3610.5
1993	285.6	3884.2
1994	301.8	4357.4
1995	300.1	4714.7
1996	254.8	4911.3
1997	240.5	5137.4
1998	214.6	5609.9
1999	207.1	5778.1
2000	203.3	5998.6
2001	231	6363.7
2002	251.7	6794
2003	268.3	7228.7
2004	324.4	8090.7
2005	382.1	8925.4
2006	429	10675.4
2007	544.8	12131.4
2008	697.9	15593.4
2009	887.9	16912.2
2010	896.2	18762
2011	888	20476.6
2012	961.7	21965.5
2013	1060.6	23851.6
2014	1140	25437.1
2015	1159.6	26637.4

Equation

$Y= a+bX$

$CON= 12.46064+0.043999GDP$

Dependent Variable: CONS0
Method: Least Squares
Date: 03/26/17 Time: 11:45
Sample: 1992 2015
Included observations: 24

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	12.46064	22.25371	0.559935	0.5812
GDP0	0.043999	0.001630	26.99601	0.0000

R-squared	0.970697	Mean dependent var	514.5042
Adjusted R-squared	0.969365	S.D. dependent var	342.0955
S.E. of regression	59.87611	Akaike info criterion	11.10209
Sum squared resid	78873.28	Schwarz criterion	11.20026
Log likelihood	-131.2251	Hannan-Quinn criter.	11.12813
F-statistic	728.7847	Durbin-Watson stat	0.575160
Prob(F-statistic)	0.000000		

Appendix 2

GDP level

Null Hypothesis: GDP0 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 2 (Automatic - based on SIC, maxlag=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.042270	0.5460
Test critical values:	1% level	-4.467895	
	5% level	-3.644963	
	10% level	-3.261452	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDP0)
Method: Least Squares
Date: 03/26/17 Time: 09:04
Sample (adjusted): 1995 2015
Included observations: 21 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP0(-1)	-0.106353	0.052076	-2.042270	0.0580
D(GDP0(-1))	0.163867	0.217827	0.752283	0.4628

D(GDP0(-2))	0.496443	0.227336	2.183740	0.0442
C	-223.6751	308.7037	-0.724562	0.4792
@TREND("1992")	142.4585	59.06917	2.411723	0.0283

R-squared	0.676731	Mean dependent var	1060.952
Adjusted R-squared	0.595914	S.D. dependent var	831.3912
S.E. of regression	528.4965	Akaike info criterion	15.58221
Sum squared resid	4468938.	Schwarz criterion	15.83090
Log likelihood	-158.6132	Hannan-Quinn criter.	15.63618
F-statistic	8.373614	Durbin-Watson stat	2.173242
Prob(F-statistic)	0.000765		

non

Null Hypothesis: GDP0 has a unit root
Exogenous: None
Lag Length: 2 (Automatic - based on SIC, maxlag=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		0.473473	0.8085
Test critical values:	1% level	-2.679735	
	5% level	-1.958088	
	10% level	-1.607830	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDP0)
Method: Least Squares
Date: 03/26/17 Time: 09:06
Sample (adjusted): 1995 2015
Included observations: 21 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP0(-1)	0.014539	0.030707	0.473473	0.6416
D(GDP0(-1))	0.303482	0.240760	1.260519	0.2236
D(GDP0(-2))	0.526329	0.256504	2.051935	0.0550

R-squared	0.525867	Mean dependent var	1060.952
Adjusted R-squared	0.473186	S.D. dependent var	831.3912
S.E. of regression	603.4400	Akaike info criterion	15.77473
Sum squared resid	6554517.	Schwarz criterion	15.92395
Log likelihood	-162.6347	Hannan-Quinn criter.	15.80712
Durbin-Watson stat	1.908874		

1

Null Hypothesis: D(GDP0) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.432239	0.0727
Test critical values:	1% level	-4.440739	
	5% level	-3.632896	
	10% level	-3.254671	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDP0,2)
Method: Least Squares
Date: 03/26/17 Time: 09:08
Sample (adjusted): 1994 2015
Included observations: 22 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP0(-1))	-0.814219	0.237227	-3.432239	0.0028
C	-62.40292	282.6235	-0.220799	0.8276
@TREND("1992")	72.98584	30.52968	2.390652	0.0273

R-squared	0.385128	Mean dependent var	42.11818
Adjusted R-squared	0.320404	S.D. dependent var	713.6325
S.E. of regression	588.3015	Akaike info criterion	15.71848
Sum squared resid	6575874.	Schwarz criterion	15.86726
Log likelihood	-169.9033	Hannan-Quinn criter.	15.75353
F-statistic	5.950362	Durbin-Watson stat	2.057670
Prob(F-statistic)	0.009850		

Null Hypothesis: D(GDP0) has a unit root
Exogenous: None
Lag Length: 1 (Automatic - based on SIC, maxlag=2)

	t-Statistic	Prob.*

Augmented Dickey-Fuller test statistic		-0.212925	0.5975
Test critical values:	1% level	-2.679735	
	5% level	-1.958088	
	10% level	-1.607830	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDP0,2)
Method: Least Squares
Date: 03/26/17 Time: 09:10
Sample (adjusted): 1995 2015
Included observations: 21 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP0(-1))	-0.022162	0.104085	-0.212925	0.8337
D(GDP0(-1),2)	-0.604300	0.192603	-3.137540	0.0054

R-squared	0.377983	Mean dependent var	34.62381
Adjusted R-squared	0.345245	S.D. dependent var	730.3680
S.E. of regression	590.9915	Akaike info criterion	15.69187
Sum squared resid	6636148.	Schwarz criterion	15.79135
Log likelihood	-162.7647	Hannan-Quinn criter.	15.71346
Durbin-Watson stat	1.983286		

Con
Null Hypothesis: CONS0 has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.224644	0.4540
Test critical values:	1% level	-4.440739	
	5% level	-3.632896	
	10% level	-3.254671	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(CONS0)
Method: Least Squares

Date: 03/26/17 Time: 09:16
Sample (adjusted): 1994 2015
Included observations: 22 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CONS0(-1)	-0.138426	0.062224	-2.224644	0.0391
D(CONS0(-1))	0.480622	0.192171	2.501015	0.0223
C	-20.29696	20.75849	-0.977767	0.3411
@TREND("1992")	8.711611	3.070156	2.837514	0.0109

R-squared	0.547219	Mean dependent var	39.72727
Adjusted R-squared	0.471756	S.D. dependent var	59.23160
S.E. of regression	43.04978	Akaike info criterion	10.52556
Sum squared resid	33359.10	Schwarz criterion	10.72393
Log likelihood	-111.7811	Hannan-Quinn criter.	10.57229
F-statistic	7.251441	Durbin-Watson stat	1.825351
Prob(F-statistic)	0.002168		

Null Hypothesis: CONS0 has a unit root
Exogenous: None
Lag Length: 1 (Automatic - based on SIC, maxlag=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		1.001619	0.9107
Test critical values:	1% level	-2.674290	
	5% level	-1.957204	
	10% level	-1.608175	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(CONS0)
Method: Least Squares
Date: 03/26/17 Time: 09:17
Sample (adjusted): 1994 2015
Included observations: 22 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CONS0(-1)	0.026491	0.026448	1.001619	0.3285
D(CONS0(-1))	0.548821	0.217941	2.518207	0.0204

R-squared	0.331783	Mean dependent var	39.72727

Adjusted R-squared	0.298372	S.D. dependent var	59.23160
S.E. of regression	49.61431	Akaike info criterion	10.73294
Sum squared resid	49231.59	Schwarz criterion	10.83213
Log likelihood	-116.0624	Hannan-Quinn criter.	10.75631
Durbin-Watson stat	1.578992		

Null Hypothesis: D(CONS0) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.967153	0.0490
Test critical values:	1% level	-2.674290	
	5% level	-1.957204	
	10% level	-1.608175	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(CONS0,2)
Method: Least Squares
Date: 03/26/17 Time: 09:19
Sample (adjusted): 1994 2015
Included observations: 22 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(CONS0(-1))	-0.290741	0.147798	-1.967153	0.0625

R-squared	0.154097	Mean dependent var	-2.222727
Adjusted R-squared	0.154097	S.D. dependent var	53.94860
S.E. of regression	49.61814	Akaike info criterion	10.69098
Sum squared resid	51701.15	Schwarz criterion	10.74057
Log likelihood	-116.6008	Hannan-Quinn criter.	10.70266
Durbin-Watson stat	1.677184		

Null Hypothesis: D(CONS0) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=2)

		t-Statistic	Prob.*

Augmented Dickey-Fuller test statistic		-3.147481	0.1216
Test critical values:	1% level	-4.467895	
	5% level	-3.644963	
	10% level	-3.261452	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(CONS0,2)
Method: Least Squares
Date: 03/26/17 Time: 09:21
Sample (adjusted): 1995 2015
Included observations: 21 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(CONS0(-1))	-0.798695	0.253757	-3.147481	0.0059
D(CONS0(-1),2)	0.365983	0.224053	1.633471	0.1208
C	-18.58983	25.61833	-0.725646	0.4779
@TREND("1992")	3.927480	2.223748	1.766154	0.0953

