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Trade Collapses and Trade Slowdowns: Evidence from Some Central and Eastern European Countries

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World trade suddenly plummeted in the last quarter of 2008 after the bankruptcy of Lehman brothers and the subsequent meltdown in financial markets. Even if the following recovery was impressive, trade growth is now noticeably below trend. The anaemic momentum in global export volume questions whether the financial crisis has permanently changed the trade landscape. In this paper, we address trade elasticities in some Central and Eastern European economies by estimating a standard import function equation. We employ a dynamic panel Auto Regressive Distributed Lag model with the Common Correlated Effects Mean Group estimator to cope with cross-sectional dependence. The model is fit on a sample of eight countries over the period 1995:q1–2017:q1. First, we estimate long-run import elasticities with respect to GDP and the relative import price. Then, we discriminate between booms and slowdowns. Results confirm imports respond differently over the business cycle.

Key Words: World trade collapse, trade elasticities, CEECS, CCEMG

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Introduction

After the fall of the iron curtain, practitioners started to quantify the trade potentials between the European and the Central and Eastern European Countries (CEECS). Scholars put considerable efforts to assess endowments in the periphery and the ability of CEECS to catch up with more advanced economies (Hamilton and Winters 1992; Wang and Winters 1992; Baldwin 1995). Yet, these early works and following contributions focus mostly on the export side. Since then, little effort has been placed on the import side, exception made for a few scattered works on single countries (Benáček, Prokop, and Višek, 2003; Mroczek and Rubazek

2004; Benk et al. 2006) and panels (Reininger 2007). Our aim is to fill this gap analysing the behaviour of imports with a sample of eight CEECS (the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, and Slovenia).

We also address the impact of the great recession and the European debt crisis, as we provide estimates on import elasticities during the period 1995–2017, whilst distinguishing between expansions and slowdowns in the business cycle. Our research objective is to supply a tentative explanation on the interplay between import and price sensitiveness to GDP during tranquil times and recessions for the aforementioned countries. This is essential to get a better understanding on CEECS' trade response to the 2008–2009 financial turmoil and the following European sovereign debt crisis, and which type of policy action may help to further foster trade and growth in the European Union.

We base our analysis on the most recent advances in the nonstationary panel literature, taking also into account parameter heterogeneity. To this aim, we adopt the Common Correlated Effects Mean Group (CCEMG) estimator for dynamic Auto Regressive Distributed Lag (ARDL) models recently introduced by Chudik and Pesaran (2015). Results confirm our research hypothesis: CEECS' trade behaviour is dissimilar during periods of relatively rapid economic growth (expansions or booms), and periods of relative stagnation or decline (contractions or recessions). First, we find a standard result of the import function literature: the income elasticity is greater than one in the whole sample. However, it is not significantly different from zero during expansions, while it is hefty (2.55) during contractions. Second, the error-correction speed of adjustment term is larger (in absolute value) in downturns, suggesting that macroeconomic variables respond asymmetrically along the business cycle, i.e. the return to the long-run equilibrium is much quicker during slowdowns than during expansions. Finally, price elasticity is significantly negative in the whole sample only.

Our work contributes to the literature on the estimation of world trade elasticities (European Central Bank 2014; Slopek 2015; Martínez-Martín 2016) with an in-depth analysis on a set of CEECS that represents a growing part of the European Union, but received so far little attention. Our investigation also sheds fresh new light on the first great recession that post-communist economies have suffered since their transition to a market economy.

The paper is organized as follows. In the next section, we illustrate re-

cent developments in world trade and present the literature underpinning import function specifications. The third section introduces a theoretically sound approach for the empirical analysis and describes the dataset, the fourth section discusses results, and the fifth section summarizes and sets directions for further research.

Literature Review

There is a large literature that provides estimates about price and income elasticities for both advanced and developing countries. These are pivotal for addressing a wide range of important policy issues such as trade liberalization, the stability of the foreign exchange market or a monetary union, and the sustainability of external deficits (Marquez 2002). The traditional import function is specified as a log-linear function of income and the relative price of imports. This approach dates back to the early 1940s (De Vegh 1941; Adler 1945; Hinshaw 1945). Yet, the most well known contribution is due to Houthakker and Magee (1969), who reckon import income elasticity is lower in developing countries than in developed ones. They report an overall elasticity of about 1.62 for 15 leading economies and a value of 1.5 in the United States. However, a value larger than unity has the puzzling implication that, in the absence of relative price increases, a country will change from a self-sufficient economy to one that eventually cannot pay for its imports.

Several years later, Goldstein and Khan (1985) publish a comprehensive survey on import elasticities, but all previous findings have been dismissed mostly because they derive from possibly spurious regression, as cointegration analysis was not yet introduced. Nonetheless, more recent long-run estimates are still in the range of those reported by previous authors (Clarida 1994; Reinhardt 1995; Senhadji 1998; Marquez 2002; Harb 2005). This literature addresses different specifications and employs heterogeneous econometric techniques, adding several explanatory variables apart from GDP and import prices. However, all these studies confirm income elasticity is larger in advanced countries than in emerging and developing ones.

Exception made from a few scattered contributions on some Eastern European countries (Benáček, Prokop, and Višek, 2003; Mroczek and Rubazek 2004; Benk et al. 2006), to the best of our knowledge, the only comprehensive analysis on import responsiveness in CEECS is due to Reininger (2007). This author estimates separately the elasticity of all the components of final demand in single countries and three panels includ-

ing respectively 5, 8, and 12 economies. Final demand elasticities are quite small in both panel and country estimates, i.e. always below unity but Slovakia. Imports in CEECS appear to be mostly driven by investment and exports, while private and government consumption play a minor role. Unfortunately, this author does not provide any results about GDP elasticities. As we will discuss in the next section, a central tenet in the trade function approach is the unitary elasticity. The standard model implies import elasticities with respect to income and price are respectively equal to one and minus one. As reported above, empirical findings are often very different. This may be due to either the over simplified theoretical model or the noise introduced by the proxies (Harb 2005).

All the contributions about CEECS have been published before the great recession and the world trade collapse. Since then, the average annual growth rate of global trade suffered from a severe drop due to the financial crisis, moving from the 7.3% of the years 2003–2007 to the 2.7% of 2008 and the subsequent breakdown (–10.2%). Global trade bounced back (12%), but its growth rate halved in the following year. Since then its pace has been stabilizing to values around 3%, less than half of the average rate of expansion during the previous three decades.¹ Global trade is now 17% below where it would be had it grown at pre-crisis trend after 2011, while world GDP is now only 3% below trend. The trade-to-GDP ratio² was 1.8 over the period 1981–2007, and declined to 1.1 in the following years (Jääskelä and Mathews 2015).

This surprising sluggish pace attracted the attention of scholars around the world, who tried to provide plausible explanations for such a phenomenon, despite not reaching a consensus (International Monetary Fund 2016; Martínez-Martín 2016). Indeed, researchers look at to what extent the current trend in the trade-to-GDP ratio is attributable to short-term (cyclical) and/or long-term (structural) effects. Amongst those who focus on the former, Bussière et al. (2013), Duval et al. (2014), Ollivaud and Schwellnus (2015) address the role of the different components in final demand (private consumption, government purchases, investment, exports). Amongst those who look at the latter, at least four structural factors have been isolated. First, the deceleration in the expansion of global value chains (Constantinescu, Mattoo, and Ruta 2015). Second, the shift of manufacturing towards emerging markets, such as China, India, the Asian tigers and Eastern Europe (European Central Bank 2016). Third, the possible substitution effect between imports and inward FDI (Martínez-Martín 2016). Fourth, the surge of protectionism, in the form

of tariff and non-tariff barriers (Evenett 2014). Our contribution does not belong to these strands of literature, as we place ourselves in the path traced by the seminal work by Freund (2009). This author computes the trade elasticity with respect to GDP during normal and contractionary periods and finds it is higher during slowdowns. Our effort is thus to follow her intuition and provide evidence of import responsiveness to income and relative prices for a selection of CEECS, before and after the 2008–2009 financial turmoil and the Euro crisis.

Model Setting and Data

Import demand functions can be derived either from producer or consumer theory. The former casts a standard cost minimization problem:

$$C(P_M, P_D, Y) = \min_{M,D} [P_M M + P_D D: f(M, D) > Y]. \quad (1)$$

Producers find the optimal bundle of imported inputs (M) and domestic ones (D , i.e. capital and labour) to attain a given level of output Y , where $f(M, D)$ is a well-behaved production function (Kohli 1991). The demand for imports that minimizes cost is:

$$M = \frac{\partial C(P_M, P_D, Y)}{\partial P_M}. \quad (2)$$

If we assume constant returns to scale, the cost function is separable in prices and output, so that the import demand function is linearly homogeneous in Y :

$$M = \frac{\partial C(P_M, P_D)}{\partial P_M} Y. \quad (3)$$

If we deem Y as income, then income elasticity is equal to one. This import function can be easily determined from a CES technology, or approximated by a translog with constant second order terms. Either way, it is given by:

$$\ln M = \ln Y - \beta \ln \frac{P_M}{P_D}, \quad (4)$$

where Y is aggregated demand, traditionally proxied by GDP or National Income. This is the linear model analysed in earlier studies as in Houthakker and Magee (1969) among others. It restricts the demand elasticity to unity, while the price elasticity must be negative.

Another strand of the literature focuses on consumers. Clarida (1994) assumes a representative agent who consumes both a domestic good D_t and an imported one M_t :

TABLE 1 Summary Statistics

Variable	Observations	Mean	Std. dev.	Min	Max
Import	716	4.460	0.243	3.818	4.854
GDP	716	4.287	0.505	2.968	5.049
Price	712	0.085	0.148	-0.142	0.750

$$\max_{D_t, M_t, A_t} = V \int_{t=0}^{\infty} e^{-\delta t} U(D_t, M_t) dt, \quad (5)$$

$$\text{s.t. } A = rA_t + \bar{Y}_t - D_t - P_t^M M_t, \quad (6)$$

where $P_t^M = P_{M,t}/P_{D,t}$ is the relative price of imports as the domestic price is the numeraire, \bar{Y}_t is labour income, A_t assets, r the interest rate and δ the subjective rate of time preference. Reinhart (1995) adopts a Cobb-Douglas utility function that allows specifying the steady state. This yields an import demand function as in (4) with $\beta = 1$, and where Y is the sum of labour and interest incomes. This framework provides several testable propositions. First, it suggests that permanent income Y and the relative price suffice to describe the long-run behaviour of imports. Second, it assigns a well-defined role to the activity level and prices to affect trade flows because the Cobb-Douglas utility function implies income and price elasticities to be equal to one and minus one, respectively.

This model is parsimonious but suitable to address trade elasticities in eight Central and Eastern European countries: the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, and Slovenia. The source of the quarterly data for imports, exports, GDP and final demand components, as well as the series of import prices and GDP deflators, covering the period 1995:q1–2017:q1, is the OECD Economic Outlook database. We compute relative import prices taking the ratio of the import prices of goods and services for each country by the correspondent output (GDP) price. Summary statistics are shown in table 1. The time dimension of our panel for these new accession countries is anyway quite sizeable, as it ranges from 83 to 96 quarters.

Estimation and Results

An autoregressive distributed dynamic panel specification $\text{ARDL}(P, Q_1, Q_2)$ represents the most appropriate approach to study the long-run behaviour of the macro variables under scrutiny. It can be modelled as follows:

$$m_{c,t} = \alpha_c + \sum_{j=1}^P \gamma_{c,j} m_{c,t-j} + \sum_{j=0}^{Q_1} \beta_{c,j}^Y y_{c,t-j} + \sum_{j=0}^{Q_2} \beta_{c,j}^M p_{c,t-j} + u_{c,t}, \quad (7)$$

where $m_{c,t}$ is the log of real imports of country c at time t , $y_{c,t}$ is the log of real GDP, and $p_{c,t}$ is the log of the relative import price, whereas $u_{c,t}$ contains unobservables and the error terms $\epsilon_{c,t}$. This approach is able to account for cross-country heterogeneity and provides useful information on the short- and long-run behaviour of macroeconomic components since (7) can be rewritten into the traditional Error Correction Model:

$$\begin{aligned} \Delta m_{c,t} = & \delta_c + \varphi_c(m_{c,t-1} - \theta_{c,y} y_{c,t} - \theta_{c,p} p_{c,t}) + \sum_{j=1}^{P-1} \lambda_{m,j} \Delta m_{c,t-j} \quad (8) \\ & + \sum_{j=0}^{Q_1-1} \mu_{c,j} \Delta y_{c,t-j} + \sum_{j=0}^{Q_2-1} \rho_{c,j} \Delta p_{c,t-j} + u_{c,t}, \end{aligned}$$

where $\varphi_c = -(1 - \sum_{j=1}^P \gamma_{c,j})$ is the Error Correction speed of adjustment term. Long run parameters can also be derived from equation (7):

$$\theta_{c,y} = \frac{\sum_{j=1}^{Q_1} \beta_{c,j}^Y}{1 - \sum_{j=1}^P \gamma_{c,j}}, \quad \theta_{c,p} = \frac{\sum_{j=1}^{Q_2} \beta_{c,j}^M}{1 - \sum_{j=1}^P \gamma_{c,j}},$$

$$\lambda_{m,j} = - \sum_{l=j+1}^P \gamma_{c,l} \quad \text{for } j = 1, 2, \dots, P-1, \quad \text{while}$$

$$\mu_{c,j} = \sum_{l=j+1}^{Q_1} \beta_{c,l}^Y \quad \text{for } j = 1, 2, \dots, Q_1-1,$$

$$\rho_{c,j} = \sum_{l=j+1}^{Q_2} \beta_{c,l}^M \quad \text{for } j = 1, 2, \dots, Q_2-1.$$

Of particular interest are the long-run elasticities: $-\varphi_c \theta_{c,y}$ and $-\varphi_c \theta_{c,p}$.

It is well known that the adoption of fixed effect estimates may lead to biased results in the computation of long-run elasticities when coefficients are not the same across panels (Pesaran 2015). However, the size of our sample allows us to estimate the slope parameter by country and we can solve this problem via the Mean-Group (MG) estimator, which averages individual slope parameters (Pesaran and Smith 1995). Pesaran, Shin, and Smith (1999) suggest an additional estimator that employs both pooling and averaging, labelled Pooled Mean Group (PMG), which allows the intercept, short-run coefficients, and error variances to be different across

countries. Yet, the PMG imposes the long-run coefficients to be the same across groups.

To cope with unobserved common factors, we adopt the approach of adding averages computed from the entire panel. As suggested by Pesaran (2006), we introduce the cross-sectional means of the dependent and independent variables in the regression model to account for the presence of latent variables that affect imports. The Common Correlated Effects Mean Group estimator requires the number of covariates in the panel regression to be less than the available time-series observations for each country, and performs quite well even for a relatively small number of nations (Pesaran 2006). Yet, the correlation amongst cross-sectional observations within a panel is not addressed by the MG approach, and this may lead to possible biased estimates and inferential errors in the outcome of standard tests. To avoid these issues, the MG estimator requires no serial correlation in the residuals, a result that is usually achieved by employing additional lags in the specification.

Given these premises, our empirical approach unfolds through two steps. First, we chose the optimal lag length for each country employing the Schwartz Bayesian Criterion (BIC). Second, we impose the same number of lags for all the countries under scrutiny, selecting the lag structure, which is most frequent within the panel. We also employ the same lag order for the dependent and independent variables to reduce the risk of persistence in the regressors (Chudik and Pesaran 2015). By making use of these guidelines we build an $ARDL(2, 2, 2)$, whose results are provided in table 2. We first estimate the model for the whole sample and then we deal with the possible divergent dynamics over the business cycle. Hence, the sample is split in two parts: one with the observations corresponding to slowdowns and the other one with the observations for tranquil times. Quarters fall into the definition of slowdowns when the change in GDP between the current and the previous quarter is lower than the mean. The opposite holds for better times. We observe these quarters are slightly less than half of the overall time span.

We report the estimates of long-run elasticity of income and relative import prices for the full sample in column 1, whereas the estimates for quarters in slowdowns and those recorded in better times are respectively reported in column 2 and 3.

Let us first focus on the plausibility of the ECM. Table 2 shows the error correction terms are always negative and largely significant. Hence, estimates are consistent with the error correcting behaviour. Exception

TABLE 2 Estimation Results of the Error Correction Model

Variables	Full sample		Slowdowns		Better times	
	(1)	(2)	(1)	(2)	(1)	(2)
Short-run	LΔ.Imports	-0.068 (0.048)	-0.051 (0.090)	-0.096** (0.048)		
	L2Δ.Imports	0.008 (0.025)	0.043 (0.059)	-0.087** (0.034)		
	Δ.GDP	0.672*** (0.204)	0.326 (0.343)	0.243 (0.371)		
	LΔ.GDP	0.386** (0.176)	-0.084 (0.302)	0.667* (0.343)		
	L2Δ.GDP	0.141 (0.114)	0.257* (0.137)	0.115 (0.343)		
	Δ.Imp. Price	-0.205*** (0.067)	-0.281*** (0.054)	-0.159 (0.125)		
	LΔ.Imp. Price	0.046 (0.108)	0.079 (0.110)	0.032 (0.095)		
	L2Δ.Imp. Price	0.081* (0.049)	0.246** (0.123)	-0.047 (0.095)		
Long-run	ECM	-0.133*** (0.026)	-0.235*** (0.080)	-0.062* (0.038)		
	GDP	1.420*** (0.273)	2.547*** (0.675)	0.786 (0.761)		
	Import Price	-0.520* (0.289)	0.600 (0.771)	-1.494 (1.434)		
Observations	688	331	357			
Number of groups	8	8	8			
R-squared	0.406	0.548	0.468			
Adjusted R-squared	0.270	0.262	0.169			

NOTES Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

made for slowdowns, absolute values are quite small yet. This points out a slow convergence towards long-run equilibria. For instance, during better times the system corrects its previous period disequilibrium at a speed of about 6%. This indicates a modest adjustment for reaching a steady state. The system appears to be quite resilient, maybe because of the long memory of time series variables, while in bad times almost 24% of the disequilibrium is corrected in a quarter. Summing up, the overall speed is 13% only.

GDP elasticities are always greater than one. More precisely, column 1 reveals a 10% increase in GDP generates, *ceteris paribus*, a 14% increase in imports. This magnitude is consistent with the findings for developed countries of Hong (1999) and Marquez (2002). In addition, Harb (2005) records similar values that are at odds with the standard theory. As far as the relative price is concerned, the estimated coefficient is negative but different from zero only at the 10% level. This indicates that the set of countries under scrutiny are not largely influenced by price oscillations in the choice of the quantity to be imported. Yet, as we pinpoint

below, this result hides heterogeneous dynamics that feature each nation.

When growth is sluggish, the long-run income elasticity is larger. In particular, a 10% rise in GDP generates, *ceteris paribus*, a 25% increase in the volume of imports, whilst import prices are now not significant and the associated coefficient is surprisingly positive. This result is consistent with Freund (2009) who finds trade is more responsive to GDP during global downturns than in better times for several reasons. First, in uncertain times people are inclined to reduce relationships with foreign firms and put more emphasis on trust and financing issues that may arise with a non-domestic counterpart. Second, firms may make extensive use of accumulated inventories when retail sales prospects are gloomy. Third, when GDP declines, protectionist measures are often introduced and they exacerbate the reduction in trade. This is one of the reasons advocated by Constantinescu, Mattoo and Ruta (2015) to explain the presence of structural factors affecting the long-term decline in trade elasticity in the aftermath of the 2008–2009 financial crisis. This does not apply to EU intra trade yet. Fourth, trade is measured in gross terms while GDP in value added. The widespread diffusion of global value chains might thus be associated with larger variations in trade that do not necessarily lead to proportional changes in value added (Ferrantino and Taglioni 2014). Fifth, manufacturing is more affected than tertiary by recessions. Goods represent the bulk of trade, whereas services represent a large and increasing part of GDP.

If we observe what takes place during better times, the slow convergence towards a long-run equilibrium is coupled with statistically insignificant income and price elasticity. Hence, it seems that during good times consumers and producers import goods and services without putting too much attention to the budget constraint, while in bad times there may be a flight from quality of domestic purchases as suggested by Chen and Juvenal (2016) for food products.

These results are not affected by serial correlation, as reported in table 3. We put a maximum of four lags in the Cumby-Huizinga test, which is the most appropriate lag-length when dealing with quarterly data. Our approach provides consistent estimates both when homoscedasticity is assumed, but also when this assumption is relaxed and we allow for heteroscedasticity, as shown in table 4. Even at the fourth lag, there is no evidence of serial correlation in the residuals.

To shed some light on the presence of non-negligible diverse behaviour in CEECS, we report the coefficients of long-run income and price elas-

TABLE 3 Cumby-Huizinga Test for Autocorrelation (Condit. to Homoscedasticity)

HO: $q = 0$ (serially uncorrelated)				HO: $q = 0$ (serially uncorrelated)			
H1: s.c. present at range specified				H1: s.c. present at range specified			
Lags	χ^2	df	p	Lag	χ^2	df	p
1-1	1.197	1	0.274	1	1.197	1	0.274
1-2	2.863	2	0.239	2	1.545	1	0.214
1-3	5.056	3	0.168	3	2.524	1	0.112
1-4	6.257	4	0.181	4	1.346	1	0.246

NOTES HO: disturbance is MA process up to order q ; H1: serial correlation present at specified lags $> q$.

TABLE 4 Cumby-Huizinga Test for Autocorrelation (Robust to Heteroscedasticity)

HO: $q = 0$ (serially uncorrelated)				HO: $q = 0$ (serially uncorrelated)			
H1: s.c. present at range specified				H1: s.c. present at range specified			
Lags	χ^2	df	p	Lag	χ^2	df	p
1-1	0.801	1	0.371	1	0.801	1	0.379
1-2	1.712	2	0.425	2	1.217	1	0.270
1-3	2.794	3	0.425	3	1.719	1	0.190
1-4	3.245	4	0.518	4	0.801	1	0.371

NOTES HO: disturbance is MA process up to order q ; H1: serial correlation present at specified lags $> q$.

ticity at the country level in table 5. Columns 1 and 2 exhibit estimates for the full sample, while columns 3 and 4 display results during slowdowns and the last ones for better times.

Only four out of eight countries present a significant coefficient for the income elasticity, as shown in column 1. Values range from 1.26 of the Slovak Republic to 1.93 of Poland. Among these countries, all but Latvia have significant long-run import price elasticities. Yet, Lithuania displays an unexpected positive and significant value (column 2). If we turn our attention to the income elasticity during slowdowns (column 3), we observe that six out of eight countries show a significant coefficient. Values range from 1.17 of the Czech Republic to 1.88 of Slovenia. These results are consistent with the previous literature (Harb 2005). Conversely, price elasticity is significant only in three cases, namely the Czech Republic, Lithuania and Slovenia. However, there is only a negative value (the Czech Republic), while the other countries exhibit positive digits. Finally, if we consider better times, long-term income elasticity is positive and

TABLE 5 Country-Level Elasticities of Income and Price

Countries	Full sample		Slowdowns		Better times	
	IE	PE	IE	PE	IE	PE
	(1)	(2)	(3)	(4)	(5)	(6)
Czech Republic	0.579 (1.841)	-1.395 (1.525)	1.169** (0.666)	-0.768* (0.500)	1.618** (0.879)	-0.712 (0.890)
Estonia	0.311 (0.830)	-1.022 (1.639)	1.776** (0.765)	1.265 (1.398)	-4.255 (10.32)	-10.030 (20.11)
Hungary	2.529 (2.470)	0.655 (2.446)	5.887 (8.526)	-2.297 (7.487)	0.464 (8.998)	-2.263 (10.35)
Latvia	1.048*** (0.293)	-0.205 (0.875)	1.195** (0.685)	0.330 (1.539)	0.961* (0.676)	0.262 (1.540)
Lithuania	1.520*** (0.188)	0.525** (0.277)	1.591*** (0.105)	0.426*** (0.158)	2.516 (2.297)	-1.706 (4.161)
Poland	1.938** (1.015)	-1.441** (0.712)	5.324 (14.02)	5.285 (25.68)	1.881* (1.363)	-0.617 (0.904)
Slovakia	1.256*** (0.481)	-0.962** (0.511)	1.553*** (0.555)	-0.126 (0.853)	0.913 (1.100)	-1.487 (1.304)
Slovenia	2.179 (1.959)	-0.313 (3.580)	1.882*** (0.277)	0.687* (0.420)	2.186* (1.446)	4.604 (11.69)

NOTES IE – income elasticity, PE – price elasticity. Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

significant for the Slovak Republic, Latvia, Slovenia and Poland (column 5). Values range from 0.96 of Latvia to 2.19 of Slovenia. Interestingly, as it can be noticed in column 6, none of the countries exhibits significant long-run price elasticity coefficients.

Conclusions

The prolonged effects of the 2008–2009 financial crisis prompted the need for a better understanding of the long-run relationship between income, imports, and relative prices, amongst others. This is not just an academic curiosum but mostly a policy issue, as decision makers should take appropriate actions to avoid disrupting changes in international trade behaviour along the business cycle.

This paper addresses these issues estimating long-run import elasticities for a sample of eight Central and Eastern European countries over the period 1995:q1–2017:q1. To fulfil such a task, we make use of a very simple but parsimonious specification, and adopt an ARDL model with the

CCEMG estimator to take into account country heterogeneity. We derive elasticities of GDP and the relative import price for the complete sample, during slowdowns and in better times, for the whole panel and for individual countries too.

Our results show macroeconomic variables behave differently along the business cycle. First, the return to the long-run equilibrium is much faster during slowdowns than in better times. Second, income elasticity is not significant during recoveries and booms, while it is positive during slowdowns and for the whole sample. This provides tentative evidence that imports are affected by variations of income with gloomy prospects of growth. Prudential reasons may push households to reduce consumption and to accumulate precautionary savings, whilst forcing companies to reduce the amount of inventories. Conversely, imports appear to be driven by animal spirits during expansionary periods as price elasticity is weakly significant for the complete sample only. Finally, when we look at country-level elasticities, outcomes mimic the panel evidence.

Our study is not based on a structural model that may require to endogenize consumers' and firms' behaviour in a general equilibrium setting. This is a drawback, but despite this shortcoming, we are the first to provide tentative but clear evidence that import adjustments to GDP variations are extremely heterogeneous across the countries under scrutiny. Policy makers at the national and international level, especially for those countries already in the Eurozone, should take stock of this aspect to adopt appropriate countermeasures in each circumstance. We are thus aware of the importance to provide an in-depth investigation at the mechanisms behind each country's behaviour along the business cycle. This is beyond the scope of the present contribution, but in the agenda for future research.

Notes

- 1 Data are available from <https://data.worldbank.org/indicator/NE.EXP.GNFS.KD.ZG>
- 2 As suggested by the literature, we use interchangeably the terms 'elasticity' and 'trade-to-GDP ratio,' despite being aware the former derives from theory, whereas the latter has more an empirical flavour.

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Corporate Capital Structure Changes during Financial Crisis: Case of Polish Companies

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The paper is addressed to the subject of corporate capital structure (equity and debt relation) for Polish companies. The aim of the paper is to identify the changes in capital structure with regard to the recent financial crisis. The research hypothesis is that the leverage would decrease during crisis period and increase after crisis. In the paper the impact of financial crisis on capital structure was analysed on four sets of data: data for all companies of the whole economy, panel data of Polish listed companies, panel data of Polish listed companies with the lowest debt ratio in 2005 (panel A) and panel data of Polish listed companies with the highest debt ratio in 2005 (panel B). The descriptive statistics and the statistical testing of the differences were employed. The multivariate regression analysis was also employed to identify how different factors affect the capital structure. The main finding of the paper is that Polish companies generally did not change their capital structure during financial crisis time. This is especially true for the panel sample and panel B, while companies from panel A increase their debt ratio despite financial crisis.

Key Words: capital structure, profitability, tangibility, size, financial crisis

JEL Classification: G01, G32

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Introduction

The financial crisis had impact on many aspects of economic activity. Banks not only were affected but also companies. One channel of crisis transferring from banks to companies was debt constraints. Banks tightened the conditions of granting bank loans. In addition, companies running business under difficult economic conditions with access that is more difficult to financing were impacted severely by financial crisis. The capital structure is one of the most important financial issues of corporate finance but also one of the financial aspect that was hit by financial crisis.

The paper addresses the issue of capital structure during a financial crisis by analysing the capital structure of firms in Poland. Although Poland is perceived to be hit slightly by financial crisis there were some changes in corporate capital structure.

The aim of the paper is to find out what are the changes in capital structure of Polish companies over time, especially during and after the financial crisis of 2007–2009. The research problem is designed in the following question: how the capital structure changed during financial crisis. The hypothesis was developed assuming that during financial crisis, the leverage ratio decreased and after financial crisis, the leverage ratio increased to the pre-crisis level.

The justification of the research is that capital structure decisions are an important aspect of company running but there are just few studies referring to the problem of capital structure during a financial crisis in relation to a pre-crisis period. These studies are as follows: Fosberg (2012), Kahle and Stulz (2013), Iqbal and Kume (2014) and Demirguc-Kunt, Martinez-Peria, and Tressel (2015), and these studies proves changes in capital structure during a financial crisis.

The paper contributes to the discussion on capital structure by including Polish financial crisis perspective. Broadening the analysis will help to have a better understanding of factors affecting financing decisions.

The impact of a financial crisis on capital structure was analysed on four sets of data: aggregated data for all companies of the whole economy, panel firm-level data of Polish listed companies, panel firm-level data of Polish listed companies with the lowest debt ratio in 2005 (panel A) and panel firm-level data of Polish listed companies with the highest debt ratio in 2005 (panel B). The descriptive statistics, the differences testing and regression analysis were employed.

The rest of the paper is organized as follows: the next section refers to the theoretical aspects of capital structure decisions, the third section to the problem of capital structure decisions during a financial crisis, the fourth section contains the description of the financial crisis in Poland, the fifth section the sources of data, the sixth section the description of methodology and the seventh section research findings; the conclusions are included in the eighth section.

Capital Structure Theories and Capital Structure Determinants

There are many static capital structure theories: the irrelevance theory of Modigliani and Miller (1958), Modigliani and Miller (1963) revision of

their theory (including corporate income tax, and later on personal income tax), the trade-off theory (including agency problems and financial distress), the pecking order theory and the market timing theory. The theories give contradictory recommendation on how to design capital structures. The irrelevance theory of Modigliani and Miller assumes that capital structure has no impact on the company value and the company value is the same regardless capital structure. The revised theory of Modigliani and Miller assumes that the companies should use leverage (debt) as much as possible because it increases the value of the company. The trade-off theory of Kraus and Litzenberger (1973) assumes that there is optimal capital structure that minimizes the cost of capital and maximizes the company value. The optimal capital structure depends on the agency costs, bankruptcy costs and tax shield of interests.

The only approach that involves changes in capital structure is the pecking order theory and the market timing theory. The problem of changes in dynamic capital structure theories is solved with reference to the single company specific features. The pecking order theory of Myers and Majluf (1984) assumes that company should use internal sources of financing as the first, if they are insufficient and company has to gain external sources it should be debt and as the last source of financing it should be equity. The timing market theory of Baker and Wurgler (2002) assumes that the managers are aware of the situation on the financial market and if they think that the securities are overvalued, they would be gaining new capital by a new issue of securities; and if they think that the securities are undervalued they would buy them back.

There are a lot of research verifying the assumption and recommendations of all the capital structure theories. However, the problem of capital structure seems to be still not solved and it is not known which theory explains better the capital structure decisions (Myers 1983; Baker and Martin 2011, 12).

Some researchers look for the factors affecting capital structure (Al-Najjar and Hussainey 2011; Rajan and Zingales 1995; Harris and Raviv 1999). Some of the most important identified factors affecting capital structure decisions are as follows (Bauer 2004; Titman and Wessels 1988; Korajczyk and Levy 2003; Cook and Tang 2010):

- *Profitability* – if the profitability is higher, the company might expect the positive effects of financial leverage (increase in ROE), but the pecking order theory assumes that the higher profitability the

more internal cash flow the company has and the lower demand for external funds and the lower debt is used.

- *Tangibility* – the more fixed and tangible assets the company has the more long-term capital it needs, but the more tangible asset might be used as collateral the more debt the company might get; the tangibility is connected with the industry the company operates because some industries need more fixed assets.
- *Size* – larger firms tend to be more diversified, to have lower cash flow volatility and better access to financial markets, so they are less likely to become financially distressed. This suggests that there may be a positive relationship between the company size and debt financing. However, since large firms communicate more with investors, the asymmetrical information problem should be decreased, and consequently they should rather issue shares than debt. Again, the exact impact of firms' size on capital structure is unclear.

A financial crisis generates some variations in future cash flows, volatility of earnings increases, downturn in profitability, which increases business risk. The crisis resulted in a lower optimism and higher uncertainty about economic recovery. This led to a decline in demand for products and services and resulted in a fall in debt and equity issuance. Financial crisis may impact the capital structure of firms through different channels. Financial crisis leads to decrease in profitability and in investment spending during a financial crisis. When operating cash flows, profitability, investment and business risk depend on current economic conditions, firms should adjust their capital structure decisions to an economies' business cycle phase. Risk is lower in an expansion than in a contraction, so the debt capacity of the firm is greater during economic prosperity (Hackbarth, Miao, and Morellec 2006; Mostarac and Petrovic 2013). The financial crisis have impact on the factors affecting capital structure and these factors have different impact on capital structure decisions before, during and after financial crisis. The crisis affected firms' ability to get financing, which is one of the key determinants of the operating activities (short and long-term). A financial crisis affected internal financing (especially net profit) and external financing (especially bank loans).

Financial Crisis and Capital Structure: Literature Review

During a crisis, as uncertainty and risk rise and expected returns decline, both lenders and borrowers become reluctant to lock-in capital in long-

term investments (Demirguc-Kunt, Martinez-Peria, and Tressel 2015). There is some research on changes in leverage ratio during a financial crisis.

Graham, Leary, and Roberts (2014) studied the impact of the recent financial crisis on the capital structure decision of UK, French and German firms. The results show that overall leverage ratios increase from pre-crisis (2006 and 2007) to crisis years (2008 and 2009) and then decrease in the post-crisis years (2010 and 2011). The sample in their study consists of firms from three major European countries, i.e. the UK, France, and Germany over 2006–2011 period. The relevant data are extracted from Datastream. The initial sample is selected using the following criteria: firms are listed on the London Stock Exchange for UK, Euronext Paris for France, and the Frankfurt Stock Exchange for Germany; firms operate in non-financial and non-utility sectors. These restrictions produce final samples of 871 firms for the UK, 564 for France, and 392 for Germany. The study uses firm-year observations for the analysis and the analysis includes descriptive statistics and a multivariate regression analysis.