R-squared	0.371606	Mean dependent var	0.161905
Adjusted R-squared	0.260713	S.D. dependent var	54.07972
S.E. of regression	46.49873	Akaike info criterion	10.68637
Sum squared resid	36756.25	Schwarz criterion	10.88533
Log likelihood	-108.2069	Hannan-Quinn criter.	10.72955
F-statistic	3.351026	Durbin-Watson stat	1.880652
Prob(F-statistic)	0.043678		

Date: 03/26/17 Time: 08:39
Sample (adjusted): 1994 2015
Included observations: 22 after adjustments
Trend assumption: Linear deterministic trend
Series: CONS0 GDP0
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.645456	24.96350	15.49471	0.0014
At most 1	0.093152	2.151172	3.841466	0.1425

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.645456	22.81233	14.26460	0.0018
At most 1	0.093152	2.151172	3.841466	0.1425

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

CONS0	GDP0
-0.014452	0.000505
0.011214	-0.000670

Unrestricted Adjustment Coefficients (alpha):

D(CONS0)	27.23633	-4.978585
D(GDP0)	-55.30148	-172.7126

1 Cointegrating Equation(s):	Log likelihood	-269.2390

Normalized cointegrating coefficients (standard error in parentheses)

CONS0	GDP0
1.000000	-0.034949
	(0.00265)

Adjustment coefficients (standard error in parentheses)

D(CONS0)	-0.393629
	(0.08841)
D(GDP0)	0.799236
	(1.93271)

UDC 338.121:339.727.22(100-773)"1990/2015"
338.121:339.727.22]:32(541.35)"1990/2015"

PANEL DATA ANALYSIS OF FOREIGN DIRECT INVESTMENT AND ECONOMIC GROWTH IN DEVELOPING COUNTRIES; POLICY IMPLICATION FOR NEPAL

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Abstract

Foreign direct investment (FDI) has increased rapidly in developing countries since the 1990s. Many studies found that there is a significant relationship between FDI and economic growth. This thesis seeks to analyze the relationship between FDI and economic growth in developing countries and explore policy implications for the South Asian countries and Nepal. The study conducts panel data analyses based on a panel data set of 63 developing countries in Asia, Africa, and Latin America for the period from 1990-2015. The results of the panel data analyses, obtained by the fixed effects, random effects, difference generalized method of moment, DGMM and system generalized method of moment, SGMM estimators, show that there is a significant positive effect of FDI on economic growth. It is also found that the FDI-economic growth relationship depends on domestic macroeconomic and financial market conditions, domestic investment climate and infrastructure in host countries.

Keywords: *Economic Growth, Foreign Direct Investment, Dynamic panel data, Developing countries, Nepal.*

1. INTRODUCTION

Foreign Direct Investment (FDI) is an investment made to acquire a lasting interest in or effective control over an enterprise operating outside of the economy of the investor. FDI net inflows are the value of the inward direct investment made by non-resident investors in the reporting economy, including reinvested earnings and intra-company loans, net of repatriation of capital and repayment of loans, this is expressed as shares of GDP (UNCTAD, 2017). Some degree of equity ownership is almost always considered to be associated with an active voice in the management of an enterprise; the BPM5 suggests a threshold of 10% of equity ownership to qualify an investor as a foreign direct investor (International Monetary Fund, 2009).

FDI encourages the transfer of technology and know-how between economies, promote its products more widely in international markets, positive effect on the development of international trade, and a crucial source of capital for a range of host and home economies (Organization for Economic Co-operation (2008). FDI is a part of economic growth, prosperity, and development of the third world today. Specifically, after the 1980s, under liberalization, globalization, and privatization, most of developing and underdeveloped countries have heavily relied on foreign sources of investment. The developing countries have felt the need for foreign capital to supplement domestic resources due to the growing mismatch between their capital requirement and their saving capacity (Srivastava 2004). Foreign direct investment has been recognized as one of the critical sources of long-term sustainable economic development in developing countries (Sadia Imtiaz, 2017). There are many demand-side and supply-side factors that have affected the trend and level of FDI: market conditions, government policies, human and natural resources, institutions, pre-investment procedure, investment repatriation policies, export and import facilities, tax-free and special economic zones and so on (Nasser, 2010). FDI provides opportunities for the economic development of developing countries as FDI would facilitate competition, innovation, human capital development, and technological advancement (Nasser, 2007).

It is a challenging task for Nepal to become a middle-income country and achieve the sustainable development goals by 2030 (Ministry of Finance, Nepal, 2016). To graduate from a least developed country to become a middle-income country by 2030, Nepal needs economic growth at an annual average rate of more than 7%. A study by Andrés (2013) showed that Nepal is facing an investment gap of around 15-18 billion dollars to achieve this target. However, the 2015 earthquake brought about a loss of 7 billion dollars, and subsequent trade disruption leads to a fuel crisis (The World Bank, 2017). Total investment gap to graduate in middle income country by 2030 is more than 24 billion USD (National Planning Commission, 2017). The domestic saving rate is below 10% of GDP, and thus domestic savings alone cannot fulfill the investment gap. In the SAARC region, net FDI as a share of GDP is 1.2%, but it was merely 0.2% in Nepal. Average per capita FDI in the SAARC region is $12.1, while in Nepal it is only $1.1. Therefore, Nepal needs more foreign capital to graduate from a least developed country by 2030.

The government of Nepal set objectives regarding FDI, human resources and technologies to reduce the trade deficit (National Planning Commission, Nepal, 2017). Nepal needs to rely on FDI for its economic development since FDI could strengthen technologies and managerial and technical skills while narrowing the savings and investment gap in capital formation. In Nepal, with abundant natural resources, biodiversity, and cultural heritages, ample opportunities exist for FDI in such areas as hydroelectricity, tourism, services, and physical infrastructure (Ministry of Finance, Nepal, 2016).

FDI in SAARC and Nepal

South Asia is a rapidly growing region and home to one-fifth of the world's population. The region's economy is facing the challenges of improving the efficiency of public spending, strengthening tax administration, enhancing regulation and supervision of the financial system, modernizing monetary policy and operations, and improving macroeconomic statistics (IMF Annual report, 2017 page 24).

Table 1 reports the average annual growth rate, average yearly net FDI inflow, FDI inflow as a share of GDP, and average per capita GDP from 1990-2015 for 5 South Asian countries (Bangladesh, India, Nepal, Sri Lanka, Pakistan), developing countries, and the world.

Table 1 Average growth rate, average FDI inflow from 1990-2015

Country	Average Growth rate (%)	Average annual net FDI inflow (mill. $)	Net FDI inflow as a share of GDP (%)	Average per capita FDI ($)
Bangladesh	5.37	698.95	0.62	4.61
India	6.57	16156.92	1.15	13.43
Nepal	4.42	28.88	0.18	1.74
Pakistan	4.08	1655.29	1.15	10.89
Srilanka	5.44	519.36	1.23	26.74
SAARC	6.19	19131.53	1.26	12.93
World	2.82	1360992.79	2.33	207.18
63 Developing countries	4.10	3624.98	3.09	76.42

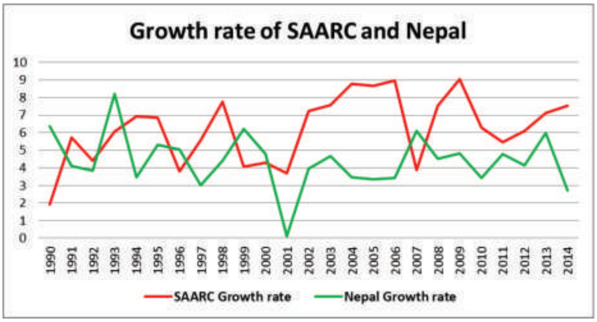
Source: The World Bank

As exhibited in table 1, the average growth rate from 1990-2015 in developing countries is higher than the world average. The average annual growth rate in the SAARC region is more than 6% (see figure 1 also); it is higher than the average growth rate of developing countries. Among SAARC countries, the average growth rate of India was the highest, while Pakistan and Nepal registered the lowest. An average growth rate of Nepal is similar to the growth rate of developing countries but is less than the growth rate of the SAARC (see figure 1 also). From 1990 to 2015, average growth rate was 6.18% in the SAARC region, while it was 4.42% in Nepal.

Average per capita FDI inflow is more than $207 in the world, whereas it is $76.42 in developing countries and $12.93 in the SAARC region. Among SAARC countries, Sri Lanka registers the highest per capita at $26.74, which is followed by India at $13.4. Meanwhile, per capita, FDI is less than $1.5 in Nepal. Net FDI as a share of GDP in Nepal is smaller than most other developing countries; it is more than 3% and 1.26%, respectively, in developing countries and the SAARC region, while it is less than 0.2% in Nepal. Among SAARC countries, Sri Lanka and India register the highest FDI inflow as a share of GDP.

According to Figure 2, which reports the per capita FDI inflow in the SAARC region and Nepal, the SAARC region has an upward trend. However, the per capita FDI inflow in Nepal is much smaller than that in the region. The gap between the SAARC region and Nepal has been increasing since 2004. Net per capita FDI of Nepal was negative in 2002, because of the Maoist insurgency. However, it increased sharply after 2007, after the end of the Maoist insurgency. It decreased again after 2012, because of political instability.