Kahle and Stulz (2013) studied changes in firm investment and financing policies during the crisis to investigate whether these changes are consistent with the view that a bank-lending shock or a credit supply shock – as opposed to a demand shock – is a first-order determinant of these policies, and whether the balance sheet multiplier made the impact of the crisis worse on levered firms. They find that net debt issuance increases during the first year of the crisis for most types of examined firms. Net equity issuance decreases during the crisis until April 2009. However, later, in the second year of the crisis, the need for external capital is weak and leads to a reduction in firms' leverage ratios. They use quarterly financial data and use cross-sectional variation in changes of ratios.

Pattani, Vera, and Wackett (2011) studied the role of public capital markets in relation to banking capital supply. They point out that only a small fraction of UK companies issue public debt or equity as a form of external finance, but evidence suggests that the access to public capital markets allowed some companies to dampen the impact of the recent financial crisis, particularly the sharp reduction in the supply of bank credit. Corporate bond issuance enabled companies to switch away from bank loans. In addition, equity issuance allowed companies to reduce their leverage.

Fosberg (2012) shows that between 2006 and 2008 the financial crisis and the simultaneous recession caused sample firms to significant increase in debt ratios of US firms over the pre-crisis period of 2006–2008

followed by a gradual decline in debt levels by the end of 2010 (i.e. post-crisis period) to the pre-crisis level. He analysed data on global debt and equity offering from 2007 until 2010 and on capital structure. He used descriptive statistics and a multivariate regression analysis.

Iqbal and Kume (2014) examined the impact of the recent financial crisis on the capital structure decision of UK, French and German firms. The results show that overall leverage ratios increase from pre-crisis (2006 and 2007) to crisis (2008 and 2009) years and then decrease in the post-crisis (2010 and 2011) years. Both equity and debt levels change during the crisis and post-crisis years. The sample in the study consists of firms from three major European countries that are the UK, France, and Germany over 2006–2011 period. The relevant data are extracted from Datastream. They used samples of 871 firms for the UK, 564 for France, and 392 for Germany. They employed descriptive statistics and a multivariate regression analysis.

Demirguc-Kunt, Martinez-Peria, and Tressel (2015) used a data set covering about 277,000 firms across 79 countries over the period 2004–2011. They examined the evolution of firms' capital structure during the global financial crisis and its aftermath in 2010–2011. The study finds that firm leverage declined in advanced economies and developing countries, even in those countries that did not experience a crisis. They use descriptive statistics and multivariate regression analysis.

Financial Crisis in Poland

Poland faced a global financial crisis that started in the summer of 2007. However, contrary to many other European countries, Poland did not suffer heavily. That is why Poland was called 'a green island' (Polanski 2014). The Polish GDP growth against UE GDP growth is presented in figure 1. In the period of 2004–2008, Poland experienced high economic growth, with the average annual GDP growth amounting to 6% (as against 3% in the EU). In 2009, Poland was the only EU country to avoid recession (with the GDP growth of 1.6%, while in the economy of the EU-27 contracted by 4.5%). However, the external conditions affected the Polish economy, leading to a significant slowdown in the rate of growth – which was particularly evident in 2012, with the GDP growth amounting to 1.9%. Therefore, the average annual rate of GDP growth in the period 2009–2012 slowed down to 2.9% (while the EU as a whole was in recession with the average annual GDP growth amounting to –0.3%) (OECD 2013).

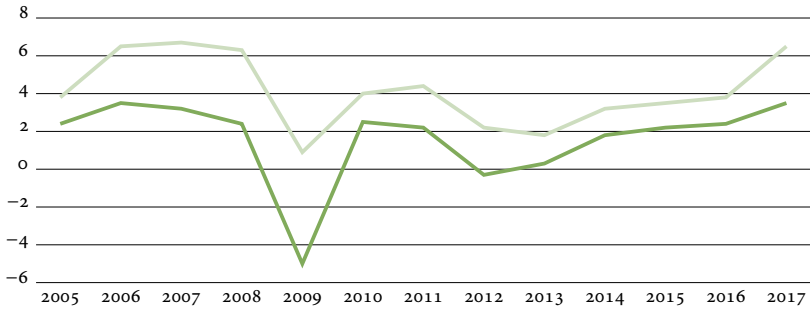


FIGURE 1 UE (dark) and Poland (light) GDP Growth (in percent)
(based on data from <https://pl.tradingeconomics.com>)

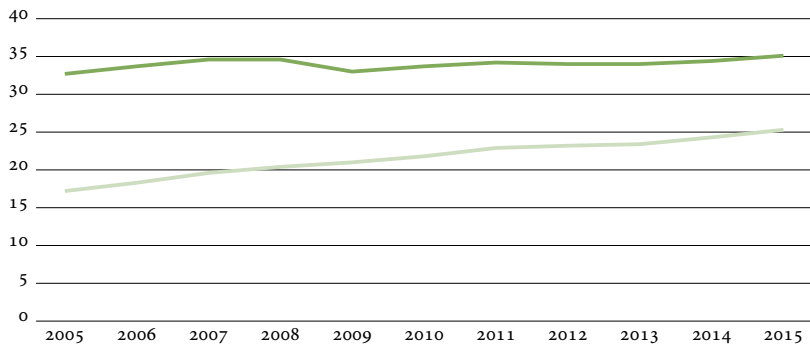


FIGURE 2 UE (Dark) and Poland (Light) GDP per Capita (in Euro)
(based on data from <https://pl.tradingeconomics.com>)

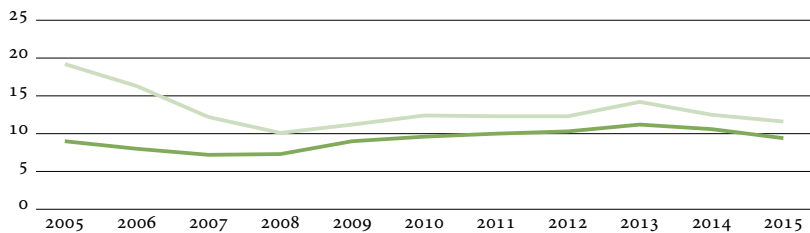


FIGURE 3 UE (Dark) and Poland (Light) Unemployment Rate (in percent)
(based on data from <https://pl.tradingeconomics.com>)

However, this relatively high rate of growth is achieved with reference to the specific Polish economy situation. Poland is still an emerging and not mature economy. Polish GDP growth is accompanied by a high unemployment rate and low GDP per capita. Although after 1990 Poland started to reconstruct its economy into a market one, in the early 2000

there were still a lot of problems to be solved. The GDP per capita is presented in figure 2 and the unemployment rate is presented in figure 3.

Although Poland seems to be barely affected by the financial crisis, it is still not a mature economy and capital structure decisions are still vulnerable to economic conditions. Due to the financial crisis and growing uncertainty of economic conditions, the investors and consumers' optimism decreased. What is more, the financial crisis was connected with more restrictive bank lending policy.

Data

Four sets of data were collected. The first set refers to aggregated financial data for the non-financial companies (NCF) of the whole economy. The data come from statistical books of Central Statistical Office of Poland. There are app. 50 thousand companies obliged to report to the Statistical Office and Statistical Office presents aggregated data. The data are available for the period of 2005–2016. However, because the data on the whole economy are aggregated and do not allow to execute a more thorough analysis, the second set of data was collected.

The second set of data consists of panel sample of non-financial companies (NCF) from the Warsaw Stock Exchange. The sample is selected by using the following criteria: firms are listed on the WSE for the whole period of 2005–2016 and firms operate in a non-financial sector. The financial data were hand collected from financial statements of each company. The relevant financial statements are extracted from Notoria Service/Emis. The financial data cover the period of 2005–2016. Companies with negative equity value and losses at the same time were eliminated to avoid obtaining a misleading positive ROE. Finally, the panel sample was designed with 2052 observations (year-company) for panel data of listed companies (12 years and 171 companies).

The third and fourth set of data consist of data from panel sample. Following Iqbal and Kume (2014), the companies with the highest and lowest debt ratio were identified and the sample was divided into two subsamples depending on the level of debt ratio. The first subsample contains the first percentile of the companies with the lowest debt ratio in the first year of the analysis (2005) – panel A, the second one contains the last percentile of the companies with the highest debt ratio in the first year of the analysis (2005) – panel B. This study further investigates the changes in leverage ratios of the sample firms and regression analysis by classifying them into two subsamples based on whether their pre-crisis

leverage ratios place them in the first – panel A or the last percentile – panel B.

Methodology

In every paper referring to the capital structure, the different methodologies of calculating leverage were implemented. In this study, the methodology of Rajan and Zingales (1995) was employed in calculating the debt ratio – the relation of total liabilities to total assets.

The analysis was conducted in two steps. The first step of the analysis is based on aggregated data for the companies of the whole economy. In addition, there are limited opportunities to conduct a more thorough analysis on the aggregated data. That is why the second step was taken, and the second step refers to panel firm-level data of the listed companies.

Because the aim of the paper is to identify whether there are any changes in the capital structure over time, especially pre-crisis, crisis and post-crisis time, it is necessary to decide on the years included in each sub period. There are different classification of crisis years (Henry and Gregoriou 2014; Wawryszuk-Misztal 2015). The idea of Iqbal and Kume (2014) was adopted who identified the 2006–2007 period as the pre-crisis period, 2008–2009 as the crisis period and 2010 and 2011 as the post-crisis period. To make it possible to compare the debt ratios for each period, the average debt ratios for each period were calculated.

For each pair of periods statistical tests were implemented to find out whether the ratios differ from each other. The study employs statistics tests for the difference in means (assuming unequal variances) to identify if equally-weighted mean leverage ratios are significantly different from each other during the three periods, namely ‘pre-crisis to crisis,’ ‘crisis to post-crisis,’ and ‘pre-crisis to post-crisis.’ However, before implementing the testing in changes of mean the normality test of the data distribution was assessed. To assess the normality of the sample Shapiro Wilk normality test was implemented. Depending on the results of Shapiro Wilk, normality test parametric or nonparametric test for the differences will be implemented.

In the paper, multivariate regression analysis was also implemented to try to find out the most important factor affecting capital structure decisions in each distinguished period. This paper also examines the impact of the financial crisis on firms’ leverage ratios in a more formal setting. The dependent variable is the leverage ratio (LEV) calculated as the relation between total liabilities and total assets. The independent variables

are the factors affecting capital structure (Bauer 2004; Titman and Wessels 1988; Korajczyk and Levy 2003; Cook and Tang 2010) such as profitability, tangibility and size. Panel data OLS regression model is used, including pre-crisis, crisis and post-crisis dummies, to capture the impact of the financial crisis. The model also controls for other firm-specific factors that may have an impact on leverage ratios, as suggested by Titman and Wessels (1988) and many other researchers followed them:

$$\begin{aligned} \text{LEV} = & \beta_0 + \beta_1 \text{Tangibility}_{it} + \beta_2 \text{Profitability}_{it} + \beta_3 \text{Size}_{it} \\ & + \beta_4 \text{PRE} + \beta_5 \text{CRISIS} + \beta_6 \text{POST} + u_i + e_{it}. \end{aligned} \quad (1)$$

Fixed assets are estimated as the difference between total and short-term assets; business profitability (*Profitability*) is return on assets (ROA) and is estimated as the net income divided by total assets; the firm's size (*Size*) is defined as the natural logarithm of firm's total assets; pre-crisis period (PRE) is represented by a dummy variable that takes a value of 1 for the years 2006 and 2007 and zero for other years, the crisis period (CRISIS), the main variable of interest, in the regression model is represented by a dummy variable that takes a value of 1 for years 2008 and 2009 and zero for other years; post-crisis period dummy (POST) variable takes the value of 1 for years 2010 and 2011 and zero for the other years in the analysed period.

The research is done for each set of data: the aggregated data of all the companies, panel sample and two subsamples. Only the firm-level data (from the panel sample and the subsamples) allow conducting statistical testing and a regression analysis.

Research Findings

The debt ratios are presented separately for each year with respect to the all non-financial companies of the whole economy and panel sample and subsamples. The ratios for the sample and subsamples are presented by using mean and median value for each year. The basic statistics of debt ratio for the 2005–2016 period are presented in table 1.

After presenting descriptive statistics, a more thorough analysis was conducted. Shapiro-Wilk normality test was implemented to identify whether the data come from normal distribution. The null-hypothesis of this test is that the population is normally distributed. Thus, after having got the *p*-value 0.000, which is less than the chosen alpha level, then the null hypothesis, is rejected and there is evidence that the data tested

TABLE 1 Statistics of Debt Ratios for the Companies of the Whole Economy and Panel Sample Data

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
(1)	39.7	39.4	37.6	39.5	38.6	38.3	40.1	39.1	40.0	40.4	40.3	41.5
(2)	53.6	50.8	47.8	52.8	50.2	50.0	52.5	51.0	51.2	52.3	56.0	57.8
	53.2	51.4	48.7	48.2	46.7	47.5	49.5	48.7	47.1	47.9	48.3	52.8
(3)	24.2	28.9	35.2	37.9	33.6	32.1	35.7	34.4	28.7	30.8	33.5	34.7
	23.3	24.5	32.5	37.4	33.2	29.1	31.6	33.8	28.9	30.4	34.1	31.8
(4)	95.1	71.9	60.0	60.8	61.4	62.4	62.5	62.1	62.7	63.0	62.9	62.8
	84.0	74.5	57.5	61.7	61.2	64.8	64.0	67.7	64.2	66.1	64.4	59.3

NOTES Row headings are as follows: (1) debt ratio percentage for the whole economy, (2) debt ratio percentage for panel data (mean and median), (3) debt ratio – panel A, (4) debt ratio – panel B.

TABLE 2 The Differences in the Debt Ratios in Sub Periods

Item	Pre-crisis and crisis		Crisis and post-crisis		Pre-crisis and post crisis	
Debt ratio – sample	-0.050	(0.960)	-0.850	(0.396)	-0.299	(0.765)
Debt ratio – subsample A	-2.082**	(0.037)	-0.131	(0.896)	-1.857*	(0.063)
Debt ratio – subsample B	-1.194	(0.232)	-0.231	(0.817)	-1.013	(0.311)

NOTES *, **, *** significant at 10, 5, 1 percent levels, respectively; *p*-values are in parentheses.

are not from a normally distributed population; in other words, the data are not normal. The parametric test cannot be implemented to compare any changes.

The study employs the nonparametric Wilcoxon tests for the differences in means to identify if the capital structure (and other) ratios are significantly different from each other during the three periods. The null hypothesis was that the mean is similar in the analysed periods. Each pair of analysed periods namely ‘pre-crisis to crisis,’ ‘crisis to post-crisis,’ and ‘pre-crisis to post-crisis’ was compared. If the *p*-value is lower than alpha 0.1, then the null hypothesis is rejected and there is evidence that the levels of ratios are similar. The statistics and *p*-value of Wilcoxon test are included in table 2.

The value of total assets for the companies of the whole economy grew by 75% between 2005 and 2011 and by 160% between 2005 and 2016. It means that Polish companies developed their business quite heavily. The value of total debt grew by 80% between 2005 and 2011 and 170% between

2005 and 2016. The growth rate of total liabilities is higher than total assets and that is why the debt ratio increased over the 2005–2016 period. The debt ratio was in 2005 lower than 40% and it got lower in 2007 because of the high profitability of Polish companies and growing value of the equity and the equity ratio. In 2009 and 2010, the impact of financial crisis on the debt ratio is visible. The companies lowered the debt ratios because it was more difficult for them to get bank financing. However, since 2011 the debt ratio is growing slowly.

For the panel sample, the average value of total assets grew by 160% between 2005 and 2011. This proves that Polish listed companies from panel sample developed their business intensively. The debt ratio for the panel sample of listed companies was in 2007 lower than in 2005 because of relatively high profitability and increase in equity value. The value of equity grew faster than total liabilities and the debt ratio decreased. However, since 2008 the debt ratio was kept at a stable level. The rapid growth in the level of the debt ratio is visible since 2014. Keeping a stable level of debt ratio and growing value of total assets means the value of total liabilities grew at the same pace as total assets. Although the changes in the debt ratio for the sample were visible, no statistically significant differences were identified over 2006–2011 (the low Wilcoxon tests value). It is because there were small changes (increase in crisis and post-crisis in relation to pre-crisis) in the debt ratio.

The average value of total assets for the companies from panel A was 116 mil PLN in 2005 and 477 mil PLN (4 times higher) in 2011 and 400 mil PLN in 2016. It means that, despite the crisis, companies were developing the business but only until 2011. Later the growth rate slowed down. It might mean the delayed effects of the financial crisis. The debt ratio for panel A grew since 2005 until 2008 but later in 2009 decreased and was kept at this low level until 2016. The increasing level of the debt ratio connected with growing total assets means that the value of total liabilities increased rapidly, faster than the equity value. After 2011 the development growth rate got slower. In addition, the debt ratio remained stable. This might mean a delayed impact of the financial crisis on the capital structure. For panel A the changes over 2006–2011 were bigger in the crisis and post-crisis period comparing to pre-crisis period (p -value lower than 0.1). There were statistically significant changes in pre-crisis debt ratio in relation to crisis and post crisis. The debt ratio was the lowest in pre-crisis and then during crisis it increased and after crisis was kept at stable level.