Figure 1.
The Economic Growth rate
of Nepal and SAARC from 1990-2015



Source: The World Bank

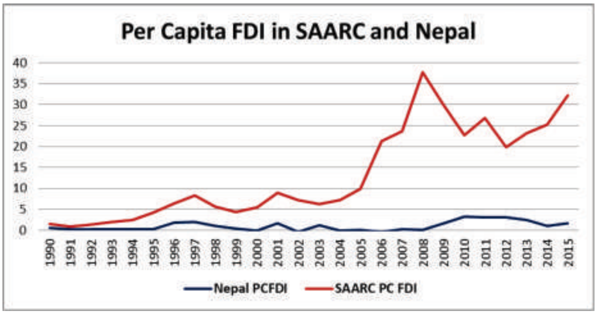


Figure 2.
Per capita FDI inflow in Nepal and SAARC from 1990-2015

Source: The World Bank

As discussed above, Nepal has not been successful in attracting FDI, and FDI inflow was very small as compared to other countries in the SAARC region. Nepal has a lot of opportunities for FDI to accelerate the economy. The government of Nepal has introduced some policies and regulations to increase FDI. Among them are: Constitutional Provisions, FDI policy in 2014, Industrial Enterprises Act in 2016, Investment Board Act in 2012, Foreign Investment and Technology Transfer act in 1991, and Special Economic Zone in 2016. To increase FDI, the government of Nepal introduced some institutional provisions in facilitation, approval, and registration. Investment Board, Industry Department, Industrial and Investment Promotion Board were set up to take care of these institutional provisions.

With these policies, regulations and institutional provisions, the government of Nepal hopes to receive more FDI, especially from within the SAARC region, as FDI would continue to strengthen the production network of the SAARC countries (World investment report, 2017 UNCTAD, page 56). Opportunities for FDI in the areas of hydroelectricity, tourism, services, physical infrastructure, and production and processing of herbs exist in Nepal with the availability of abundant natural resources, biodiversity, and cultural heritage. The government of Nepal should design policies to attract more FDI to achieve high economic growth, where it is essential to promote investment in the private sector (Ministry of Finance, Nepal, 2016).

The primary objective of this study is to analyze the effect of FDI on economic growth in developing countries and explore the factors that would affect the effectiveness of FDI on economic growth. The study also tries to draw some policy implications for the economic development of Nepal, which is one of the least developed countries in the world. A number of studies have been conducted to analyze the relationship between FDI and economic growth. Many of them found that FDI has significant and positive effects on economic growth, but some studies found an adverse effect. Many empirical studies suggested that the relationship between FDI and economic growth depends on economic and business conditions such as political stability, human capital, infrastructure, innovative capacity, and so on. This study investigates the effects of FDI on economic growth using a panel data set of 63 developing countries in Asia, Africa and Latin America (22 countries in Asia, 26 countries in Africa and 15 Latin American and other developing countries) for a relatively longer time-period from 1990 to 2015, which is constructed by using the databases of World Bank, IMF, UNDP and UNCTAD.

This study conducts a dynamic panel data regression analysis. By using the difference and system GMM (generalized method of moments) estimators developed by Arellano and Bond (1991) and Blundell and Bond (1998) based on a dynamic panel data set, the study analyzes the effects of FDI on economic growth after controlling for some other variables which would affect economic growth. Based on the empirical results of the dynamic panel data regression analysis, it tries to draw some policy implications for the economic development of the SAARC region, particularly Nepal. To the best of the author' knowledge; there have been no studies on the effects of FDI on economic growth in Nepal.

From this dynamic panel data regression analysis, the study finds that FDI has a significant and positive effect on economic growth among developing countries after controlling for some other factors of economic growth. The result is robust in the sense that the sign of the coefficient for FDI is positive regardless of model specifications we choose. It is also found that among other factors, infrastructure, human resources, trade openness and domestic financial market are essential for the effectiveness of FDI on economic growth.

The paper is organized as follows. Section II presents a review of empirical literature on the relationship between FDI and economic growth. Section III presents the data and the methodology used in the study, while Section IV discusses the empirical results. Finally, Section V summarizes the main findings and provides some policy implications for the development of Nepal.

II RELATED LITERATURE

According to the literature studied the relationship between FDI and economic growth, the role of FDI in developing economies has become very important because of a decline in nations' saving, conventional financing, and instability of private financial flows. FDI has seen as a remedy to the problem of resource gaps and external funding now experienced by developing nations.

Theoretical Evidence

There is a considerable body of literature emphasizing the impact of FDI on economic growth. Neo-classical models of growth, as well as an endogenous growth model, provide the basis for most of the empirical work on the FDI-growth relationship (Ozturk, 2007). New growth theory argues that technological progress is the heart of economic growth. Capital formation is defined to include investment in human capital and skill, R&D, and tangible capital which also provide the basis for economic growth. Moreover, the dependency school theory stands for the negative impact of FDI on long-run economic growth (Mebratu Seyoum, 2015).

Felipe (1999) followed the neoclassical growth theory in his empirical study and found that economic growth generally comes from two sources: Factor accumulation and total factor productivity growth. As opposed to the limited contribution that the neoclassical growth theory accredits to FDI, the endogenous growth literature points out that, FDI can not only contribute to economic growth through capital formation but also through augmentation of the level of knowledge through labor training and skill acquisition (DeMello, 1999). The empirical study of Anam, 1993 followed the endogenous growth model and found that FDI is an essential vehicle for transferring technology, contributing relatively more to growth than domestic investment. FDI enables low wage countries to improve productive efficiency by stimulating domestic research and development (Walz, 1997).

The new growth models, unlike the Solow model, assume an increasing return to scale to input. These models argue in favor of FDI affecting the level and rate of aggregate output growth, level of human capital and productivity through permanent technology and knowledge transfers and spillover and do not necessarily diminish as the economy grows (Romer 1986 and Lucas 1988). According to Dunning (1993), the impact of FDI on economic growth depends on the nature and degree of firm-specific ownership characteristics, location-specific characteristics of host countries, demand conditions, market, and the way how multinational corporations own, organize and use their resources.

On the other hand, the dependency school theory, by Stonemen (1975) and Bornschier (1980) argued that developed nations become wealthy by extracting labor and other resources from third world nations, developing countries are unable to compensate for their natural resources, and it increases poverty, and FDI will affect growth negatively in the long run.

2.2 Positive and negative view

Under the traditional framework, in general, FDI promotes economic growth endogenously through augmenting domestic capital accumulation; in doing so, it facilitates the technological transfer, which is a favorable impact according to Ozturk (2007). One of the earliest investigations of the role of the FDI on economic growth, Findaly (1978) postulated that FDI promotes economic growth through its effect on technological transfer and progress. Other empirical studies are summarized in the following table:

Table 2: FDI and Economic Growth: Literature Survey

Studies	Sample	Period	Empirical Approach	Effect of FDI on growth
Balasubrimanyam V.N. (1996)	46 developing countries	1970-1985	OLS, Generalized Instrumental Variable Estimators	FDI has a positive impact on growth through FDI-labor (including human capital) interactions in the growth process.
Basu P., (2003)	23 developing countries	1978-1996	Panel Casualty test	There is a long-run steady state relationship between FDI and growth, and a relationship is bidirectional.
Choe J. (2003)	80 countries	1971-1995	Panel VAR model	Strong and positive correlation between growth. FDI, possible reverse relationship, which high growth attract FDI to promote GDI
Simona O. H. (2012)	7 Eastern European Countries	1993-2008	OLS, GMM, Panel cointegration and Granger casualty test	A positive effect of FDI on growth and the relationship is bidirectional between FDI and GDP.
Wang M. (2009)	12 Asian Countries	1987-1997	Random effect and weighted least Square	FDI in the manufacturing sector generate a significant positive impact growth
Reichert U. N. 2001)	24 developing countries	1971-1995	OLS, Fixed Effect, and MFR casualty test	FDI on average has a significant impact on growth.
Zhang K. H. (2001)	11 countries	1960-1997	Granger casualty, Unit root test, and cointegration	The positive impact of FDI on growth. The Impact is strong if host countries adopt liberalize policy and improve the education system.
Kasibhatla K.M. (2008)	Five countries	1970-2005	Unit root, cointegration, and VECM	The negative relationship between FDI and growth
Kingsley N. (2008)	Malaysia, Indonesia, Thailand and the Philippines	1990-2005	OLS and Seemingly unrelated regression (SUR)	FDI in 4 ASEAN countries has a negative impact on economic growth.

Kentor, (1998).	79 developed and developing countries	1938-1990	OLS	FDI has a negative impact on growth in the long run
Nolan P. (1983)	25 Firm-level data	1971-1980	Analysis of Variance	FDI would increase the inequality
Dunn C. (1975)	less developed countries	1950-1970	Panel OLS	Domestic firms may affect negatively, they would not compete with foreign firms, and it would create a monopolistic market

2.3 Conditional view

Some empirical studies have found that the impact of FDI on growth highly depends on the economic, technological, socio-political, legal conditions of the host country. The empirical study of De Mello (1997) found that cultural factors, roles of the receiving government in the economy, the protection of property rights, tax structure, the openness of the receiving country and the adequacy of the infrastructure play essential roles in the relationship between FDI and growth. The empirical study of Busse and Groizard (2003) using 84 sample countries from 1994-2003. It suggests that to generate a positive impact of FDI inflows, government first have to tackle the institutional setting and improve the regulatory quality in their countries. Another empirical study of Haji M. nor (2013) studied the role of the financial institution in the relationship between FDI and growth, using data from 11 developed and 16 emerging countries. The study found FDI has a negative impact on growth, but the relationship is significantly positive when FDI interacts with financial development.