TABLE 3 Descriptive Statistics of Factors Affecting Debt Ratio

Category	Factor	Mean	Median	Min	Max	SD
Sample	Debt ratio (%)	52.12	49.00	1.00	99.00	32.60
	Size (mil PLN)	24,518	325	310	4,766,207	280,833
	Profitability (%)	3.39	4.24	-18.90	24.70	15.70
	Tangibility (%)	49.14	49.05	0.01	99.00	21.76
Panel A	Debt ratio (%)	32.42	30.35	4.00	96.00	15.37
	Size (mil PLN)	709	282	23	3,550	825
	Profitability (%)	5.17	5.99	-18.90	23.00	17.25
	Tangibility (%)	58.79	59.25	0.01	99.0	20.23
Panel B	Debt ratio (%)	65.70	66.67	8.00	99.00	21.38
	Size (mil PLN)	1,226	544	12	2,700	3,064
	Profitability (%)	1.64	2.48	-15.00	42.00	13.96
	Tangibility (%)	38.19	34.33	0.01	95.00	24.96

NOTES *, **, *** significant at 10, 5, 1 percent levels, respectively; *p*-values are in parentheses.

The average value of total assets for companies from panel B was 207 mil PLN in 2005, while 713 mil PLN in 2011 (more than 3 times higher) and 1,070 mil PLN in 2016. It means that companies were developing their business despite the crisis. As for leverage for the companies from panel B, different pattern is present. The debt ratio was highest in 2005 and since then it started a systematical decrease and the debt ratio in 2007 got the level by more than 20 percentage point was lower. Since 2007, the debt ratio started to increase slowly. It means that companies development was financed by a growing value of the equity. As for period 2006–2011 for panel B, there were no statistically significant changes although there were small downward trend in debt ratio.

The next step of the analysis is to find factors affecting the debt ratio. Some factors were chosen such as profitability, tangibility, size and proxy for crisis. The descriptive statistics of the chosen factors were prepared and presented in table 3. The companies from panel A seems to be smaller, more profitable and they have higher tangibility than the companies from panel B. This might imply that the debt ratio is negatively related with profitability and tangibility but positively with size.

To find out how the factors (profitability, tangibility, size but also the crisis) a regression analysis was conducted. The regression analysis results were presented in table 4. Profitability is negatively related for the sample

TABLE 4 Regression Analysis Results

Item	Sample	Panel A	Panel B
Profitability	-0.969*** (0.000)	-0.078 (0.179)	-0.528*** (0.000)
Tangibility	-0.213*** (0.000)	-0.173** (0.003)	-0.076 (0.134)
Size	0.014*** (0.000)	0.015** (0.087)	0.027** (0.004)
Pre-crisis	0.039** (0.012)	0.239** (0.016)	0.002 (0.369)
Crisis	-0.069*** (0.001)	0.064** (0.040)	-0.166*** (0.000)
Post-crisis	-0.022 (0.122)	0.034 (0.154)	-0.164*** (0.000)
F-test	113.738*** (0.000)	2.954** (0.013)	11.587*** (0.000)
R-square	0.218	0.059	0.200

NOTES *, **, *** significant at 10, 5, 1 percent levels, respectively; *p*-values are in parentheses.

and subsamples. This is consistent with the previous research (González and González 2012; Rajan and Zingales 1995; Titman and Wessels 1988). The negative relation means that the higher profitability, the lower debt ratio which is consistent with the pecking order theory that assumes companies with higher profitability have lower debt ratios (Myers and Majluf 1984; Myers 1983). It seems that the crisis did not distort the pecking order preference and behaviour.

Our research points out that tangibility is also negatively related with the debt ratio, which is quite surprising because the theory and the previous research proved positive relation (e.g. Campello and Giambona 2010). A negative relation is present for the sample and subsamples. A negative relation was identified because companies with more fixed assets use more equity to finance them. Size and leverage are positively related (for the sample and subsamples) and it means that the bigger company, the higher debt ratio. This is consistent with the theory and the previous research (e.g. Rajan and Zingales 1995).

As for the impact of crisis on the debt ratio, the hypothesis assumed to find a positive relation between debt ratio and pre-crisis and post-crisis period and negative relation between the debt ratio and crisis period. The results are not confirming fully the expectations. The positive impact of pre-crisis period on debt ratio was found for the sample and subsamples. This means that in pre-crisis period companies were prone to increase debt ratios. However, the crisis had negative impact on the companies from the sample and from panel B, while for panel A the crisis had positive impact. This is consistent with the results of Wilcoxon test proving the changes in debt ratio in crisis period – increase for panel A and de-

crease for panel B. The post-crisis period had negative impact on debt ratio for the sample and panel B – decrease in debt ratio while for panel A the positive impact was found – increase in debt ratio.

Conclusions

The aim of the paper was to identify changes in debt ratio during a financial crisis. The hypothesis was that the leverage would decrease during a crisis period and increase after a crisis. Financial data describing all companies in the whole economy (aggregated data) were employed and for research that is more thorough, a sample of listed companies (2052 observations) was designed. The analysis covered the period of 2005–2016.

The main finding of the study is that companies did not change significantly their capital structure. The debt ratio was similar during the whole period 2005–2016. It is especially true for the panel data and the companies with the highest debt ratio in 2005, but for the companies with the lowest debt ratio the financial crisis has positive impact on debt ratio. What is important, the financial crisis had some delayed impact on the debt ratio because the debt ratio was kept low long after the financial crisis was over.

The research results on the debt ratio changes contradict those, which identified the change in leverage, as argued by Fosberg (2012), Graham, Leary, and Roberts (2014) and Iqbal and Kume (2014). Especially, the drop in the debt ratio in our analysis was not as deep as in the mentioned research. In addition, the rise in debt ratio after crisis was not present. Polish economy and companies were not hit heavily by the crisis but the financial crisis had long-term impact on Polish economy. This might be proof that Polish economy still needs reforms. Managers of Polish companies are aware of specific situation of Polish economy. They try not to add extra financial risk to operating risk resulting from vulnerable and volatile economic situation.

But the analysis done for the purpose of the paper allows to raise more questions, e.g. what changes were in using bank loans during financial crisis, what changes were identified in the relation between long and short term capital during the financial crisis. It was also negative relation between tangibility and debt ratio identified and this makes a new research question and needs closer examination.

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Game Theory Applied to Business Decision Making under Fiscalization in Croatia: Analysis, Equilibrium, and Policy Recommendations

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The Croatian Fiscalization Law implemented in Croatia in 2013 created dynamic interaction and significant consequences for business and the Government. We examine the influence of the Fiscalization Law on decision making of businesses and its consequences. The paper provides an overview and analysis of the implementation process, business decisions, interactions between business and Tax Administration, as well as the consequences. Financial benefits of tax evasion form a clear motivation for businesses, but noncompliance could lead to losses due to penalties. Given the decision-making under risk, the interaction between a business and Tax Administration should be formed as a game model enriched with empirical data. Given the empirical data, while businesses show tendency to deviate, Government generates gain. Hence, it is necessary to examine the equilibrium: how much deviation will the Government tolerate before raising penalties, and which amount of risk will business be willing to take in order to evade taxes.

Key Words: game theory, decision-making under risk, fiscalization

JEL Classification: C72, D81, H26

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Introduction

There have been negative economic trends in Croatia for several years, caused by the global economic crisis. In the last few years, fiscal policy actions are aimed at fiscal consolidation of revenue, and the expenditure

side of the national budget. Activities on the revenue side relate to changes in tax regulations, reducing grey¹ economy and the more efficient charging of budget revenues (Republika Hrvatska 2014).

In a wider sense, grey economy includes all activities that occur outside the boundaries of the official economy, although it is very difficult to precisely define grey economy and to estimate its real size (Kesner-Škreb 1994). Tanzi (1983) defines grey economy as any earned income that is not reported to national authorities. Feige (1990) divides grey economy into four categories:

1. Illegal economy, which includes production and distribution of goods and services that are specifically prohibited by law, such as drug trafficking, prostitution, smuggling and organized crime;
2. Undeclared economy, which includes activities to avoid the compliance with the tax rules and activities to avoid paying taxes, for example not reporting the turnovers;
3. Unregistered economy, which includes activities that are not reported to official statistics and are not part of the national accounts;
4. Informal economy, which refers to activities by which a company reduces costs and violates administrative rules, such as unregistered workers.

There are numerous reasons for the existence of grey economy in Croatia. Škare (2001) sees those reasons as both external and internal. External reasons are the ones outside the economy domain, related to the consequences of war, alienation, insecurity, and weak regulations for law implementation. The internal factors include poor implementation of regulations and law corruption, bad administration, and bad allocation of public resources by the state.

According to the survey 'Grey Economy in Croatia' (Selectio 2006), the main reasons for participating in grey economy for both the employers and the businesses are high taxes, which burden the legal businesses; non-implementation of laws; weak sanctioning of law offenders; the 'untouchables,' i.e. privileged individuals; and the appetite for more money.²

This paper includes the category of grey economy which is related to non-compliance with tax rules; tax avoidance by not reporting the real amount of turnovers generated during the performance of activities; and not issuing the invoice to customers. According to Feige (1990), this is the category of undeclared economy.

The previous business tradition of not submitting all of the invoices

and financial benefits of tax evasion form a clear motivation for businesses. On the other hand, if revealed, noncompliance could lead to losses due to penalties for tax evasion. The business is observed as a decision-maker under risk, whose aim is to maximize the gain and minimize expected losses due to penalties. Given the decision-making under risk, the interaction between a business and Tax Administration should be formed as a game model enriched with empirical data. This enables the analysis of the previous course of interaction development, an assessment of deviation tendency and questioning the existence of long-term equilibrium.

The paper is structured as follows: the conceptual framework offers overview of the Fiscalization Law, its motivation, implementation, process and effects; methodology introduces modelling of business and Government decision-making framework, and sets a model for their interaction; the results and discussion section indicates possible outcomes of a business and Government interaction; while conclusion offers the summarization of the main points and indicates possible implications of the findings.

Conceptual Framework

FISCALIZATION

The Tax Administration presented the Suggestion for the Implementation of Cash Transactions Fiscalization (Vlada Republike Hrvatske 2012), which was a direct attack on tax evasion. This Suggestion explains the causes and reasons why taxpayers involve in tax evasion: unjust and complex tax regulations, the amount of penalty imposed for tax law violation, and the existence of opportunities for tax evasion. The Tax Administration conducted a detailed analysis of taxpayers' reported income and reached devastating results. The analysis led to the conclusion that the biggest tax evasion in cash transactions happens in the sectors of catering, retail trade and some service business. Not issuing the invoice – and by doing so, participating in tax evasion – has many negative consequences for the country. Tax offenders do not pay taxes on the part of the non-reported turnovers. This diminishes the basis for calculating the annual personal income tax or profit tax, which is not realistic given that it is calculated using only the reported income. Therefore, the first loss for the national budget is not calculating the real income and profit tax. Second, the national budget is diminished through the smaller amounts of reported Value Added Tax and Special Consumption Tax. Not issuing invoices creates an unfair competition by 'demolition of the price,' and in

TABLE 1 Phases in Fiscalization Implementation

Phase	Date of implement	Obligation for
I	1 January 2013	All taxpayers who are performing activities from the Area 1 through NCA: Activities such as providing accommodation and preparation and serving of food. All large and all medium-size companies by the Accounting Law.*
II	1 April 2013	All taxpayers who are performing activities from the Area G through NCA. Activities wholesale and retail, repair of motor vehicles and motorcycles. All taxpayers who are performing free professions activities.
III	1 July 2013	All the other taxpayers. Small fiscalization obligors.

NOTES * The way of company's categorization on micro, small, medium-size and large is shown in the article 5 of The Accounting Law (*Narodne novine*, 78/15, 134/15). ** A small fiscalization's obligor is each physical entity who is a liable by The Personal Income Tax Law (*Narodne novine*, 177/04, 73/08, 80/10, 114/11, 22/12, 144/12, 43/13, 120/13, 125/13, 148/13, 83/14, 143/14, 136/15) through performing free professional activities, excluding catering or trade, who has a yearly turnover not more than 149.500 Kn, whose income and tax income are calculating through flat rate by The Personal Income Tax Law and The Regulation of Flat Rate Taxing Free Professional Activities (*Narodne novine*, 143/06, 61/12, 160/13, 137/15).

that way a regular taxpayer can lose his or her turnovers, which leads again to a decrease in the national budget revenues.

THE INTRODUCTION OF FISCALIZATION

The obligation of fiscalization implementation had three phases. Dates of the implementation and the obligation for taxpayers from different National Classification of Activities (NCA) are given in table 1. The fiscalization obligors are taxpayers who meet the following criteria:

1. Physical entities are liable by The Personal Income Tax Law if performing free professional activities;³
2. Legal or physical entities are liable by The Profit Tax⁴ if performing any business activity that creates the obligation of issuing invoices to customers for purchased goods or services provided.

All taxpayers who are fiscalization obligors have to adjust the content of the invoice; determine the method of coding the invoice's number; determine an internal act of the branches with the determination of coding rules; highlight a warning sticker about the obligation of issuing and tak-

ing the invoice. These actions should be performed for all business activities except for activities exempted from the obligation of fiscalization.⁵ This paper includes an analysis only for those taxpayers who are fiscalization obligors and who charge their invoices in cash.

The period of enforced fiscalization was very short, but meeting the preliminary requirements necessary for fiscalization was conducted prior to it and it meant costs for the taxpayer. For taxpayers' convenience, Tax Administration issued a brochure (Republika Hrvatska 2016b) with instructions for conducting the process of invoice fiscalization.⁶

SUPERVISING THE IMPLEMENTATION OF FISCALIZATION

The Ministry of Finance – Tax Administration (www.porezna-uprava.hr) conducts supervision of the fiscalization implementation. The worst-case scenario enables the controller to prohibit further taxpayer's business activities until deficiencies are eliminated. The penalty for violating the Fiscalization Law can amount from 10.000 up to 500.000 HRK for issuing an invoice that does not contain all the required data. There is also:⁷

1. A penalty for the taxpayer or the taxpayer's responsible person in the amount from 1.000 to 50.000 HRK;
2. A penalty between 5.000 and 500.000 HRK for issuing an invoice that does not contain the exact invoice number, or for not highlighting a warning sticker (about the obligation of a business to issue and a customer to take the invoice) in a visible place inside the premises;
3. A penalty for the responsible person (business or taxpayer) that amounts from 1.000 to 40.000 HRK;
4. A penalty for the customer if he or she does not take the invoice after the purchase of goods or services, in the amount from 200 to 2.000 HRK.

The Government has also included citizens in the process of supervising the implementation of fiscalization, like a special form of 'inspectors.' Citizens can check every invoice with the Tax Administration within 30 days of invoice issuance, and are invited to report irregularities. Another way to motivate citizens to report irregularities are prize contests and rewards.⁸

THE EFFECTS OF FISCALIZATION

During the first period, the Tax Administration conducted 21.590 controls, during which it found 2.186 irregularities (roughly 10% of controlled

taxpayers), and imposed a penalty of temporary prohibition of work in 465 cases (roughly 2% of controlled taxpayers). During the second study period, the Tax Administration conducted 6.604 controls during which it found 2.002 irregularities (roughly 30% of controlled taxpayers), and for 388 of them (roughly 6% of controlled taxpayers) imposed a temporary prohibition of work. Thus, in the second reference period, the number of controls was drastically reduced, while the relative number of irregularities tripled. The Tax Administration explains that in 2013, the first year of fiscalization implementation, they tolerated irregularities due to taxpayers' adaptation. If true, this explains the number of controls, and such a small number of detected (or reported) irregularities. It is assumed there were much more irregularities, but the Tax Administration first issued a warning and pointed the irregularities, and if the irregularities were not removed by the second control to the same taxpayer, the taxpayers were punished.

At this point, the conclusion from these data is that the number of controls and the number of irregularities in 2014 indicated that the Tax Administration punished nearly every third controlled entity, which probably means that the Tax Administration started applying target controls. Were the customers' reports the reason for that? The citizens' involvement in the process of supervising the implementation of fiscalization, through reporting irregularities, made them act as an additional mechanism of control.

During the first two seasons of the contest, citizens sent in 800.000 invoices altogether, while in the third season their response incredibly increased. By the end of the third round of the third season, the Tax Administration received 8.78 million invoices (1.8 million in the first, 3.5 million in the second and 3.5 million in the third round) (Republika Hrvatska 2016a).

Since Tax Administration has to check each received invoice, such control is conducted by a computer. Checking all of the received invoices equals to at least 10 million field inspections. This might be the answer to the question on whether or not tax inspectors are making target controls considering the previously found irregularities.