Several other empirical studies tried to clarify which are the determinants of FDI to achieve higher rates of economic growth and welfare in a host country. Wu and Lin (2014) studied the impact of FDI in African economies and found that policy and strategy of country-specific factors determine this relationship. The empirical study of Oktay and Ahmet (2016) examined the relationship between FDI and growth with the data of 39 countries from 2000–2013 and found that to attract long-term capital movements, host countries need sufficient human capital, economic stability and free markets. Legislative regulations contribute to improving economic freedom in these countries, and a higher level of economic freedom also has more efficiency and higher growth rates. Lall and Narula (2004) examined FDI and its role in economic development and suggested that FDI cannot drive industrial growth without local capabilities. Robust local capabilities raise the possibility of attracting high-value systems and of capturing skill and technology spillovers from them; these capabilities need selective policies. Bengoa (2000) studied the relationship between FDI and growth in Latin American countries and found that there is a positive and significant correlation between FDI and growth with a minimum threshold of development associated with social capital. The contribution of FDI on economic growth is enhanced by its positive interaction with financial market development, and absorptive capacity; human capital and technology (Carp, 2012). Holding constant the level of FDI or EFPI (which the host legal environment also likely influences), countries with higher legal standards likely channel foreign investment more efficiently (Durham, 2004). Batten and Vo (2010) used two measures of FDI; inflow and stock to analyze the impact of FDI measures on growth. Their empirical result revealed that FDI stock and inflow have strong impact on growth in countries which have a higher level of educational attainment, and government size.

2.4 Empirical Study on the Role of FDI in Asian economy

The empirical studies of Choong, Yusop and Soo (2004) presented the empirical result for FDI, economic growth, and financial sector development. Their result revealed that the presence of FDI inflows creates a favorable technological diffusion in the long run only if the evolution of the domestic financial system has achieved a certain minimum level, and the well-developed financial sector can represent a source of comparative advantage for that country. Similarly, Athukorala and Wagle (2011) studied the data from 1990-2006 of ASEAN countries. Their result showed that FDI has been a significant driver of Malaysia's rapid growth and structural transformation through export-oriented industrialization over the four decades. Innovative capacity has a positive and significant effect on FDI,

Thangavelu and Yong (2009) empirically assessed the FDI on growth and financial crisis of 10 East Asian and South East Asian countries from 1992-2007. The study reveals that FDI tends to have a more significant impact on output growth than domestic capital formation. Better absorptive capacities, infrastructure, human capital, and technologies have a more significant impact on output growth of MNCs through productive spillover. Chaitanya (2009) examined the determinants of FDI and volatility in Southeast Asian economies and found that socioeconomic factors, institutional factors and political factors, and labor-related issue are significant determinants. Faruq and Peter J. (2011) empirically studied the links between FDI and manufacturing productivity from 1975-2005 of 10 Asian countries. The result confirmed physical capital investment, trade openness and large FDI inflows are positively related to the difference between manufacturing and agriculture sector. FDI inflow contributes to increasing the productivity via technological transfer, and Financial sector development.

Vogiatzoglou (2016) applied factor analysis to 10 ASEAN countries from 2003-2013 and showed that efficiency and exercise have a positive effect on FDI. Efficient regulation and macroeconomic fundamentals are essential prerequisites for receiving country, and skilled business-friendly employment regulations have a positive effect in FDI inflows. Another empirical study of Sivalogathasan and Wu, (2014) studied the impact of FDI on south Asian countries and suggested that FDI has a positive impact on growth through technical spillover and domestic innovation.

Overall, the diversity of these findings highlights the difficulty in making generalized comments on the relation between FDI and growth. There is a relative dearth of studies of this relationship under different doing business environment in developing countries. This study contributes to the further insights into this relationship by examining in more detail and extensively than other recent studies considering the role of business environment, and other financial and institutional conditions and design policy implication for Nepal.

III THEORETICAL FRAMEWORK, DATA, AND METHODOLOGY

This study analyzes the effect of FDI on economic growth by conducting several panel data regression analyses. This chapter will discuss theoretical arguments on the impact of FDI on economic growth and the data and methodology that the study uses.

Theoretical Arguments on the Effect of FDI on Economic Growth

Many empirical studies on the impact of FDI on economic growth showed that FDI would stimulate economic growth through technology transfer and spillover effects (Findlay, 1978, Chowdhary, 2006). The Harrod-Domar growth model provides the fundamental relationship between investment and economic growth. According to the model, economic growth is depending on the domestic savings ratio (domestic investment), capital-output ratio and depreciation rate. As to the effect of FDI on economic growth, Hermes (2003) suggested that FDI would enhance technological change through spillover effects of knowledge and technologies embodied in new products. FDI will not only serve to narrow the gap between domestic savings and investment but also introduce new technologies and expertise, thereby enhancing economic growth. With FDI, total investment will be the sum of domestic investment and FDI, where domestic investment depends on GDP and internal interest rate (Gocer, 2014).

Neo-classical growth models such as the Solow growth model and endogenous growth models provide the basis for most of the empirical studies on the relationship between FDI and economic growth. The relationship has been studied by considering (1) determinants of economic growth, (2) determinants of FDI, (3) the roles of multinational firms in host countries, and (4) direction of causality between FDI and economic growth (Abdur Chowdhury, 2003). According to the Solow growth model, the growth of GDP per capita of an economy depends on the initial per capita GDP. The growth of per capita GDP relies not only on the initial per capita GDP but also some other factors. Therefore, after controlling for differences between countries regarding preferences, savings rate, technologies, and institutions, the Solow growth model expects that countries would converge in per capita GDP to the steady states, that is, poorer countries tend to grow faster than wealthier countries. One of the other essential factors is FDI since it promotes capital accumulation and increases total factor productivity through technological advancement and human capital development (Blomstrom, 1996; Felipe 1999; Kotrajaras, 2011; Zhang, 2003; DeMello, 1999; Dunning, 1993; Romer, 1986; Borenszteinn, 1998). We expect that FDI has a positive impact on economic growth.

The Data and the Description of Variables

This study uses a panel data set of 63 developing countries in Asia, Africa and Latin America (22 countries in Asia, 26 countries in Africa and 15 Latin American and other developing countries) for the period from 1990 to 2015, which is constructed by using the databases of World Bank (data.worldbank.org), IMF (data.imf.org), UNDP (hed.undp.org), UNCTAD (stats.unctad.org) and World Heritage (heritage.org). In addition to these databases, the study uses data from the database of Department of Industry of Nepal. The dataset includes data on GDP, FDI, and other independent variables.

The growth rate of GDP per capita is measured by using GDP at constant 2010 prices in US dollars obtained from the World Bank. Data on the flow of FDI have also derived from the World Bank, while data on the stock of FDI are obtained from UNCTAD. FDI stocks are presented at book value or historical cost, reflecting prices at the time when the investment was made. FDI inflow is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital. In the panel data analyses, FDI per capita is used as an explanatory variable after converting to the natural logarithm. Labor force data are obtained from the World Bank. The labor force includes people aged 15 and over who are currently employed and who are unemployed but seeking jobs. Data on (domestic) savings are also obtained from the World Bank. By taking the ratio between savings and GDP, we obtained savings ratio.

This study also considers the domestic saving rate as a share of GDP, education, inflation rate, trade openness, and financial market development as other explanatory variables. The proxy for education/human capital is the mean year of schooling; an average number of years of education received by people ages 25 and older. The inflation rate is thought to indicate economic stability, thus as another explanatory variable, the inflation rate is considered. Trade openness is measured by taking the ratio between total trade (import + export) and GDP. According to Vogiatzoglou (2016) and Alfaro (2004), the business environment is an essential determinant of the impact of FDI on economic growth. This study thus includes the capital gain tax as a proxy for the business environment. Data for these variables are obtained from the databases mentioned above.

Methodology

This study conducts several panel data regression analyses using the panel data set described above. Based on the theoretical arguments outlined above, a panel data regression model that we estimate is given by:

$$gr\_pcgdp_{it} = \alpha + \gamma_1(pcgdp_{it}) + \gamma_2(fdi\_gdp_{it}) + \boldsymbol{X}'_{it}\boldsymbol{\beta} + \alpha_i + \varepsilon_{it} \qquad (1)$$

Where gr_pcgdp_{it} is the growth rate of per capita GDP in country *i* and year *t*, $pcgdp_{it}$ is per capita GDP in country *i* and year *t*, fdi_{it} is FDI per GDP (FDI/GDP) in country *i* and year *t*, $\boldsymbol{X}_{it}$ includes all other independent variables in country *i* and year *t* (domestic savings rate, inflation, trade openness, education, and so on), α_i = individual specific term and ϵ_{it} = idiosyncratic error term. Equation (1) is estimated by using the pooled OLS model, the fixed effects (FE) model and the random effects (RE) model. The following discusses these models and two tests to select an appropriate model for the analysis.