Methodology

The previous section provides a conceptual framework for the next step. Our goal is to examine the interaction between the Government and the businesses, the perception of motives and the possibility of long-term

equilibrium in tax evasion. Fiscalization is a regulation form, which does not introduce new taxes, but demands that every legal entity submits their invoices daily to Tax Administration, thus enforcing certain behaviour. Business and Government are two parties with different preferences over outcomes, which creates a conflict of interests. There are rules (enforced by the law), but the tendency for deviation is high. In order to analyse decision-making under risk, the dynamics of the interaction, the conflict of interests, the dependence of the outcome on the decisions of both parties, and the aim to examine interaction, motivation and possible equilibrium, an adequate model has to be applied. Given the features of the observed situation, the business and Tax Administration interaction should be formed as a game model enriched with empirical data. That enables the analysis of the previous course of interaction development, an assessment of deviation tendency, motivation and questioning the existence of long-term equilibrium. In order to define potential outcomes, as well as perceived Government motivation, we will apply game theory. Similar approach was suggested by Ordeshook (1986) while examining the interaction of the public and the Government in situations of public goods supply and demand using game theory and social choice theory. Laffont and Tirole (1986) use game theory to model regulation and efficient Government procurement, and introduce a moral hazard as a form of deviation from rational choices. The same authors, in 1993, extensively examine market regulation through firm and benevolent regulator interaction by changing conditions of the interaction (such as the number of firms on the market, regulator's motivation, introducing interest groups, incentives and incomplete information). While considering regulatory agency's position, they found that it has more complete information, and is inclined to increase its own payoff function, rather than social welfare pay-off. Such a finding points out the need for a proper incentive mechanism, which would ensure the efficiency of the regulation. Schmidt (1994) points out that regulator's beliefs and goals in Laffont and Tirole (1993) model are not observable prior to the action, which makes it hard to empirically test the predictions. This is not an aggravating circumstance for modelling the situation in this paper. The conceptual framework section contains the statements of motivation and goals publicly stated by the Government (Tax Administration) – the regulator. Thus, examination of the Government's decisions and underlying motivation will be the comparison of actions and outcomes (given the empirical data) to the claims of its motivation and goals. Rasmusen (2007) examines the application

of game theory in law and economy, showing that the application is possible in many areas, especially in the contract theory, as far as the use of the abstraction in modelling is correct and allows us to examine underlying principles regardless of the details. Corchon (1992) presents a partial equilibrium model of tax evasion, re-examining Nash, Stackelberg, maximin and Bayesian equilibrium, as well as cooperative game outcome. The author introduces the probability of tax evasion and probability of being monitored, and models tax evasion as a discrete variable. Similar approach will be used in this paper, regarding to probabilities and modelling tax evasion as a discrete variable. Corchon derives two conclusions: the evasion occurs due to imperfect information and high penalty for the evaders is socially desirable. Carfi and Musolino (2015) use game theory model to analyse the interaction between the state and relative taxpayer using realistic frequencies for probability and propose an honesty award. Antoci, Rusu, and Zarri (2014) model taxpayer situation using evolutionary game theory, considering three types of taxpayers: cheaters, honest citizens and punishers. They find that honest taxpayers who are willing to pay taxes play crucial role in a long-run equilibrium. Tan and Yim (2014) consider the effect of uncertainty on taxpayers' decisions and find that 'increasing the level of strategic uncertainty among taxpayers could be an effective device to deter tax evasion.' Tsebelis (1991) argues that a better approach to modelling probabilities is to derive them from maximization functions rather than assume them prior. He finds that lowering the penalties or law standards leads to a decrease in the frequency at which regulatory agency enforces the law. The author considers that this situation must be modelled as a game in order to explain the situation.

Given the previous research and recommendations on the subject, the situation observed in this paper will be described using dynamic game of complete information framework. In the first stage, business gets to choose to evade or not to evade taxes. At the second stage, the Government chooses to induce control over a business, or not to induce control. The game exceeds to the third stage only if control occurred at the second stage. At that stage, a business chooses between paying the penalty, not paying the penalty and closing the business.

BUSINESS DECISION-MAKING FRAMEWORK

Regularly, the business profit function is defined as revenues diminished by expenses. For the purpose of this paper, we will observe the part of this function related to the GDP and tax evasion. Therefore, it will be defined

by the revenue that contributes to production and taxes that contribute to GDP, parsed and corrected for tax evasion.

Hence, the business function is defined as

$$B_i = (R_i, R_{Ei}, T_i, T_{Ei}), \tag{1}$$

where i denotes the observed business, respectively, $i = 1, \dots, n$; R_i denotes regular business income; R_{Ei} denotes unreported business income; T_i denotes taxes paid for the regular income and T_{Ei} denotes unpaid taxes for unreported income.

The parsed function takes the following form,

$$B_i = R_i + (-1)^c e b r c R_{Ei} - T_i + (-1)^c e b r c T_{Ei} + (-1)^c e b r c K(1 + p), \tag{2}$$

where c denotes occurrences of the control, $c = 0, 1$ and gains the value 1 if control occurred for the observed business, otherwise gains value 0; business tax evasion decision is denoted as $e = 0, 1$ and gains value 1 if business evades taxes and 0 if it does not; the penalty value is $K = 0, 300000$ measured in HRK by the Law; the sum of all occurred controls is $C = \sum_{k=1}^n c_k$ assumed to be evenly distributed over the set of the businesses; r denotes the probability of control occurrence for a business, respectively,

$$r = \frac{\binom{n}{1} \binom{n-1}{C-1}}{\binom{n}{C}},$$

and b stands for business belief of probability of getting a penalty if they chose to evade taxes.

The business motivation is to maximize the gain and minimize the loss. It seems that tax evasion can contribute to gain maximization, but the accompanying uncertainty and penalties can contribute to higher loss.

There are also businesses, which will obey the law regardless of the possibility for evasion or penalties. However, this paper targets primarily those, which tend to deviate from obeying the law. This subset of businesses will always choose to obey the law and for the purpose of this paper, they will be treated among the set of businesses whose belief on being caught is equal to one.

The businesses have to make decisions under the uncertainty of tax control. Given the motivation, there are two constraints:

1. $\max_{R_i, R_{Ei}} B_i$ and

$$2. \min_{T_{Ei}, K} B_i.$$

In order to satisfy the first constraint, the first order condition has to be satisfied:

$$(-1)^c rceb = 0.$$

There are two possible outcomes, which empower possible business decisions.

If the business perceives the probability of control to be $r \neq 0$, hence $rce \neq 0$ it can decide that e should be equal to zero, in order to fulfil the first order condition without the decision under the risk.

If the business perceives the probability of control to be $r = 0$, it can allow e to be equal to 1, and respectively $c = 0$. Given the empirical data provided on the number of controls, $r \neq 0$, rational decision would be to dismiss this option.

However, there is also the third possibility, which is not foreseen by previous condition, where business perceives r to be close to zero, and makes decision under the risk about the e . In this case, r denotes the perceived risk of control. In addition, it is important to take in consideration another reason for this outcome, based on the belief in the probability of getting caught, b . It is related to the dynamics of business interaction with their customers and it is based on trust. If the business chooses to evade invoice report in rare situations only with loyal customers, it can form a belief that if the control occurs, the business will be perceived as $e = 0$ and will not receive penalty.

Second, the first order condition requires:

$$R_i - T_i = -(-1)^c rceb(R_{Ei} + T_{Ei} + K(1 + p)). \quad (3)$$

In order to solve this, it is necessary to notice that the business gain would be largest if the right side of the equation was equal to zero, which leads to solving this equation for r , c , b and e , and that has already been done in the first of the two first order conditions.

The second constraint leads to solving the first order conditions:

$$(-1)^c rceb = 0 \quad (4)$$

$$(-1)^c rcb(1 + p) = 0 \quad (5)$$

$$R_i - T_i = -(-1)^c rceb(R_{Ei} + T_{Ei} + K(1 + p)) \quad (6)$$

If we look at the second constraint conditions, it can be noticed that if e has been previously chosen to be $e = 1$, the only way to minimize the penalty cost is to minimize r , c , b or bring them all to zero. However, that

is not in the domain of the business to decide. The bottom line is, these conditions also show that the outcome depends on the business choice of e , which will depend on the perceived value of r and b .

Hence, possibilities for business decisions are: (1) obey the law, where $e = 0$, and (2) decision under the risk, tax evasion, where $e = 1$, and $r = [0, 1], b = [0, 1]$.

GOVERNMENT DECISION-MAKING FRAMEWORK

The Government function will be composed of the aggregated and parsed business contribution to the GDP.

$$\Delta Y = (T_r, T_E, I_r, I_E), \tag{7}$$

where T_r denotes Government income from regularly paid taxes, respectively $T_r = \sum_{i=1}^n T_i$; T_E denotes unpaid taxes (opportunity cost), $T_E = \sum_{i=1}^n T_{Ei}$; I_r denotes regular business income (production), $I_r = \sum_{i=1}^n R_i$, and I_E denotes unreported income (opportunity cost), $I_E = \sum_{i=1}^n R_{Ei}$.

Parsed form of the function is:

$$\Delta Y = T_r - (C - k)ET_E + I_r - (C - k)EI_E + k(K(1 + p) - K_y) - (C - k)K_y, \tag{8}$$

where C denotes sum of occurred controls, $C = \sum_{k=1}^n c_k$; E is a sum of tax evasion occurrences, $E = \sum_{i=1}^n e_i$; k is a set of occurred controls which found tax evasion, $k = C \cap E = C \cdot E$; and K_y is the expense for each tax control.

The Government motivation is to generate more income, which is possible either through the income maximization, or loss and expenses minimization. Given the Government’s awareness of tax evasion, they use instrument of control in order to maximize the effectiveness of the tax control. It is assumed that the Government makes rational decision and maximizes the function value through the income and taxes, and not by paid penalties. Respectively, it minimizes the loss regarding the opportunity cost of tax evasion and the cost of induced controls. Hence, Government decisions will be driven by minimization of the negative effects to the budget. The motivation creates constraint, which forms first order conditions for solving the Government’s problem:

$$\min_{E, K_y} \Delta Y.$$

That leads to solving

$$E(T_E + I_E) = 0 \text{ and} \tag{9}$$

$$(C - k)(I_E - T_E) = 0. \tag{10}$$

The first condition clearly shows that the best outcome for the Government would be if there were no tax evasion. That could happen if no one chooses to evade taxes, $E = 0$. The other possibility is that the sum of tax evasion and unreported income equals zero. However, none of these decisions is in the domain of Government decision making.

The second condition points out factors relevant for Government decision making, $C - k = 0$ where $C = k$. In that situation, every control results in charging a penalty. That points out to optimal Government decision to conduct controls only in the set of tax evaders. Despite the rationality behind this solution, the implementation could be questionable. In fact, the purpose of the control is to determine whether the observed business evades taxes or not, so they can have the complete information only after the observation. However, they can obtain extensive information before the control in order to diminish uncertainty and enhance the success rate. Unfortunately, there is also another possibility for inspectors to achieve $C = k$ and that is to charge a penalty within every control for every irregularity regardless how small the penalty is.⁹

Inference leads to optimal situation for the Government: either no one evades taxes, or the control finds all those who evade taxes.

However, the outcome depends neither solely on the business nor on the Government decision. The previously shown optimizations from business and Government perspectives point out preferred outcomes, which will serve as a framework for the Government – business interaction.

BUSINESS AND GOVERNMENT INTERACTION

The environment of the observed situation is defined by fiscalization. Given the decision-making under risk, the business and Tax Administration interaction should be formed as a game. That enables the analysis of the previous course of interaction development, the assessment of deviation tendency and questioning the existence of long-term equilibrium.

The game theory decision tree shows the possible choices and related outcomes. So, let us play a game.

Given the game environment, the business makes the first move and decides whether to obey the law or to evade taxes. At this point, if the business decides to evade taxes, it is decision under the risk regarding to their belief on r and b . Next, the Government is on the move and it can decide to induce control over the observed business or not. If the Government controls were not randomly distributed, they would depend on

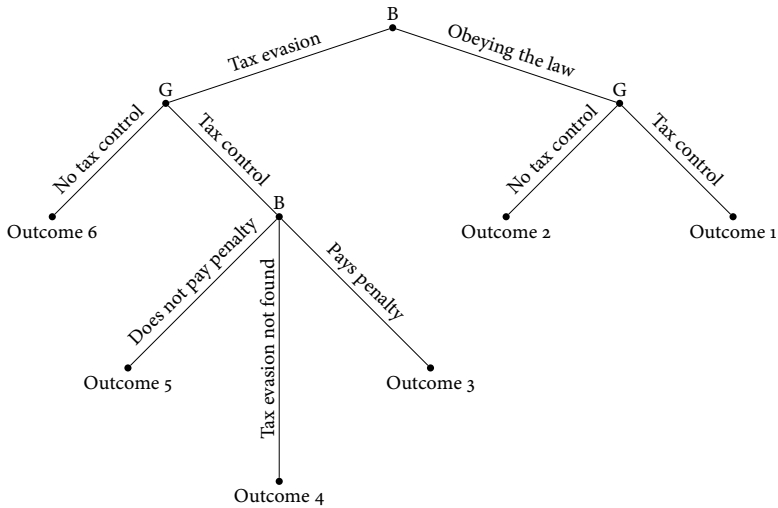


FIGURE 1 Decision Tree Game Representation (B – business, G – government)

their belief on the business’s choice of e . If the control finds irregularities, the business will have to pay penalty. At that decision node, the business has to decide to pay or not to pay the penalty. If the total cost of penalty exceeds the regular income diminished by regular tax on income, the business will not be able to pay for it; hence, it will probably shut down the business. The described decisions and their interconnection lead to six possible outcomes. The first outcome shows that the business decided to obey the law and the Government induced the control. No irregularities were found and no penalty has been paid. The second outcome describes a situation where business decides to obey the law and the Government decides not to control this business. The third outcome describes the decision path where the business decides to evade taxes, the Government decides to conduct control and the business pays the penalty. The fourth outcome describes the business’s decision to evade taxes, after which the Government conducts control but does not find irregularities. The fifth outcome occurs if the business decides to evade taxes, the Government conducts control and the result is closing the business due to the impossibility of paying the penalty. The sixth outcome denotes the decision path of the business’s choice of tax evasion, the absence of Government control, and the lack of the penalty. The possible outcomes reveal the existence of cheaters and honest taxpayers, which can be related to Antoci, Russu, and Zarri’s (2014) research.

Results and Discussion

This section deals with model implementation, as well discussion, and interpretation of results. It attempts to answer the research questions: is it possible to use the model for analysis of the previous course of interaction development, is it possible to assess deviation tendency and can it determine the existence of long-term equilibrium. In order to determine the equilibrium, two questions will be answered: how much deviation will Government tolerate before raising penalties or increase the amount of control, and which amount of risk will business be willing to take in order to evade taxes.

First, we will analyse the game implementing the functions, which underline players' motivation, which is shown in figure 1.

In the first stage of the game, the business is on the first decision node and gets to choose between obeying the law and tax evasion. At the very beginning, their motivation function is perceived as:

$$B_i = R_i - rebR_{Ei} - T_i - rebT_{Ei} - rebK(1 + p), \quad (11)$$

given the belief b .

The decision on tax evasion is determined with the previous belief in the probability of being caught in tax evasion, and probability of control occurrence and the penalty cost. The business makes decision on e , based on the available information and perception of r and/or b . In order to consider r , business had to have previous belief on b to be equal or close to zero. If the business maximizes the gain and minimizes the loss regarding to probability of r , then it achieves higher perceived gain if r is smaller, respectively

$$r \leq \frac{R_i - T_i}{K(1 + p) + (R_{Ei} + T_{Ei})}. \quad (12)$$

That relation reveals underlying motivation $R_{Ei} + T_{Ei} > R_i - T_i - K(1 + p)$, which shows that the rb will be small enough and tax evasion profitable in every outcome, if and only if possible overall gain from tax evasion is bigger than regular business profit diminished for the penalty. Based on this relation, each business should decide on their e , tax evasion decision parameter.

Hence, the motivation function for the business, which chooses to obey the law in the first stage, looks like this:

$$B_i = R_i - T_i, \quad (13)$$

and for the business which decided for tax evasion:

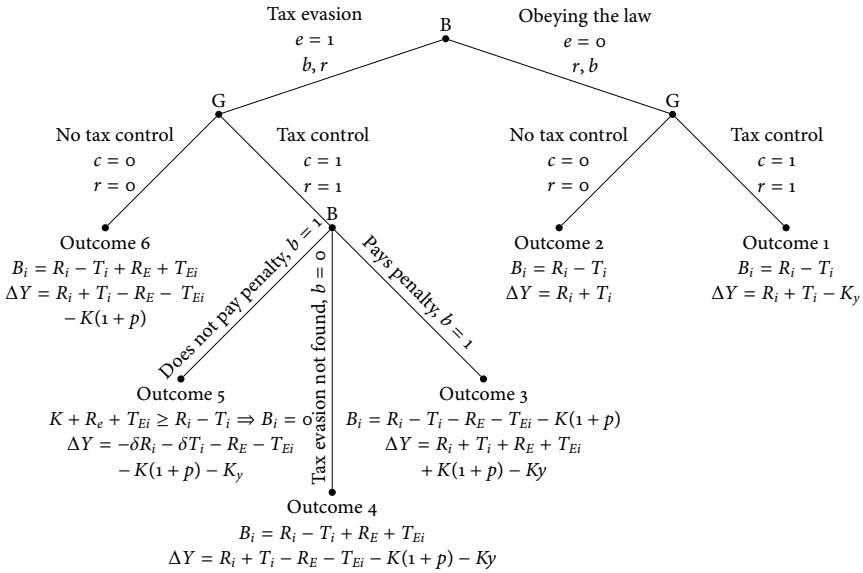


FIGURE 2 Decision Tree Game with Probabilities and Outcome Functions

$$B_i = R_i + (-1)^c c R_{Ei} e - T_i + (-1)^c c T_{Ei} e + (-1)^c c K(1+p), \tag{14}$$

with risk probability r , and belief in not getting caught b , which become exogenous parameters after the decision has been made.