Pooled OLS Model

Consider the following panel data regression model.

$$y_{it} = \alpha + \boldsymbol{X}'_{it}\boldsymbol{\beta} + \alpha_i + \varepsilon_{it} \qquad (2)$$

where y_{it} = dependent variable, $\boldsymbol{X}_{it}$= independent variables, α_i = individual-specific effects, and ε_{it} = idiosyncratic error term. In a pooled model, we assume that independent variables are exogenous. By substituting $u_{it} = \alpha_i + \varepsilon_{it}$ into the equation above, a pooled model is written as

$$y_{it} = \alpha + \boldsymbol{X}'_{it}\boldsymbol{\beta} + u_{it} \qquad (3)$$

where u_{it} = idiosyncratic error term.

Fixed Effects Model

A panel data analysis enables us to control for variables that we cannot observe, such as cultural factors and account for individual heterogeneity. α_i in equation (2) takes care of this heterogeneity. In the fixed effects model, α_i in equation (2) are allowed to be correlated with the independent variables $\boldsymbol{X}_{it}$. However, we assume that the independent variables $\boldsymbol{X}_{it}$ are uncorrelated with the ideosyncratic error term ε_{it}. A fixed effects model would have been appropriate if we were interested only in the variation across time. One problem of the fixed effects model is that the model cannot be used to investigate time-invariant causes of the dependent variable.

Random Effects Model

In the random effects model, we assume that in equation (2) is random rather than fixed. That is, it is assumed that is uncorrelated with the independent variables. One advantage of the random effects model is that the model allows us to estimate the coefficients of the time-invariant independent variables. However, if the fixed effects model is appropriate, the estimates of the random effects estimator are inconsistent. The random effects model allows us to generalize the results beyond the sample used in the model.

We conduct several hypothesis tests regarding the results of the panel data regression analyses. The following discusses the Hausman test and the Breusch and Pagan Lagrangian Multiplier test.

Hausman Test

Under the null hypothesis that individual-specific effects are random, the fixed effects and random effects estimators should be similar since they are both consistent. Under the alternative hypothesis, however, these two estimators are different. The Hausman test compares the estimated coefficients of time-varying independent variables and helps to choose between the fixed effects and random effects models. The null hypothesis is that individual-specific effects are random, i.e., the appropriate model is the random effects model. If there is a statistically significant difference in the estimated coefficients between the fixed effects and random effects models (Chi-squared statistic is significantly large), we can reject the null hypothesis that the appropriate model is the random effects model. That is, the preferred model is the fixed effects model.

Breusch and Pagan Lagrangian Multiplier Test

The null hypothesis in the Breusch Pagan Lagrangian Multiplier test is that the variance across individual units (districts in our study) is zero, i.e., there is no difference across these individual units. The Breusch Pagan Lagrangian Multiplier test helps us to decide between the random effect and pooled OLS regression models. If the Chi-squared statistic is significantly large, then we can reject the null hypothesis that there is no difference across these individual units, that is, the appropriate model is the pooled OLS model. On the other hand, if we cannot reject the null hypothesis, that is, the Chi-squared statistic is minimal, the appropriate model is the random effects model.

Dynamic Panel Data Analysis

Since per capita GDP in year t should be, to some extent, related to per capita GDP in the previous years, it is reasonable to include per capita GDP in year t-1 as an independent variable. Therefore, in addition to the panel data regression analyses with the pooled OLS, fixed effects and random effects models, this study also conducts a dynamic panel data regression analysis with the following dynamic model.

$$pcgdp_{it} = \alpha + \gamma_1(pcgdp_{i,t-1}) + \gamma_2(fdi\_gdp_{it}) + \boldsymbol{X}'_{it}\boldsymbol{\beta} + \alpha_i + \varepsilon_{it} \quad (4)$$

In equation (4), all the variables are converted to the natural logarithm when necessary. To estimate this dynamic panel data regression model, a GMM (generalized method of moments) estimator developed by Arellano and Bond (1991) is used. After first-differencing the dynamic panel data regression model given above, consistent estimates can be obtained by the GMM estimator. Thus, the Arellano-Bond estimator is also called the difference GMM (generalized method of moments) estimator. This study also uses a GMM estimator developed by Arellano and Bover (1995) and Blundell and Bond (1998), since it is more efficient than the Arellano-Bond estimator. This GMM estimator is usually called the system GMM estimator.

Both Arellano-Bond(1991) and Blundell Bond(1998) estimators are designed for the situation with small T, large N panels, a linear functional relationship, single left-hand side variable that is dynamic, depending on its past realizations, independent variables that are not strictly exogenous (correlated with past and possibly current realization of the error), fixed individual effects, and heteroskedasticity and autocorrelation within individuals but not across them. Arellano Bond estimation starts by transforming all regressors, usually by differencing (Roodman, 2006).

Blundell Bond, 1998/ system GMM model, is an extension of the Arellano–Bond estimator that accommodates large autoregressive parameters and a large ratio of the variance of the panel-level effect to the variation of idiosyncratic error. This method assumes that there is no autocorrelation in the idiosyncratic errors and requires that the panel-level results be uncorrelated with the first difference of the first observation of the dependent variable (Blundell and Bond, 1998).

To use the dynamic panel data regression model, we need to conduct two specification tests. The following discusses these tests.

Arellano Bond Test (Test of Serial Uncorrelation of the Error Term)

To obtain consistent estimates, the dynamic panel estimators require that the error term be serially uncorrelated. The null hypothesis is that (i.e., are not correlated) for k = 1, 2, 3. If the error term is serially uncorrelated, we expect to reject the null hypothesis at order 1 (k =1) but not at higher orders (k = 2 and 3).

Sargan Test (Test of Overidentifying Restrictions)

Since a number of instrumental variables are used to estimate a fewer number of parameters in the GMM estimators, one needs to test for overidentifying restrictions. The Sargan test can do this test. The null hypothesis is that the population moment conditions are correct (i.e., overidentifying restrictions are valid). If the Chi-squared statistic is huge and the probability of having this Chi-squared statistic is smaller than 0.05, we can reject the null hypothesis at the 5% significance level. Otherwise, we can not reject and can thus conclude that overidentifying restrictions are valid.

Hypothesis Testing

Given the theoretical arguments in Section 4.1, this study tests the following two main hypotheses based on the results of the panel data regression analyses.

(1) FDI should have a positive effect on economic growth, after controlling for other factors. Therefore, the increase in FDI would increase the growth of per capita GDP. That is, the coefficient of pcfdi is significant and expected to have a positive sign.

(2) The larger the initial per capita GDP is, the smaller the growth rate tends to be. Thus, the coefficient of pcgdp is significant and expected to have a negative sign.

In addition to these two main hypotheses, this study tests the following hypotheses: (1) domestic savings have a positive effect on economic growth; (2) inflation has an adverse impact on economic growth; (3) infrastructure as proxied by electricity has a positive effect on economic growth; (4) FDI has substantial impact on growth under improved business environment.

IV EMPIRICAL RESULTS

This chapter provides estimation results of the panel data regression analyses on the effect of FDI on economic growth. We control some other independent variables that could affect economic growth. Before discussing the results of the panel data analyses, Table 5.1 provides the correlation matrix for the dependent and independent variables included in our empirical study. In the empirical results tables 5.2 to 5.9, L_l.LPCGDP is log value of 1 year lag per capita GDP, L_PCFDI is log value of per capita FDI, L_PCFDIstk is log value of per capita FDI stock, saving_rate is domestic saving as a share of GDP, L_Pcelect is log value of per capita electricity consumption (proxy of infrastructure), L_labf is log value of total labor force, L_mnsch is log mean year of schooling, DCbyFIN is domestic credit provided by financial sectors, Capitalg.tax is capital gain tax, and trade is the ratio of total international trade (total sum of import and export) as a share of GDP.

Result of Specification Test:

Hausman Test:

Since the key consideration in choosing between a random effects and fixed effects approach is whether ai (a fixed effect which captures all unobserved, time constant factor that affects yi) and xit (Independent variables) are correlated, it is important to have a method for testing this assumption. Hausman, (1978) proposed a test based on the difference between the random effects and fixed effects estimates. Since Fixed Effect is consistent when ai and xit are correlated, but Random Effect is inconsistent, a statistically significant difference is interpreted as evidence against the random effects assumption. The null hypothesis of the Hausman test is that the preferred model is a random effect. According to the result of the Hausman test of our empirical study as shown in table 5; the prob>chi2 is less than 0.05 (almost 0 in both measures of FDI; FDI inflow and FDI stock as an independent variable), which means that fixed effect model is more appropriate than random effect model.

Breusch and Pagan Lagrangian Multiplier Test:

The breusch pegan lagrangian multiplier (LM) test helps us pick the appropriate method of a random-effects regression and a simple OLS regression. The null hypothesis in the LM test is that variances across entities are zero; the preferred model is pooled OLS. According to the LM test result in table 5; prob>chi2 is less than 0.05 (almost 0 in both measure of FDI; inflow and stock), which means that the random effect is better than the pooled OLS.

F-test:

The result of F-test shows whether there is a fixed effect in the model or not. Table 5 presents the result of the F-test. According to the result, fixed effect model is more significant than pooled OLS, under both measures of FDI: inflow and stock. P-value of F-test score under both regression methods are less than 0.0001, and F- value of fixed effect model is higher than OLS. This means that FE is preferred model to pooled OLS.

Arellano bond Test:

The result of the Arellano bond test (estat abond) reports serial correlation in the first-differenced error. Rejecting the null hypothesis of no serial correlation in the first-differenced errors at order zero does not imply model misspecification, because the first-differenced errors are serially correlated if the idiosyncratic errors are independent and identically distributed. Table 8 reports the results of Arellano bond test under DGMM and SGMM with different measures of FDI; stock and inflow. According to the result, we reject no autocorrelation of order 1 and cannot reject any autocorrelation of order 2. There is evidence that the Arellano–Bond model assumptions are satisfied in the case of both FDI measures: inflow and stock under both regression methods (DGMM and SGMM). P-value (prob>z) in first order is less than 0.05, and it is more than 0.1 in the second order in both case. Therefore, the assumptions of Arellano bond are satisfied.

Sargan Test:

Only for a homoscedastic error term does the Sargan test have an asymptotic chi-squared distribution. Arellano and Bond (1991) show that the Sargan test over rejects in the presence of heteroskedasticity. Table 8 reports the results of sargan test under different regression models; DGMM and SGMM. The output of the two-step Sargan test (Prob> chi2 is more than 0.1; almost 1.0) presents strong evidence that we cannot reject the null hypothesis; therefore, the overidentifying restrictions are valid in both model specification of FDI inflow and stock under DGMM and SGMM.

Estimation Results of 63 Developing Countries

Tables 3 and 4 present the results of the panel data regression analyses based on pooled OLS, fixed effect and random effects models, where the dependent variable is the growth rate of per capita GDP. Table 3 presents the result when the FDI variable is FDI inflow divided by GDP, while Table 4 reports the result when the FDI variable is FDI stock divided by GDP. Since according to the Breusch Pegan lagrangian multiplier test we can reject the null hypothesis that OLS is consistent, the random effect model seems to be appropriate. According to the Hausman test, we can reject the null hypothesis that individual-specific effects in equation (1) are random, meaning that an appropriate model is the fixed effects model. Therefore, we discuss the result based on the fixed effects model.

First, the coefficient of per capita GDP in the previous year is statistically significant (at the 1% level) and has a negative sign; this means that countries with larger per capita GDP tend to have smaller growth rates than countries with lower per capita GDP. Developing countries are converging to their steady state after controlling for other independent variables (conditional convergence according to Barro and Sala-i-Martin, 1992). Second, the coefficient of the FDI variable is statistically significant (either at the 1% level or the 5% level) and has a positive sign, whether the flow FDI variable (Table 5.2) or the stock FDI variable (Table 5.3) is used. Since the estimated coefficient is 0.067 according to Table 5, the 1% increase in FDI inflow (as a share of GDP) results in a 0.067 percentage point increase in the growth of per capita GDP.

Third, the coefficient of the domestic savings rate has a positive sign. However, according to the result of the fixed effects model, it is not statistically significant. Therefore, it is not clear whether domestic savings is significantly affecting economic growth from these results. Fourth, among other independent variables, the coefficients of the labor force variable and the education variable are statistically significant. However, while the coefficient of the labor force variable has a positive sign as expected, the coefficient of the education variable has a negative sign. This may be because most developing countries still rely on labor-intensive technologies and low-skilled workers: Thus, the expansion of education has not contributed to economic growth yet. Fifth, the coefficient of domestic financial development (proxied by credit provided by domestic financial sectors) is positive and significant at 1% level of significance, whether the flow FDI variable (Table 3) or the stock FDI variable (Table 4) is used.

Tables 6 and 7 reports the results of the dynamic panel data regression analysis, which are obtained by using the Arellano Bond estimator (difference GMM estimator) and the Blundell Bond estimator (system GMM estimator). Table 6 presents the result when the FDI variable is FDI inflow divided by GDP, while Table 7 reports the result when the FDI variable is FDI stock divided by GDP. In the dynamic panel data model (equation (4)), all the variables are converted to the natural logarithm unless otherwise indicated. According to the Arellano Bond Test (Test of Serial Uncorrelation of the Error Term), there is no first-order serial autocorrelation in the error term, while according to the Sargan Test (Test of Overidentifying Restrictions), overidentifying restrictions are valid.

We now discuss the results of Table 6, in which the FDI variable is FDI inflow as a share of GDP. First, the coefficient of the FDI variable is statistically significant at the 1% level and has a positive sign in all model specifications; thus, the result is robust. In other words, the increase in FDI inflow (as a share of GDP) would raise per capita GDP, ceteris paribus. Second, the coefficient of domestic savings ratio is also statistically significant the 1% level in most model specifications and has a positive sign; this implies that the increase in domestic savings rate would increase per capita GDP, ceteris paribus. If GDP is fixed, a larger domestic savings ratio will result in domestic investment, and in turn, bring about a higher per capita GDP through capital formation.

Third, the coefficient of the infrastructure variable (proxied by per capita electricity consumption) is statistically significant at either the 1% and 5% significance level in all model specifications and has a positive sign: This means that the development of infrastructure has played an essential role in raising per capita GDP. Fourth, among other independent variables, the coefficient of the labor force variable is statistically significant in most model specifications; but the results are mixed regarding its sign: favorable in some model specifications and negative in some other model specifications. Therefore, it is unclear whether the increase in the labor force will increase per capita GDP. According to the result, as shown in table 6, the coefficient of human capital proxied by mean year of schooling is significant at 1% level of significance in all model specification, and the sign is positive. Table 6 shows significant results for some other independent variables, but their effects are negligible.

We next discuss the result of Table 7 in which the FDI variable is the stock of FDI as a share of GDP. First, the coefficient of the FDI variable is statistically significant in most, but not all model specifications, though it has a positive sign in all model specifications. Unlike FDI inflow, the result is not robust; this implies that the increase in the inflow of FDI has played a more important role than the increase in the stock of FDI on economic growth. Second, the coefficient of the domestic savings ratio is statistically significant the 1% level in most model specifications and has a positive sign; this confirms the result using the flow of FDI as an independent variable.

Third, the coefficient of the infrastructure variable as proxied by per capita electricity consumption is statistically significant at the 1% significance level in all model specifications and has a positive sign; this again confirms the result using the flow of FDI as an independent variable. Fourth, among other independent variables, the coefficient of the labor force variable is statistically significant in most model specifications; but like the FDI flow variable case, the results are mixed regarding its sign: positive in some model specifications and negative in some other model specifications. Therefore, it is not clear whether the increase in the labor force will increase per capita GDP. Fourth, the impact of human capital proxied by mean year of schooling is similar as the result of FDI inflow; statistically significant at 1% level in the most model specification, and the sign is positive. The coefficient of domestic financial development is statistically significant at 1% level, but the sign is negative, and the scale of impact is very small.

It should be noted that the estimated coefficients of inflation and business environment are very small and almost negligible, though some coefficients are significant; this means that these variables have not exerted much impact on economic growth among developing countries. We also performed panel data regression analysis for each region (Africa, Asia, and Latin America and others), but did not find any significant or interesting results other than the result for 63 developing countries. The results of different regions validate the similar results as we discussed above.

Effects of FDI on Economic Growth under Difference Conditions

From the empirical results presented above, FDI is found to have a statistically significant and positive impact on economic growth, whether FDI is flow or stock. This section now investigates the effect of FDI on economic growth under different conditions by estimating the interaction effect of FDI with other independent variables such as domestic savings rate, infrastructure, labor force, education, domestic financial development, trade openness, and business environment. Tables 9 and 10 report results where the FDI variable is the flow of FDI divided by GDP in Table 9 and the stock of FDI divided by GDP in Table 10.

Table 9 shows that FDI inflow has a stronger impact on economic growth in countries with higher levels of infrastructure (proxied by per capita electricity consumption), education (proxied by mean year of schooling), trade openness and better developed domestic financial market. However, FDI flow has a negative impact on economic growth in countries with higher levels of domestic savings rate, labor force, and low doing business performance.

As shown in Table 10, the results are similar when the stock of FDI is used as the FDI variable. That is, the stock of FDI has a stronger impact on economic growth in countries with higher levels of infrastructure (proxied by per capita electricity consumption), education, trade openness and better developed domestic financial market, while the stock of FDI has a negative impact on economic growth in countries with higher levels of domestic savings rate, labor force, and business performance. These observations suggest that the effect of FDI on economic growth of an FDI receiving country depends very much on the condition of the country, such as infrastructure, trade openness, labor force, education and so on.