Given this finding, the game has been enhanced and represented in figure 2.

If a business decides to obey the law, and makes decision based on belief b and risk probability r , then it is true that $e = 0$. If control occurs, the probability of control takes the value of 1, hence control occurrence parameter takes the value of $c = 1$. The outcome for the business is equal to regular business income diminished by taxes, while the Government has the loss of conducting control. If control does not occur, $r = 0$, hence $c = 0$, the second outcome is equal to regular business and Government operations (there is no control expense, so there is no loss for the Government).

If a business has a belief b close to zero and perceives risk probability also to be close to zero, it will choose $e = 1$. If control occurs, $r = 1$, and $c = 1$. In the third outcome, the values regarding tax evasion become the loss for the business and the gain for the Government. The fourth outcome occurs when a business's belief b proves to be true, and control does not find irregularities. The outcome shows gain from tax evasion for

TABLE 2 Conducted Controls in Croatia

Year	Conducted controls	Found irregularities	Temporary closed businesses	Total number of businesses
2013	21590	2186	465	144356
2014	6604	2002	388	171046

a business, and loss for the Government formed from the control expense and opportunity cost of tax evasion values.

The fifth outcome is the worst possible outcome for both the Government and the business. If the penalty amount is so high that the business cannot pay for it, it will have to shut down. This situation is slightly worse for the Government. First, it will not reimburse tax evasion, neither will it charge the penalty, but it will also lose all future possible incomes from that business (and indirectly, it will cost the Government additionally through the social expenses for newly unemployed workers). Therefore, this outcome provides a recommendation for the upper bound in defining penalties. The significance of the penalty is to educate/indoctrinate businesses and make sure they will obey the law, and not to enable them to do business. Given that, penalties should be defined individually for a business, respectfully

$$K \leq \frac{1}{1+p} [R_i - T_i - R_{Ei} - T_{Ei}], \quad (15)$$

assuming that the unreported income will be determinate and related taxes charged (as shown in the right part of the inequality). The findings are contrary to Corchon's (1992) conclusion that high penalties for evaders are socially desirable.

The sixth outcome derives from the business's decision to evade and the absence of Government control. Tax evasion is a business's profit and the Government's opportunity loss.

So far, it is clear that if the Government wants to minimize tax evasion, it has to influence important factors for business decision-making: perceived risk of control r and the belief of not getting caught b , and to make any of them, or both close or equal to zero. Unreasonably high penalties are not a rational choice. However, the number of tax controls defines perceived risk of control (yearly), and the belief of not being caught is based on a business's relations with the customers. The Government can, and as will be shown, already has used this influential factor in order to reduce tax evasion.

We will now consider presented model as a repeated game, which has been played in Croatia. We will insert the available empirical data and examine the effectiveness of induced changes over the years (table 2). Given the stated parameters, it is possible to calculate the probability of control occurrence for each year,

$$r_{2013} = \frac{\begin{pmatrix} 21590 \\ 1 \end{pmatrix} \begin{pmatrix} 122766 \\ 215589 \end{pmatrix}}{\begin{pmatrix} 144356 \\ 21590 \end{pmatrix}}, \text{ and } r_{2014} = \frac{\begin{pmatrix} 6604 \\ 1 \end{pmatrix} \begin{pmatrix} 164442 \\ 6603 \end{pmatrix}}{\begin{pmatrix} 171046 \\ 6604 \end{pmatrix}},$$

as well as the belief of paying the penalty if control occurred,

$$b_{2013} \frac{2186}{21590} = 0.10125 \text{ and } b_{2014} = \frac{2002}{6604} = 0.3031496.$$

Regarding the probabilities and beliefs, the situation significantly changes if we include ‘recruited inspectors’ – citizens that enrolled in invoice collecting game. The information on the annual amount of collected invoices is not available, but in over three years, 27,640.000 invoices were submitted altogether. Unfortunately, the information on how many businesses have been covered by submitted invoices is not available. If that information was available, each of them could be included in the model as a control occurrence.

So, what does it mean for the business and Government payoff functions? If the business observes only inspector control, the risk of control occurrence is quite small and it diminishes the expected penalty. This creates a motivation for evasion. Given that the number of the businesses covered by submitting invoices for prize competition is not available, a business can assume that some of its customers are invoice collectors and choose to evade taxes only when providing service or selling to familiar and loyal customers. Given the decision making criteria has been defined before,

$$r \leq \frac{R_i - T_i}{K(1 + p) + (R_{Ei} + T_{Ei})},$$

it can be noticed that companies with higher profit have higher tendency for deviation. However, the decision-making is crucial for the businesses which balance with covering their expenses, and that is even more emphasized for small businesses. A choice to evade taxes can provisionally seem to be a good solution if the business is not going well and owner’s

existence is violated, but it can also lead to shutting down the business if the penalty occurs.

From the Government's perspective, their motivation is to increase success rate in charging penalties when control occurs, which is aligned with the Laffont and Tirole (1993) conclusions. That uncovers the underlying motivation for collecting penalties. In addition, data shows that only 0.3% of all active businesses have been closed by inspector's decision in 2013 and 0.23% in 2014. That can be demonstrated through another conclusion,

$$K \leq \frac{1}{1+p} [R_i - T_i - R_{Ei} T_{-Ei}],$$

involving the amount of the penalties. If the inspectors charge penalty higher than other yearly revenue from controlled business, it is more profitable for the Government. In other words, if business's revenues are small, in a short run it is more profitable for the Government to induce higher penalty, charging it and causing the closing of a business. However, seriously, is that the point of this law?

However, in a long run, the rational choice for Tax Administration is to adjust the penalty given the previous equation, otherwise it will not compensate tax evasion and charge the penalty, but it will also lose all possible future incomes from that business. In addition, shutting down a business indirectly costs the Government through the social expenses for newly unemployed workers. Given the results, the right way to fight evasion is to increase the business's perceived risk of control and belief of being caught, through an increase in the number of controls. That is only partially inclined with Tan and Yim (2014), who claim that increasing the strategic level of uncertainty could negatively affect tax evasion. Our findings suggest that it is necessary to increase perception of the certainty of being caught.

Conclusions

The paper provides short overview of the Fiscalization Law implementation, which was used as a situational framework for designing a game theory model. Given the business and Government decision making framework a model of their interaction was modelled.

The results show that there are six possible outcomes for the business and Government interaction considering tax evasion.

The implications of the results show that the optimal strategy for a business which chooses tax evasion, is not to issue an invoice only to

loyal customers, which diminishes the possibility of being reported and diminishes the business's perceived risk of control and the belief of being caught. The optimal strategy for the Government is to increase the business's perceived risk of control and the belief of being caught, through an increase in the number of controls. In the long run, that is a better strategy than charging high penalties. High penalties increase the Government pay-off function in a short run, but diminish possible future incomes as discussed for the sixth outcome. Hence, the penalties should be individually tailored for each business in order to enable future business activities.

The paper provides theoretical game theory model for the analysis of decision making under the Fiscalization Law in Croatia enriched with empirical data. Findings point out to consistency with Laffont and Tirolé's (1993) results, but show discrepancy to Corchón's (1992) in the long run equilibrium. The model provides practical recommendations for professionals and policy makers.

Because the Fiscalization Law was enforced in 2013, and not all the data is available, the collected empirical data considered in this paper refer to 2013 and 2014. In addition, the overall scientific literature regarding economic perspective of the Fiscalization Law in Croatia is scarce. This represents a limitation of the research, but it also suggests possibilities for further research when more data is available.

Only the following elements are considered in the model: business and Government pay-off functions, occurrences of the control, business tax evasion decision, the penalty amount, the sum of all occurred, the probability of control occurrence for a business, business's belief of the probability of getting a penalty if they choose to evade taxes, the sum of tax evasion occurrences, set of occurred controls which found tax evasion, and the expense for each tax control. That is a limitation of this paper, but it also reveals the possibility for enriching the game with other situational or behavioural variables in further research.

Notes

- 1 Except for the term 'grey economy,' other terms are used in literature as well, such as: underground economy, informal economy, parallel economy, working on black.
- 2 A very interesting fact this survey showed is the evidence of employers' ignorance about the existence of a law framework, which disables them to work legally. The survey pointed out a very high level of ignorance regard-

ing law regulations by taxpayers, customers, and citizens in general. Therefore, the Government's activities, besides the repression of grey economy, should be focused on informing the public about law regulations and tax obligations.

- 3 Free professional activities are stated in the article 18 of The Personal Income Tax Law (*Narodne novine*, 177/04, 73/08, 80/10, 114/11, 22/12, 144/12, 43/13, 120/13, 125/13, 148/13, 83/14, 143/14, 136/15).
- 4 Article 2 of the Profit Tax Law (*Narodne novine*, 177/04, 90/05, 57/06, 146/08, 80/10, 22/12, 148/13, 143/14) defines the profit tax obligor.
- 5 The activities that are exempted from the fiscalization are stated in the article 5 of The Cash Transactions Fiscalization Law (*Narodne novine*, 133/12).
- 6 Taxpayers are obligated by the Financial Agency to provide the certificate for electronic signature of the elements in the invoice, because it is required for identification during electronic data exchange with the Tax Administration.
- 7 According to the General Tax Law, a taxpayer is obliged to issue an invoice to a customer for any purchased goods or services performed. The case of non-issuance of invoices represents the heaviest form of tax violation for which the taxpayer could get a penalty in the amount from 20.000 to 500.000 HRK (HRK is official acronym for Croatian currency, Kuna), while the taxpayer's responsible person could be penalized in the amount from 5.000 to 40.000 HRK. The Tax Administration may prohibit further work to the taxpayer due to non-issuance of invoices, and this prohibition can last from 15 days to 6 months. In addition, the taxpayer is also obligated to issue invoices by the Value Added Tax Law, the Personal Income Tax Law and the Profit Tax Law.
- 8 The first season of the prize contest took place in the period from February to December 2013 through 4 rounds, with the total prize of 180.000 HRK. The second prize contest lasted from August 2014 to April 2015, and through 3 rounds rewarded citizens with the total prize of 480.000 HRK. The third season began in August 2015 and lasted until April 2016 under the new slogan 'Search invoices and catch Kunas,' through 4 rounds and the total prize of 290.000 HRK. In order to achieve even greater effects of fiscalization in fighting tax evasion, the Government turned to tourists visiting the country, and prepared two different prize contests specifically for them. The first one was conducted under the slogan 'And where is the invoice!?' intended for Czech tourists, and the other under the slogan 'The invoice, please!' intended for all the other tourists. As a reward, the winners got a holiday in Croatia in the value of 15.000 HRK (see http://www.poreznuprava.hr/HR_Fiskalizacija/Stranice/UzmiteRacunBezRacunaSeNeRacuna.aspx).

- 9 This behavior is questionable because there are reported situations that it sometimes occurs, even though it is contrary to the purpose and declarative goals.

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Education and Economic Growth: Empirical Evidence from Nigeria

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Experts opined that education affects the society both at the micro and macro levels. However, the place of education has not been given its right place in Nigeria as reflected in the nation's budgetary allocations. Hence, this study examined the impact of different levels of education on different components of growth in Nigeria. Data were sourced from the CBN *Statistical Bulletin* (see <http://www.cbn.gov.ng/documents/statbulletin.asp>), the Nigerian Bureau of Statistics (see <http://www.nigerianstat.gov.ng>) and The World Bank (see <http://www.worldbank.org>) from 1970–2015. The Fully Modified OLS estimator was used and the results revealed that different levels of education impact at varying magnitude on each of the components of growth positively in Nigeria but the magnitude of the impact is much higher from completion rate. By implication completion rate explains growth at a higher magnitude than enrolment rates in Nigeria, therefore government should endeavour to provide modalities to curtail school dropout rate in the schooling system as a measure to boost completion rates that will facilitate growth.

Key Words: education, non-oil growth, oil growth, fully modified OLS

JEL Classification: I2, J24, O4

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Introduction

Policy makers and development planners have recognized the pivotal place of education as a means of increasing output as it has the capacity to improve health, productivity and provides an escape route from poverty. Hence, considering the place of education in nation building, countries

TABLE 1 Human Development Index and Years of Schooling

Countries	HDI	Expected Years of Schooling	Mean Years of Schooling
Nigeria	0.527	10.0	6.0
Ghana	0.579	11.5	6.9
South Africa	0.666	13.0	10.3
Kenya	0.555	11.1	6.3

NOTES Based on data from UNDP (see <http://hdr.undp.org/en/content/human-development-index-hdi>).

of the world have been investing on this all-important sector, as the development of any nation may be traceable to its level of stock of human capital, which normally entails education and health (Umo 2007; Dauda, 2010; Kakar, Khiljiand, and Khan 2011). While these two factors are key to national development, several studies have found that the former impacts positively on the latter (see Gyimah-Brempong 2011). The nexus between education and growth have continued to attract the attention of economists and policy makers as an engine for increased economic growth. Experts argued that education impacts the society at both the micro and macro levels (Barro and Lee 2010; Bashir, Herath, and Gebremedhin 2012; Barro 2013) but the quest of most developing countries to maximally utilize education to break out of the vicious circle of poverty and increase output has been a challenge (Barro 1997; Anyanwu et al. 1997).

Additionally, investment in education secures return in the form of skilled work force that could be geared to the needs of development, both for accelerating economic development and for improving the quality of the society (Yogish 2006). For instance, countries that are closer to the technological frontier, high brow education include research and innovation provides the path for technological advancement that increases labour productivity and economic growth whereas; low brow education sufficient for imitation of technology aggrandizes productivity and making them far from the frontier (Aghion et al. 2006). In Nigeria however, investment in the recurrent and capital expenditure on education has been low, unstable and inadequate considering the ever increasing demand for formal education, thereby rendering the available learning infrastructures to be short in supply.

Nigeria with all her oil wealth is ironically classified as a low-income country, a mono-product dependent economy with a rapidly growing

population but has a low adult literacy rate among other features. For instance, the Human Development Index (HDI) for Nigeria in 2015 stood at 0.527 compared to South Africa, Ghana and Kenya with HDI of 0.666, 0.579 and 0.555 respectively (see table 1). Similarly, the adult literacy rate in Nigeria was 29, 39.9 and 39.2 in 2006, 2008 and 2009 respectively and varies even with countries along the same regional bench such as that of Ghana which was 35.8, 34.2 and 33.4 while Benin stood at 60.3, 59.3 for 2006 and 2008 though reduced to 30 in 2009 (see <http://hdr.undp.org/en/content/human-development-index-hdi>). The abundance of well-educated people goes along with high level of labour productivity and that a larger number of more skilled workers have greater ability to absorb advanced technology from developed countries (Barro and Lee 2010).

The nexus between education and growth have continued to attract the attention of economists and policy makers. Experts opined that education impacts the society both at the micro and macro levels. However, the place of education has not be given its right place in the case of Nigeria as reflected in the nation's budgetary allocations and the ugly characteristics rocking the sector. The country is also characterized by dualism in every form such as oil and non- sector and this dualism also reflect in the contributions to growth and education impacts on these components differently.

Several studies (Babatunde and Adefabi 2005; Dauda 2010; Adesoye 2010; Nurdeen and Usman 2010; Loto 2011; Odior 2012; Adewara and Oloni 2012; Odeleye 2012) have delved into the likely effects of education on economic growth in Nigeria with many focusing on capturing education from expenditure perspective with specific emphases on primary school enrolment rate as proxy for human capital in their growth model. Surprisingly, the available expenditure data does not capture consolidated education expenditure in Nigeria, as the country is a three-tier system of government. Whereas school enrolments and education expenditures are good measures for assessing education, but not sufficient, as they are flow of resources devoted to the education capital formation, enrolment rate should be a better measure especially in the Nigeria case and this present study intends to bridge this gap.

Also, Gyimah-Brempong (2011) found that different levels of education impacts growth differently and studies in this area need to disaggregate education into the different level else the result will be misleading and bias. To the best of our knowledge, there is little or no study in Nigeria

that examined educational impact on growth by capturing the different levels of education in one study and this present study also intends to bridge this gap.

Another propelling factor for this study is borne out of the desire to investigate the contributions of education to the development of both the Oil and Non-Oil sectors in Nigeria. Since Nigeria is a mono-product based economy, education has the capacity to improve other sectors of her economy and adapt new technologies to promote long run economic growth. The study is at variance with previous studies as it focuses on the impact of different levels of education or schooling on different components of growth in Nigeria as well. The study is structured into five sections. Section two presents the empirical literature, while section three discusses the methodology used, section four delves into the discussions of the empirical results and lastly section five concludes the paper.

Empirical Review

The empirical literature on the effects of education on economic growth has been an issue of intellectual discourse for ages with several and sometimes conflicting views. Economists believe that investment on education or human capital increases output and labour productivity. The arguments stem from the position that a positive causal relationship exist between the proportion of government income spent on education and long run growth while some others hold the view that increasing the education spending does not necessarily translate to economic growth.