Table 3 Result of OLS, FE, and RE (FDI Inflow as a share of GDP); Growth rate as a dependent variable				**Table 4** Result of OLS, FE, and RE (FDI Stock as a share of GDP); Growth rate is the dependent variable.			
GDP growth rate	OLS	FE	RE	GDP growth rate	OLS	FE	RE
L_l.PCGDP	-97.976***	-102.916***	-102.640***	L_l.PCGDP	-100.017***	-103.524***	-103.383***
	(1.10)	(0.54)	(0.54)		(1.08)	(0.54)	(0.53)
L_PCFDI	0.054	0.067***	0.075***	L_PCFDIstk	0.486**	0.221**	0.208**
	(0.05)	(0.02)	(0.02)		(0.20)	(0.10)	(0.10)
Saving_rate	0.002	-0.000	0.003	Saving_rate	0.007*	0.003	0.005
	(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)
L_Pcelect	-0.453***	-0.162	-0.144	L_Pcelect	-0.469***	-0.109	-0.114
	(0.06)	(0.11)	(0.09)		(0.06)	(0.12)	(0.10)
L_labf	-0.003	1.111***	0.057	L_labf	-0.017	0.693**	0.060
	(0.03)	(0.28)	(0.08)		(0.03)	(0.29)	(0.09)
L_mnsch	-0.272*	-1.491***	-1.220***	L_mnsch	-0.271*	-1.375***	-1.270***
	(0.24)	(0.25)	(0.24)		(0.25)	(0.24)	(0.24)
Inflation	0.000	0.000	0.000	Inflation	-0.000	-0.000	-0.000
	(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)
DCbyFIN	0.004***	0.004***	0.003***	DCbyFIN	0.003**	0.003***	0.003**
	(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)
Capitalg.tax	0.003	-0.010***	-0.008***	Capitalg.tax	0.002	-0.006**	-0.005**
	(0.00)	(0.00)	(0.00)		(0.00)	(0.00)	(0.00)
Constant	6.370***	-11.758**	5.380***	Constant	7.049***	-5.066	5.164***
	(0.73)	(5.44)	(1.60)		(0.74)	(5.43)	(1.88)
R-Squared	0.95	0.78	0.94	R-Squared	0.92	0.87	0.93
The *t*-statistics are in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% level respectively.							

Table 5 Result of Specification Test (Hausman test, F-test, and LM test)

Hausman test result (FDI inflow as a share of GDP)	
Test: Ho: difference in coefficients not systematic	
chi2(10) = (b-B)'[(V_b-V_B) ^ (-1)] (b-B)	
=	35.34
Prob>chi2 =	0.0001
Hausman test result (FDI stock as a share of GDP)	
Test: Ho: difference in coefficients not systematic	
chi2(10) = (b-B)'[(V_b-V_B)^(-1)](b-B)	
=	24.28
Prob>chi2 =	0.0069

F-test (Dependent Variable: FDI inflow as a share of GDP)			
FE	F (11,601)	=	4168.84
	Prob > F	=	0.0000
OLS	F (11, 644)	=	999.10
	Prob > F	=	0.0000
F-test (Dependent Variable stock as a share of GDP)			
FE	F (35,600)	=	1448.01
	Prob > F	=	0.0000
OLS	F (35, 643)	=	347.22
	Prob > F	=	0.0000

Breusch and Pagan Lagrangian multiplier test for random effects (Dependent variable: FDI inflow as a share of GDP)		
GDPgrowth[Countrynum,t] = Xb + u[Countrynum] + e[Countrynum,t]		
Estimated results:		
|	Var	sd = sqrt (Var)
GDP growth |	13.74833	3.707874
e |	.1577898	.3972276
u |	.6281543	.7925619
Test: Var(u) = 0		
chibar2(01) = 2998.79		
Prob > chibar2 =	0.0000	
Breusch and Pagan Lagrangian multiplier test for random effects (Dependent variable: FDI Stock as a share of GDP)		
GDPgrowth[Countrynum,t] = Xb + u[Countrynum] + e[Countrynum,t]		
Estimated results:		
|	Var	sd = sqrt (Var)
GDP growth |	15.10302	3.886261
e |	.1644895	.405573
u |	.9114046	.9546751
Test: Var(u) = 0		
chibar2(01) = 3461.87		
Prob > chibar2 =	0.0000	

Table 6 Estimation result under DGMM and SGMM; FDI inflow as a Share of GDP (Per capita GDP as the dependent variable)

Log Per capita GDP PPP 2010	DGMM	SGMM	DGMM	SGMM	DGMM	SGMM	DGMM	SGMM
L_l.PCGDP	0.906***	0.967***	0.914***	0.934***	0.925***	0.945***	0.885***	0.940***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
L_PCFDI	0.012***	0.016***	0.007***	0.010***	0.006***	0.009***	0.010***	0.012***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Saving_rate	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***	0.001***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
L_Pcelect	0.010***	0.021**	0.040***	0.041***	0.042***	0.046***	0.043***	0.027**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)
L_labf	-0.045**	0.035***	-0.054***	0.014***	-0.047***	0.034**	-0.101***	0.046**
	(0.02)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)
L_mnsch	0.106***	0.055***	0.050***	0.068***	0.066***	0.063***	0.170***	0.071***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Inflation			0.000	-0.000***	-0.000	-0.000**	-0.000***	-0.000***
			(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
DCbyFIN					-0.000***	-0.000***	-0.000***	-0.000***
					(0.00)	(0.00)	(0.00)	(0.00)
Capitalg.tax							-0.001***	-0.001***
							(0.00)	(0.00)
Constant	1.151***	-0.226***	1.136***	0.096	0.966***	-0.219	1.801***	-0.341
	(0.25)	(0.07)	(0.14)	(0.09)	(0.23)	(0.22)	(0.32)	(0.36)

The *t*-statistics are in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% level respectively.

Table 7 Estimation result under DGMM and SGMM; FDI stock as a Share of GDP (Per capita GDP as the dependent variable)

Log Per capita GDP PPP 2010	DGMM	SGMM	DGMM	SGMM	DGMM	SGMM	DGMM	SGMM
L_l.PCGDP	0.907***	0.961***	0.915***	0.940***	0.926***	0.952***	0.874***	0.926***

	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
L_PCFDIstk	0.003	0.011**	0.04*	0.009**	0.08**	0.011***	0.021***	0.031***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Saving_rate	0.001***	0.002***	0.001***	0.002***	0.001***	0.002***	0.002***	0.002***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
L_Pcelect	0.033***	0.022***	0.026***	0.032***	0.035***	0.040***	0.056***	0.045***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)
L_labf	-0.209***	0.036***	-0.012*	0.007	-0.022**	0.010	-0.088***	0.09**
	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.03)	(0.01)	(0.03)
L_mnsch	0.028***	0.052***	0.025	0.073***	0.038***	0.081***	0.093***	-0.006
	(0.01)	(0.00)	(0.02)	(0.01)	(0.01)	(0.02)	(0.03)	(0.03)
Inflation			0.000	-0.000***	-0.000	-0.000	-0.000***	-0.000***
			(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
DCbyFIN					-0.001***	-0.001***	-0.000***	-0.001***
					(0.00)	(0.00)	(0.00)	(0.00)
Capitalg.tax							-0.001***	-0.001***
							(0.00)	(0.00)
Constant	0.469***	-0.216***	0.471*	0.166	0.600***	0.317	1.694***	0.007
	(0.11)	(0.07)	(0.24)	(0.13)	(0.13)	(0.45)	(0.17)	(0.32)

The *t*-statistics are in parentheses. *, ** and *** indicate significance at 10%, 5% and 1% level respectively.

Table 8 Result of Specification Test (Abond test and Sargan test)

Arellano Bond

Abond test for zero autocorrelation in first-differenced errors (FDI inflow as a share of GDP)
Order z Prob > z
1 -4.1161 0.00
2 -.85813 0.39
H0: no autocorrelation

Blundell Bond

Abond test for zero autocorrelation in first-differenced errors (FDI inflow Share as a share of GDP)
Order z Prob > z
1 -4.0806 0.00
2 -1.2722 0.20
H0: no autocorrelation

Sargan test of overidentifying restrictions (FDI inflow as a share of GDP)
H0: overidentifying restrictions are valid
chi2(275) = 36.82
Prob > chi2 = 1.00

Sargan test of overidentifying restrictions (FDI inflow as a share of GDP)
H0: overidentifying restrictions are valid
chi2(298) = 35.74
Prob > chi2 = 1.00

Abond test for zero autocorrelation in first-differenced errors (FDI stock as a share of GDP)
Order z Prob > z
1 -3.5092 0.00
2 -1.2527 0.21
H0: no autocorrelation

Abond test for zero autocorrelation in first-differenced errors (FDI stock as a share of GDP)
Order z Prob > z
1 -4.1072 0.00
2 -1.0779 0.28
H0: no autocorrelation

Sargan test of overidentifying restrictions (FDI stock as a share of GDP)
H0: overidentifying restrictions are valid
chi2(275) = 34.14
Prob > chi2 = 1.00

Sargan test of overidentifying restrictions (FDI stock as a share of GDP)
H0: overidentifying restrictions are valid
chi2(298) = 35.65
Prob > chi2 = 1.00

Table 9 Growth impact of FDI Inflow on economic growth under different conditions

	L_PcGDP	Saving_rate	L_Pcelect	L_labf	L_mnsch	trade	DCbyFIN	Capitalg.tax
L_l.PCGDP	-4.006***	-104.097***	-103.723***	-102.675***	-104.596***	-103.033***	-103.922***	-103.953***
	(1.14)	(1.87)	(1.88)	(1.83)	(1.86)	(1.87)	(1.85)	(1.88)
L_PCFDI	-0.341	0.096	-0.948**	2.086***	-1.230***	-0.363***	-0.468***	0.149
	(1.75)	(0.11)	(0.37)	(0.50)	(0.33)	(0.12)	(0.13)	(0.14)
FDI inflow X Interaction	0.162	-0.012***	0.126**	-0.132***	0.587***	0.003***	0.006***	-0.009**
	(0.22)	(0.00)	(0.05)	(0.03)	(0.17)	(0.00)	(0.00)	(0.00)
L_PCGDP		0.123***	0.074	-0.498	3.649***	-0.019*	0.001	-0.041
		(0.03)	(0.64)	(0.31)	(0.96)	(0.01)	(0.01)	(0.03)

Saving_rate	103.713***		0.373**	-0.009	0.014	0.006**	-0.003	-0.018**
	(1.92)		(0.16)	(0.08)	(0.25)	(0.00)	(0.00)	(0.01)
L_Pcelect	103.268***	-0.047***		-0.049	0.218	0.004	-0.002	-0.012
	(1.92)	(0.01)		(0.08)	(0.25)	(0.00)	(0.00)	(0.01)
L_labf	102.517***	-0.042***	0.191		0.087	0.006**	-0.002	-0.026***
	(1.87)	(0.01)	(0.16)		(0.24)	(0.00)	(0.00)	(0.01)
L_mnsch	104.247***	-0.045***	0.188	-0.077		0.003	0.001	-0.008
	(1.91)	(0.01)	(0.16)	(0.08)		(0.00)	(0.00)	(0.01)
trade	102.685***	-0.047***	0.280*	-0.023	0.143		-0.002	-0.017**
	(1.91)	(0.01)	(0.16)	(0.08)	(0.24)		(0.00)	(0.01)
DCbyFIN	103.375***	-0.043***	0.433***	-0.079	0.184	0.002		-0.011
	(1.89)	(0.01)	(0.16)	(0.08)	(0.24)	(0.00)		(0.01)
Capitalg.tax	103.481***	-0.038***	0.264	-0.088	0.074	0.004	-0.000	
	(1.93)	(0.01)	(0.16)	(0.08)	(0.25)	(0.00)	(0.00)	

Table 10 Growth impact of FDI Stock on economic growth under different conditions

	L_PcGDP	Saving_rate	L_Pcelect	L_labf	L_mnsch	trade	DCbyFIN	Capitalg.tax
L_l.PCGDP	-3.133	-103.447***	-104.021***	-102.815***	-104.684***	-103.953***	-105.635***	-103.482***
	(2.29)	(1.87)	(1.90)	(1.85)	(1.89)	(1.82)	(1.89)	(1.82)
L_PCFDIstk	0.756	-0.096	-0.748*	1.799***	-0.941***	-0.162	-0.436**	0.035
	(1.83)	(0.16)	(0.38)	(0.54)	(0.32)	(0.15)	(0.17)	(0.16)
FDI Stock X Interaction	-0.013	-0.011**	0.122*	-0.110***	0.490***	0.006***	0.009***	-0.018***
	(0.26)	(0.00)	(0.07)	(0.03)	(0.17)	(0.00)	(0.00)	(0.00)
L_PCGDP		0.134***	0.254	-0.508	3.782***	-0.018	-0.004	-0.053*
		(0.03)	(0.68)	(0.33)	(1.08)	(0.01)	(0.02)	(0.03)
Saving_rate	103.360***		0.341**	-0.051	-0.160	0.007**	-0.001	-0.018**
	(1.91)		(0.17)	(0.08)	(0.28)	(0.00)	(0.00)	(0.01)
L_Pcelect	103.381***	-0.046***		-0.044	0.167	0.003	-0.001	-0.013*
	(1.92)	(0.01)		(0.08)	(0.27)	(0.00)	(0.00)	(0.01)

L_labf	103.381***	-0.044***	0.172		0.086	0.006**	-0.000	-0.024***
	(1.92)	(0.01)	(0.16)		(0.26)	(0.00)	(0.00)	(0.01)
L_mnsch	104.233***	-0.045***	0.143	-0.077		0.004	0.002	-0.011
	(1.93)	(0.01)	(0.17)	(0.08)		(0.00)	(0.00)	(0.01)
trade	103.215***	-0.047***	0.160	0.053	0.233		-0.002	-0.018**
	(1.85)	(0.01)	(0.16)	(0.09)	(0.26)		(0.00)	(0.01)
DCbyFIN	104.771***	-0.041***	0.465***	-0.035	0.124	0.001		-0.011
	(1.90)	(0.01)	(0.17)	(0.08)	(0.26)	(0.00)		(0.01)
Capitalg.tax	103.481***	-0.041***	0.276*	-0.201**	-0.165	0.006**	0.004	
	(1.85)	(0.01)	(0.16)	(0.09)	(0.26)	(0.00)	(0.00)	

V CONCLUSION AND POLICY IMPLICATIONS

The primary objective of this study is to analyze the effects of FDI on economic growth and explore the factors and conditions that affect the effectiveness of FDI on economic growth. This objective was achieved by using several panel data regression methods with a panel data set of 63 developing countries for the period from 1990 to 2015, including 22 Asian, 26 African and 15 Latin America and other countries. The following sections provide a summary of significant findings and policy implications for the SAARC countries, particularly Nepal.

Summary of Major Findings

Major findings are summarized as follows. First, according to the results (by the fixed effects estimator) for all countries, countries with smaller per capita GDP in the previous year tend to grow faster than countries with higher per capita GDP; this suggests that countries are converging to their steady states after controlling for other variables affecting economic growth. Second, according to the results (by the fixed effects, difference GMM, and system GMM estimators) for all countries, except a few model specifications, FDI has a significant and positive effect on economic growth, whether a flow or stock variable measure FDI. Third, according to the results (by the fixed effects, difference GMM, and system GMM estimators) for all countries, domestic savings ratio has a significant and positive effect on economic growth, suggesting that investment financed by domestic savings has played an important role in economic development in developing countries.

Fourth, according to the results (by the difference GMM and system GMM estimators) for all countries, infrastructure (as proxied by per capita electricity consumption) has a significant and positive effect on economic growth, suggesting that infrastructure has played an important role in economic development in developing countries. Fifth, according to the results (from the DGMM and SGMM estimators), education (as proxied by mean year of schooling) has played an important role in the economic growth of developing countries. Whether measured by a flow or stock variable, FDI has a stronger impact on economic growth in countries with higher levels of infrastructure, education, trade openness, and better developed domestic financial market. On the other hand, FDI has a negative impact on economic growth in countries with higher levels of domestic savings rate, labor force, and poor doing business environment. These observations suggest that the impact of FDI on economic growth of developing countries depends very much on the economic condition of the country, such as infrastructure, domestic savings, we trade openness, labor force, natural resources and so on.

Policy Implications:

From these findings, some policy implications can be drawn for the roles of FDI in economic development. First, since FDI is found to have a significant and positive effect on economic growth, the government should develop and strengthen economic and business environment that is conducive to FDI, where FDI should be directed more to the tradable sector such as manufacturing sectors, since trade openness seems to have enhanced the effect of FDI on economic growth. The government of Nepal should design policies to attract FDI in tradable sectors to achieve the higher growth, to reduce the trade deficits, and to increase employment generation. Second, since the saving rate has a positive impact on growth. The saving rate as a share of GDP of Nepal is very small, so the government of Nepal should design effective monetary policy, and also focus on financial market development to encourage people to save more. Third, since well-developed physical infrastructure seems to have promoted the effect of FDI on economic growth, the government should allocate more funds to the development of physical infrastructure. Fourth, since the development of financial institutions and markets seems to raise the effect of FDI on economic growth, the government of Nepal should promote financial institutions development, and also should expand the network of the financial institution in every local body to attract more FDI, and to realize higher growth.

Fifth, since the size of labor force, seems to have affected negatively to the effect of FDI on economic growth, and education has affected positively to the effect of FDI on economic growth, the government should raise the level of education by expanding basic education and promoting vocational education. The government of Nepal should focus on the institutional capacity of technical and vocational educational institutions and should also expand vocational education and training centers at the local level. It should also try to mitigate the educational mismatch between employers and employees by providing vocational training programs. Finally, the government should improve its institutional capacity to reduce unnecessary costs and time associated with the business. The government of Nepal should design the policy to improve the business environment and also focus on the institutional strengthening for effective implementation of a one-door policy to administer FDI. Some policy means to attract FDI include the establishment of special economic zones, the introduction of one-stop government, and tax facilities.

Conclusions:

It is a well-accepted argument in the developing economics literature that FDI plays an important role in the growth of developing countries. This empirical study contributes to the FDI literature, as it explicitly treats host countries' conditions and FDI impact on economic growth in developing countries and policy implication for Nepal.

The estimated result confirms the hypothesis that FDI can promote the economic growth of host countries. Moreover, FDI will generate more growth impact if host countries have appropriate economic and institutional conditions such as high education level, efficient physical infrastructure, trade liberalization, domestic financial market development, and improved doing business environment in developing countries. To generate the positive impact of FDI (inflow and stock) on economic growth developing countries should have some prerequisites or absorptive capacities. However, we do not find the evidence to support our hypothesis that the FDI has a substantial positive impact on growth if host countries have higher domestic saving, higher labor force, and economic stability.

This research study seeks to further our knowledge of the FDI and growth in developing economies and policy implication for Nepal. Better knowledge about the importance of FDI to fulfill the investment gap and economic growth of developing countries is crucial for devising strategies to promote long-term policies. Because of time, knowledge and resource constraints, we left many factors that can affect this relationship such as foreign exchange rate, migration, political stability, etc.

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Publisher: Center for Economic Analyses - CEA

For the publisher: Marjan Nikolov

Title: CEA JOURNAL OF ECONOMICS

Cover & pre-press: **GLOBAL Communications, Skopje**

Skopje, December 2018