Meanwhile, there have been robust literatures on the effects of education on growth but from analytical perspective the issue of concern has been what is the best instrument for measuring education (Dowrick 2002; Barro and Lee 2010; Barro 2013). A closer look at the literature classified these measurements into flow variables (flow of resources devoted to education capital formation) and stock variables (stock of education human capital), however, available evidence favoured the stock variables more but it all depends on data availability. From the literature, there are several ways to measure education. While some studies measure it as the enrolment rate (Easterly and Rebelo 1993; Barro 1997; Dowrick 2002; Hanushek and Woessmann 2007), others measure it as education expenditure/GDP ratio (Musila and Belassi 2004; Pradhan 2009; Chadra 2010; Nurudeen and Usman 2010; Loto 2011; Odior 2011; Adewara and Oloni 2012). Some other studies measured it as completion/attainment rate as well as years of schooling (Barro and Sala-I-Martin 2004; Barro and Lee

2010; Gyimah-Brempong 2011; Barro 2001; 2013). However, enrolment rate and education expenditure are classified as flow variables that is they show the flow of resources to human capital formation while years of schooling or school attainment are stock variables that is, they measure the stock of educational human capital (Gyimah-Brempong 2011; Barro 2013). Most endogenous growth empirics used enrolment rate as a measure of human capital (Barro 1997; 2001; Dowrick 2002; Diop, Dufrenot, and Sanon 2010). Of all these measures of education, school attainment or years of schooling is most preferred as espoused in the literature as it is a measure of stock of human capital but this is often faced with measurement problems and data availability constraints (Easterly and Rebelo 1993; Barro 2013).

For the specific case of Nigeria, almost all the studies used education expenditure as measure of education (Nurudeen and Usman 2010; Loto 2011; Odior 2011; Adewara and Oloni 2012) though few of them included primary school enrolment rate to capture human capital in their growth model. But, the available expenditure data captures only the federal government expenditure on education and not the consolidated education expenditure as Nigeria operates a three tier government (local, state and federal) where all the tiers have their spending commitment to education and as well the private sector involvement. Besides, Diop, Dufrenot, and Sanon (2010) showed that public expenditures in most ECOWAS countries would reach the growth objectives if public office holders are made to be more accountable to the public, which has the ability to reducing bribe-seeking and rent-seeking behaviours in public investment. This study further reiterated that most of the ECOWAS countries are faced with diversion of public funds, embezzlements and poor public service delivery. It is in this regard that this present study intends to use different levels of enrolment rates that capture the three tiers of government flow of resources to the different levels of education or schooling better than the available federal government expenditure as used by previous studies. The study also used the only available stock variable (secondary school completion) data to capture education and examines its impact on the different aspect of growth.

Babatunde and Adefabi (2005), Dauda (2010), Adesoye (2010), Nurudeen and Usman (2010), Loto (2011), Odior (2011), Adewara and Oloni (2012), and Odeleye (2012) have delved into the likely effects of education on economic growth in Nigeria but the results are mixed. This is due to the methodology used and the variable for capturing education. For

instance, Babatunde and Adefabi (2005) examined the long run relationship between education and economic growth in Nigeria using evidence from the Johansen's co-integration approach for the period 1970–2003. The authors examined specifically two channels through which human capital can affect long run economic growth in Nigeria. The first channel is when human capital is a direct input in the production function while the second channel is when the human capital can affect the technology parameter. The authors observed that though it may be difficult to separate the two channels from each other, the result revealed that a well-developed labour force possessed a positive and significant impact on economic growth through factor accumulation and on the evolution of total productivity. Thus, a good performance of an economy in terms of per-capita growth may therefore be attributed to a well-developed human capital base.

Odiior (2011) examined the impact of government increase in spending on education on economic growth in Nigeria using the Computable General Equilibrium (CGE) model calibrated with a 2004 Social Accounting Matrix (SAM) data of the Nigerian economy. The study revealed among other things that reallocating resources to education sector is significant in explaining economic growth in Nigeria. Based on the finding of the study, the author concluded that education should be highly prioritized among other public expenditures, as it is capable of leading to long run substantial growth of the economy. Unarguably, moving resources from unproductive ventures to education (as is the case sometimes, due to rent seeking, misallocation of fund, diversion of public fund) will enhance quality of education; reduce poverty levels since investment in education is one of the pro-growth policies for promoting economic growth.

Odeleye (2012) examined education and economic growth in Nigeria using primary and secondary data for the period 1985–2007 and adopted the OLS technique. Findings from the study revealed that only recurrent expenditure had significant effects on economic growth, and that the academic qualification of teachers had significant impact on students' academic performance. The result of this study is not very different from several other studies on the impact of public expenditure on education except that it tends to deviate a little by revealing the pivot place of recurrent expenditure on learning outcomes as well as growth.

Adesoye (2010) examined the link between government spending and economic growth in Nigeria for the period 1977–2006 using the time series data to analyse the RAM model comprised of three variants con-

structured for the study. These include: regressing Real GDP on Private investment, Human capital investment, government investment and Consumption spending at absolute levels; regressing it as a share of Real output and regressing the growth rate Real output to the explanatory variables as a share of GDP in order to capture the precise link between public investment spending and economic growth in Nigeria based on different levels. The results revealed private and public investments had insignificant effects on economic growth during the period under review. The study's main policy recommendation was that government spending should be channelled especially to education and infrastructural facilities in order to influence economic growth significantly and positively in Nigeria. Results from this study is not far from the submission of Nurudeen and Usman (2010) who found a negative effect of government expenditure on education on growth in Nigeria and recommended increase in both the recurrent and capital expenditures on education.

Loto (2011) investigated the growth effects of government expenditure in Nigeria over the period of 1980–2008 with particular focus on sectoral expenditures. In the study, five key sectors were chosen (Security, Health, Education, Transportation and Communication and Agriculture). Results from the study revealed that in the short-run, expenditure on agriculture was found to be negatively related to economic growth. The impact of education, though also negative was not significant. The impact of expenditure on health was found to be positively related to economic growth. Though expenditures on national security, transportation and communication were positively related to economic growth, the impacts were not statistically significant. The author added that it is possible that education expenditure could be positive in the end if brain drain is checked.

Adewara and Oloni (2012) in a study of the composition of public expenditure and economic growth in Nigeria for the period 1960–2008 observed that expenditure on education failed to enhance economic growth. This, the authors argued may not be unconnected to the high rate of rent seeking coupled with the growing rate of unemployment.

Gyimah-Brempong (2011) examined the effects of education on several development outcomes in African countries for the period covering 1960–2010 using different sets of estimation techniques. The study among other things revealed that educational attainment had significant impact on all development outcomes *ceteris paribus*, and that different levels of education affect development outcomes differently.

Theoretical Framework and Model Specification

THEORETICAL FRAMEWORK

This study follows a framework espoused from Barro and Lee (2010) which assumes a Cobb-Douglas Production function. This framework follows the endogenous growth theory path. Assume a Cobb-Douglas function as:

$$Y = AK^\alpha H^{1-\alpha}, \quad (1)$$

where, Y is output, K is stock of physical capital, H is human capital stock, and A is total factor productivity.

Assuming $H = hL$, where h represents the amount of human capital per worker and L the number of workers, the production function can be rewritten as:

$$Y = AK^\alpha (hL)^{1-\alpha}, \quad (2)$$

Expressing the variables in per worker term and then taking log, we have:

$$\log\left(\frac{Y}{L}\right) = \ln A + \log\left(\frac{K}{L}\right) + (1 - \alpha)\log\left(\frac{H}{L}\right)$$

or

$$\log y = \ln A + \alpha \log k + (1 - \alpha)\log h, \quad (3)$$

where, y is output per worker and k is capital stock per worker, Barro and Lee (2010) assumed human capital per worker to be directly proportional to education (schooling), we have:

$$h = e^{\phi(s)}. \quad (4)$$

In the above equation, $\phi(s)$ denotes the efficiency of a unit of labour, with s years of education. If we assume further that $\phi(s)$ is linear thus:

$$h = e^{\theta s}. \quad (5)$$

Substituting equation (5) into equation (3):

$$\log y = \log A + \alpha \log k + (1 - \alpha)\theta s. \quad (6)$$

To measure the relationship between output and human capital, Barro and Lee (2010) estimated thus:

$$\log Y_t = \beta_0 + \beta_1 \log K_t + \beta_2(s_t) + \varepsilon_t. \quad (7)$$

MODEL SPECIFICATION

Based on the above framework and following Hanushek and Woessmann (2009) and Barro (2013) that extended the above to account for different

levels of education (primary, secondary and tertiary), the study specifies an empirical model on the relationship between education and economic growth thus:

$$\log Y_t = \psi_0 + \psi_1 \text{pryernl}_t + \psi_2 \text{secenrl}_t + \psi_3 \text{terenrl}_t + X\beta + \mu_{1t}, \quad (8)$$

$$\log Y_t = \alpha_0 + \alpha_2 \text{seccomp}_t X\beta + \mu_{2t}, \quad (9)$$

where Y is used to capture either oil growth, non-oil growth or overall economic growth depending on the model, pryernl , secenrl , and terenrl are primary school enrolment rate, secondary school enrolment rate and tertiary school enrolment rate respectively, seccomp represents secondary school completion, X is a vector of other explanatory variables included in each of the models (the included variables are defined below), and ε is a stochastic error term. Equation (8) is to examine the effect of education on growth through flow of resources devoted to human capital formation channel while equation (9) examines education effect on growth through stock of education capital channel.

Data Source and Method of Analysis

To empirically analyse the long-run relationships and short run dynamics interactions between education capture by school enrolment and completion rates and growth as espoused from the theoretical framework from equation (1) to (6). Several estimators are proposed in the presence of cointegration. These include The Error Correction approach (OLS), Fully Modified OLS (FMOLS), and the Dynamic OLS (DOLS). The study adopted the Fully Modified OLS approach. This estimator corrects the standard OLS for serial correlation and endogeneity of regressors that are normally present in a long-run relationship (Pedroni 1996; 1997). It also allows consistent and efficient estimation of cointegrating vectors. The FMOLS is an alternative cointegration approach that also bypass the problem faced by econometricians in the usual having to start with over parameterized model and trying to arrive at the parsimonious model (Pedroni 1996). Present below is the Fully Modified OLS equation.

$$y_t = \alpha + \beta x_t + \mu_t, \quad (10)$$

$$y_t = \alpha + \beta x_t + \sum_{k=-k}^k \gamma_t \Delta x_{t-k} + \mu_t, \quad (11)$$

where y is the dependant variable that takes either Non-oil GDP growth, Oil GDP growth and/or per capita RGDP growth, x is a vector of explana-

tory variables depending on the model, k takes the form of a lead (1) or lag (1), and μ is the stochastic error term.

The data cover the period 1970–2015 and were extracted from the CBN *Statistical Bulletin* and the Nigerian Bureau of Statistics. The data used in the estimation are Non-oil GDP growth (captured by log of non-oil GDP per capita (NOGDPPC)), Oil GDP growth (captured by log of Oil GDP per capita (OILGDPPC)), Economic Growth (proxied by log of Real GDP per capita (RGDPPC)), Primary School Enrolment rate (PRYENRL), Secondary School Enrolment rate (SECENRL), Secondary School Completion rate (SECCOMP), tertiary school enrolment rate (TERENRL), other variables included in the models are log of capital formation (KFM) and a time trend (t).

Empirical Analysis

UNIT ROOT TEST

The study began its analysis by conducting stationarity test to establish the unit root status or otherwise of the variables and the appropriateness of the specification of the Fully Modified OLS approach. Thus, both the Augmented Dickey Fuller (ADF) and the Phillips-Perron (PP) unit root tests are employed in this study. The results are reported in table 2.

The result as reported in table 2 shows that all the variables are non-stationary in their levels. The variables became stationary after the first difference. This is supported by both the ADF and PP unit root test results. This is an indication of I(1) variables. Hence, testing for the long run relationship of the variables became necessary.

COINTEGRATION TEST

One of the main steps in using any of the cointegration approaches is to establish long-run relationship among the variables. Therefore, the study adopted the Engle-Granger residual based cointegration test as presented in table 3.

It is evident from table 3 that the residuals from the long run models all passed the unit root test, as they were all significant at 1% level that establishes the existence of cointegration in all the models alluding to the fact that there exists a long run relationship in all the models.

Empirical Result

Based on the establishment of long run relationship among the variables, we proceed to estimate empirical models using Fully Modified OLS

TABLE 2 Unit Root Test Result

Variables	Augmented Dickey Fuller				Phillips-Perron				RMK
	Without trend		With trend		Without trend		With trend		
	Level	1st diff.	Level	1st diff	Level	1st diff	Level	1st diff.	
Log(non-oil GDP per capita)	3.44	-4.34*	0.92	-5.31*	3.57	-4.34*	0.87	-5.31*	I(1)
Tertiary enrolment rate	-0.82	-4.11*	-1.96	-4.12*	-0.45	-6.75*	-2.13	-6.77*	I(1)
Secondary enrolment rate	-0.42	-2.65	-2.03	-3.76*	-0.42	-4.39*	-2.52	-3.78*	I(1)
Primary enrolment rate	-2.46	-3.78*	-2.18	-3.58*	-2.30	-3.58*	-1.78	-3.75*	I(1)
Secondary completion rate	-1.29	-4.30*	-1.69	-4.29*	-1.26	-6.16*	-1.79	-6.12*	I(1)
Log(oil GDP per capita)	-1.33	-5.26*	-2.15	-5.34*	-1.24	-7.22*	-2.47	-7.28*	I(1)
Log(real GDP per capita)	-0.66	-4.89*	-2.32	-4.83*	4.46	-6.43*	-2.36	-6.34*	I(1)
Log(capita formation)	-0.36	-5.04*	-0.89	-5.11*	-0.76	-6.32*	-0.27	-4.98*	I(1)

NOTES * indicates 1% level of significance.

TABLE 3 Engle-Granger Residual Based Single Equation Cointegration Test Result

Residuals	ADF stat.	Critical values			Residuals	ADF stat.	Critical Values		
		1%	5%	10%			1%	5%	10%
Residual 1	-5.36	-3.54	-2.86	-2.52	Residual 4	-5.68	-3.54	-2.86	-2.52
Residual 2	-5.46				Residual 5	-6.47			
Residual 3	-5.61				Residual 6	-5.38			

TABLE 4 Schooling and Economic Growth in Nigeria

Regressors	School Enrolment and Growth Equation		School Completion Rate and Growth Equation	
	Coefficients	T-ratio	Coefficients	T-ratio
<i>c</i>	0.170**	2.214	0.050*	1.721
Primary enrolment rate	0.018*	1.677	–	–
Secondary enrolment rate	0.064***	6.048	–	–
Secondary completion rate	–	–	1.120***	3.664
Tertiary enrolment rate	0.031**	2.478	–	–
Log(capital formation)	0.430**	2.443	0.570***	2.962
<i>t</i>	0.024***	2.986	0.025*	1.790
<i>R</i> ²	0.782		0.792	–
Durbin-Watson	1.820		2.040	–

NOTES ***, **, and * indicates 1%, 5%, and 10% level of significance, respectively.

(FMOLS) cointegration approach. Table 4 shows that about 78% of the total variation in economic growth is explained by the included variables in the result. The Durbin Watson statistics values of 1.82 and 2.04 also indicates that the result is devoid of serious econometrics problem as the value implies that there is no serial correlation associated with this result.

A cursory look at the result indicates that schooling has positive and significant effect on economic growth in Nigeria. It was revealed that all levels of schooling impacted overall real GDP per capita positively though the magnitude of the effect differs across levels of schooling. For instance, the coefficient of schooling at the primary school level proxied by primary school enrolment rate was found to be 0.018 and it is significant at 10% which invariably indicates that changes in primary school enrolment facilitates per capita GDP for about 0.018. However, the coefficient of schooling at the secondary level captured by secondary enrolment rate was found to be 0.06 and it is significant at 1% level, which implies that changes in secondary enrolment rate triggered overall GDP per capita for about 0.064. The coefficient of schooling at the tertiary level was found to be 0.03 and it is significant at 5%, the magnitude of the effect is less than that of secondary level schooling in Nigeria. This is not surprising as percentage of the Nigerian population with secondary level schooling are more than that of tertiary and besides the facts that they are involved in more productive activities than those with tertiary level schooling that are faced with alarming rate of unemployment that ren-

TABLE 5 Schooling and Non-Oil GDP Growth in Nigeria

Regressors	School Enrolment and Growth Equation		School Completion Rate and Growth Equation	
	Coefficients	T-ratio	Coefficients	T-ratio
<i>c</i>	0.260**	2.330	0.320*	1.680
Primary enrolment rate	0.134*	1.712	–	–
Secondary enrolment rate	0.101***	3.710	–	–
Secondary completion rate	–	–	1.217***	2.920
Tertiary enrolment rate	0.027**	2.210	–	–
Log(capital formation)	0.110	1.090	0.070*	1.780
<i>T</i>	0.030**	2.540	0.090*	1.820
<i>R</i> ²	0.891	–	0.684	–
Durbin Watson	1.810	–	1.890	–

NOTES ***, **, and * indicates 1%, 5%, and 10% level of significance, respectively.

ders them incapacitated from being involved in productive activities. On the other hands, secondary level schooling captured by secondary completion rate was found to have a greater magnitude of positive and significant effect on overall growth in Nigeria than as captured by enrolment rate. The coefficient was found to be 1.12 and it is significant at 1%.

By implication, it is an indication that not all who enrolled completed and the effect of schooling from the perspective of completion rate is much higher. The findings here are consistent with the studies of Barro (2013), Gyimah-Brempong (2011), Benhabib and Spiegel (1994), Barro and Sala-i-Martin (1997), and Sala-i-Martin (1997) that found schooling to be positively correlated with the per capita real GDP. All other variables included in the model were found to have the expected signs and were significant. For the other variables to have the expected signs, it is an indication that schooling in the output per capita models is not just one of the control variables but a key and relevant variable in output equation in Nigeria. One main implication that can be drawn from this result is that disaggregating schooling or education into different levels is key in explaining the effect of education on growth.

One main area in which this present study is at variance with the previous studies especially in Nigeria is that it examined the effect of schooling or education on sectoral output and for this reason, the study separated growth into non-oil and oil growth and examine how different levels of schooling impact on them.

Table 5 shows the value of R^2 , which is 0.89, that about 89% of the variation in non-oil GDP growth is explained. The Durbin-Watson values of 1.81 and 1.89 indicate that there is no autocorrelation associated with this result, which is an indication of the fact that the result is devoid of econometrics problem.

A closer look at the result in table 5 shows that schooling impacts non-oil GDP per capita positively and this is significant. However, lower levels of schooling were found to have a greater magnitude of effect on non-oil GDP growth in Nigeria. For example, the coefficients of primary, secondary and tertiary enrolment rates are 0.134, 0.101 and 0.027 respectively and they were all significant but the magnitude of the effect is much higher at the primary school level, this is not surprising because agriculture still dominates the employment statistics of the Nigerian populace and the agricultural sector is dominated by people of lower educational cadre basically the primary and the secondary levels. Completion rate, which is the alternative measure of schooling/education in this study, was found to impact non-oil GDP per capita positively and this is significant. The coefficient in magnitude is higher than that of schooling captured by enrolment rates.

The implication is that school completion has much impact than school enrolment. This invariably implies that enrolment is an indicator of flow of resources to education, which would not guarantee that those enrolled would complete their education and thereby contribute to growth. This means that, human capital as a driver of growth is better captured by completion rate indicative of stock of human of human capital.

Table 6 shows the impact of schooling on per capita oil-GDP in Nigeria. It is evident from the table that about 79% of the total variation in oil GDP per capita is explained as shown by the R^2 value of 0.792 and the Durbin-Watson statistics values of 1.97 and 2.03 are indications that there is no serial correlation in this regression result.

It can be deduced from the result that schooling at different levels had positive and significant effect on oil GDP per capita in Nigeria except for the coefficient of primary level of schooling that is found to be insignificant though positive in its impact on oil GDP per capita. It is also very clear from the table that the magnitude of the effect is much higher in higher level of schooling than lower levels. For instance, the coefficients of schooling are found to be 0.036, 0.07 and 0.16 respectively for primary, secondary and tertiary levels of schooling respectively.

TABLE 6 Schooling and Oil GDP Growth in Nigeria

Regressors	School Enrolment and Growth Equation		School Completion Rate and Growth Equation	
	Coefficients	T-ratio	Coefficients	T-ratio
<i>c</i>	0.430**	2.640	0.190**	2.520
Primary enrolment rate	0.036	0.774	–	–
Secondary enrolment rate	0.070***	5.740	–	–
Secondary completion rate	–	–	1.281***	2.830
Tertiary enrolment rate	0.160**	2.300	–	–
Log(capital formation)	0.060	1.220	0.120*	1.730
<i>T</i>	0.046***	3.320	0.092**	1.980
<i>R</i> ²	0.731	–	0.792	–
Durbin Watson	1.970	–	2.030	–

NOTES ***, **, and * indicates 1%, 5%, and 10% level of significance, respectively.

This implies that the oil sector is involving with regards to technical know-how and a higher level of schooling or education demanded for proper contributions on the sector on the part of the citizenry. Completion rate was also found to impact oil-GDP growth positively and significantly too and the magnitude of the effect as in the case of the previous result is much higher than that of enrolment rates.

Conclusion

This study examined the impact of education on economic growth in Nigeria and specific consideration was made on the different components of growth such as non-oil growth, oil growth and overall economic growth captured by non-oil GDP per capita, oil-GDP per capita and real GDP per capita respectively in Nigeria. The place of non-oil sector in facilitating growth and development cannot be over-emphasized as the sector determines largely the needed diversification of the economy and salvaging the Nigerian economy from an oil dependent one. However, the oil sector has not triggered the expected growth and development in the country despite the huge revenue from the resource. Experts argue that one of the main problems facing such resource dependent economies is management of the resource wealth. Education on the other hand serves as engine of growth and development and therefore, investment in education is a tool for developing inexhaustible resources (human capital), hence this study is not only timely but also inevitable. The study captured

education or schooling from two channels vis-à-vis; enrolment rate and as well completion rate. The study finds all levels of schooling to be fundamental in affecting overall growth positively and that schooling in a growth model is not serving as a control variable but a relevant one in explaining the behaviour of growth in Nigeria. The study revealed the effect of primary, secondary and tertiary enrolment rates on overall growth to be 0.018, 0.064 and 0.031 respectively and that of completion rate to be 1.12.

By implication, secondary schooling impacts overall growth much more than others and the magnitude of the effect is higher when education or schooling is captured by completion rate. This can be explained that school completion is more relevant to overall growth than enrolments. This is the case for all the other estimated models that is, the non-GDP and oil GDP growth models as completion rate impacts on them on a higher magnitude. Productivity as captured by a time trend in all the models was found to facilitate overall growth as well as non-oil and oil growth in Nigeria. One significant finding of this study is that lower levels of schooling impacts non-oil GDP growth much more than oil GDP growth while higher level of schooling impacts oil GDP growth on a higher magnitude than non-oil GDP growth. Consequently, since completion rate explains growth at a higher magnitude than enrolment rates in Nigeria, government should therefore endeavour to provide modalities to curtail school dropout rates in the schooling system. It is therefore recommended that the present universal basic education policy be given top priority with proper monitoring, supervision and financial supports as the policy has the capacity to curtail school drop outs and ensure that all have access to basic education at no or low cost as this will facilitate higher completion rate in Nigeria which is crucial for growth.

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Startup Branding: Empirical Evidence among Slovenian Startups

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Branding seems to be an important issue among all companies, also among newly established and young companies with high growth potential or so-called startups. This was also confirmed in our empirical research, conducted among 195 Slovenian startups. Startup founders/CEOs see branding as the most important business strategy in their companies. Separated startup branding building blocks were evaluated as similarly important, from brand vision and context building blocks to brand development and its implementation. These findings bring important managerial implications not only for startups, but also for other companies that want to treat and maintain their brands as dynamic and evolving entities.

Key Words: branding, startup, story, innovation

JEL Classification: M31, M39

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Introduction

Examples such as Tesla, Facebook, Uber or Airbnb have shaped the anticipation that startups will be the ones to come up with the next great innovation, disrupt entire industries, and build a strong brand. According to Interbrand's evaluation of Best Global Brands in 2016, Facebook showed the highest growth among all brands (48% in year 2015), while Tesla became a new member among 100 top valued brands (see <http://interbrand.com/best-brands/best-global-brands/2016/ranking/>). Previous data as well as many other examples in today's competitive environment show that branding is important among new companies as well, especially among those that have innovation ideas with growth potential.

The times when branding was generally connected to large companies or even multinationals are over. Today's fierce environment, in combination with endless use of information and communication technologies, has significantly changed the rules in the field of branding (Konecnik Ruzzier, Ruzzier, and Hisrich 2013). Branding has become a crucial activity for the successful establishment of a new company, its long-term survival, and favourable and strong equity in the eyes of its target customers (Gardner and Cooper 2014).

The main purpose of this paper is to present the importance of branding among startups and to examine whether startups in Slovenia recognized branding activities as important activities during their development and implementation on the market. Startups founders or CEOs of 195 companies have shared their opinion about the importance of branding in their operations on the market and evaluated separate steps in the proposed startup branding funnel model.

Defining Startups and Their Role in the Economy

Although startups and their role in the economy are growing, there is no commonly accepted definition of a startup. According to Rode and Vallaster (2005), startups are raw companies, without any organizational structure, acting legally and economically in the market for a short time. Moreover, the authors explained that this type of business is regularly characterized by a strong personal influence of founders and small business networks. Ries (2011, 27) defined a startup as a 'human institution designed to create a new product or service under conditions of extreme uncertainty,' while he omits the organization's size, industry and sector of the economy. A similar definition is proposed by Ruzzier and Ruzzier (2015, 19), who say that a startup is 'a team of people that works on a common goal to create something new and impactful, driven by a future vision and potential of sharp growth, sharing an exciting and passionate atmosphere, working in unstable conditions and with high risk of failure.' While Rode and Vallaster (2005) and some other authors (e.g. Timmons 1999) also relate startup characteristics with a time dimension, recent definitions (Ries 2011; Ruzzier and Ruzzier 2015) omit it and instead of the time frame stress the role of innovation, growth and unstable conditions in the marketplace.

Startups are often based on innovative ideas with growth potential, and could be the company to change the marketplace and create the uncontested market space (Weiblen and Chesbrough 2015). A startup has

TABLE 1 Main Characteristics of IDES and Traditional SMES

IDES	SMES
Focus on global markets.	Focus on addressing local and regional markets only.
The company is based on some sort of innovation (tech, process, business model) and potential competitive advantage.	Innovation is not necessary to SME establishment and growth, nor is competitive advantage.
‘Tradable jobs’ – jobs that do not have to be performed locally.	‘Non-tradable jobs’ – jobs generally performed locally, e.g. restaurants, dry cleaners, service industry.
More diverse ownership base including wide array of external capital providers.	Most often family businesses or businesses with very little external capital.
The company starts by losing money, but if successful will have exponential growth. Requires investment. When you put money into the company, the revenue/cash flow/jobs numbers do not respond quickly.	The company typically grows at a linear rate. When you put money into the company, the system (revenue, cash flow, jobs, etc.) will respond quickly in a positive manner.

NOTES Adapted from Aulet and Murray (2013).

promising ideas, organizational agility, the willingness to take risks, and aspirations of rapid growth (Weiblen and Chesbrough 2015). Similar was also proposed by Rus and Rebernik (2015), who stated that startups are an important driver of the development of new business ideas, innovations and technologies in the economy. They attract creative individuals, increase the level of engagement of entrepreneurial talent and contribute to the commercialization of new knowledge and technologies. In most cases, startup companies are developing globally interesting products or services, which are also intensively directed towards growth through the internationalization of their business (Rus and Rebernik 2015). Innovation, growth, risk, uncertainty, agility are all words that describe startups well. However, it is important to stress that not all new companies are startup companies.

Aulet and Murray (2013) distinguished between two types of enterprises. As the first type, they refer to ‘innovation-driven enterprises’ (IDES) that pursue global opportunities based on bringing to customers innovations that have a clear competitive advantage and high growth potential. IDES can be a synonym for startups. The second type refers to ‘small- and medium-sized enterprises’ (SMES), which are serving local markets with traditional, well-understood business ideas and a limited

competitive advantage. SMES generally have low growth potential and linear growth rate, while IDEs have high growth potential and if they are successful, an exponential growth rate. The main characteristics of IDEs and SMES are presented in table 1 (Aulet and Murray 2013). The distinction between these types of companies is the key to understanding the differences between companies and their potential for job creation and value added. Non-discrimination between entrepreneurs and their companies, which differ in innovation, ambitions, target markets and other characteristics, is impermissible, as it leads to a generalization of entrepreneurship. The distinction is particularly important in the light of developmental government policies that seek to promote long-term sustainable economic growth and development, and consequently social well being (Rebernik et al. 2016).

Numerous studies, especially global ones within the OECD, as well as many at the country level, have shown that new enterprises are the driving force behind job creation (Calvino, Criscuolo, and Menon 2015). For example, Criscuolo, Gal, and Menon (2014) explored the growth dynamics of jobs in 17 OECD countries and Brazil, confirming the key role of newly created small businesses in job creation. Similarly, this was also confirmed by Haltiwanger, Jarmin, and Miranda (2013).

Branding in Startups

IMPORTANCE OF BRANDING IN STARTUPS

Strong brands are well accepted among their consumers, who have a unique and positive image of them (Keller 1993). The power of the brand occurs because these consumers have been exposed to clear business and marketing strategies implemented by the founders and other employees. These business and marketing strategies need to reflect the views of the founders and other employees in the startup. Internal stakeholders (founders, other employees) develop, co-create and live the brand, thus enabling external stakeholders (customers) to experience it. The previously described approach represents the main ideas of the so-called balanced or two dimensional perspective on branding (De Chernatony and McDonald 2001; Konecnik Ruzzier and Ruzzier 2009; Konecnik Ruzzier, Ruzzier, and Hisrich 2013) in a dynamic environment, and incorporates the idea of brand co-creation, where all stakeholders have a role in brand development (da Silveira, Lages, and Simões 2013).

The changing conditions in the market, more sophisticated and de-

manding customers as well as a higher level of knowledge about branding strategies require a more systematic approach to branding than ever before. Branding plays an important role in SMES (Krake 2005; Merrilees 2007; Spence and Essoussi 2010; Konecnik Ruzzier, Ruzzier, and Hisrich 2013), especially among those young companies that are innovative and have strong growth potential. As we highlighted earlier, the latter are called startups (Bresciani and Eppler 2010; Konecnik Ruzzier and Ruzzier 2015), where branding activities should be treated as strategic ones (Gardner and Cooper 2014; Busche 2014).

In the past, brand development models (i.e. De Chernatony 2010; Kapferer 1998; Aaker and Joachimsthaler 2000) were quite static, probably in line with changes, which accrued quite slowly. Da Silveira, Lages, and Simões (2013) seeks to advance the established conceptualization of brand identity by proposing brand identity as dynamic concept, constructed over time through mutually influencing inputs from managers and other stakeholder (e.g., consumers). Similarly, the startup branding funnel model, proposed by Ruzzier and Ruzzier (2015), represents a dynamic branding process that incorporates the current dynamics of the market, which is especially evident among startup companies. In its essence, the startup branding funnel model is the idea that the brand is an evolving entity (Ruzzier and Ruzzier 2015). This idea of a brand as an evolving entity was already stressed by previous authors (e.g. De Chernatony and Dall’Olmo Riley 1999; Burmann, Jost-Benz and Riley 2009; da Silveira, Lages, and Simões 2013; Gardner and Cooper 2014) in branding literature, while the idea of lean methodology (Ries 2011; Blank 2013) is presented mostly within entrepreneurship literature.

STARTUP BRANDING FUNNEL: DYNAMIC BRANDING PROCESS

Ruzzier and Ruzzier (2015, 30–3) explain the branding process through four phases and eleven building blocks. The branding process starts with the vision, the building block zero, because it is the starting point of every entrepreneur’s journey. In the first investigation phase, entrepreneurs need to investigate the industry, competitors, customers and key resources within the startup. During the second, development phase, the entrepreneurs start developing what Ruzzier and Ruzzier (2015, 71) indicate as the ‘minimum viable brand,’ which includes a story and visual elements. In the third, implementation phase, internal branding, marketing channels as well as communication strategy need to be developed. The last phase of validation and evaluation includes the process of brand

validation and evaluation, which is done by the brand's customers but managed by the entrepreneurs. The validation and evaluation phase thus complements the first three phases, while some building blocks (like story, communication) can be validated with the help and feedback of customers. The last phase result in brand equity.

The startup branding funnel building blocks consist of (Ruzzier and Ruzzier 2015, 32):

- Building block zero: vision
- Context building blocks: industry, competitors, customers, myself
- Development building blocks: story, visual elements
- Implementation building blocks: internal branding, communication, channels
- Validation and evaluation building block: brand equity

'All new companies and new products begin with an almost mythological vision – a hope of what could be, with a goal few others can see' (Blank and Dorf 2012). A vision is a forward looking statement that sets the direction for the future development of a brand (De Chernatony 2010). As an example, take the Apple or Amazon brands and their leaders. We can describe Steve Jobs or Jeff Bezos with different superlatives in the process of their brand building, but what was probably the most important was their visionary role in brand development. Both had visions of what was to come.

Selecting the future industry of a startup is one of the first strategic decisions entrepreneurs need to make. The industry characteristics, specifics and potential significantly influence the success of a startup; therefore, its analysis and selection require considerable attention. The most important aspects related to the industry analysis are: estimated future industry growth; main trends; industry size; maturity of the industry; industry structure in terms of competition; entry barriers; capital intensity; and industry dynamics. The success of the startup brand is highly related to the target group of customers and the innovative way the startup addresses their perceived pains. In addition to knowing their target customers, the startups need to be aware of what others are doing in order to know how to develop, build, and strengthen their own brand. The focus should not only be on direct competitors who sell similar brands, but also indirect competitors who satisfy the same need of target customers with different brands. Knowing and understanding your competitors gives you the ability to position your brand uniquely in front

of the competition. During the 'myself' building block, financial and human resources need to be evaluated (Ruzzier and Ruzzier 2015, 46).

Previously described context building blocks are all prerequisites for starting the development of a brand, starting with the brand story as the invisible part of the brand. In addition to brand vision, additional elements should be stressed: attributes, benefits, values, culture, personality, relationships and/or community. Attributes are those descriptive features that characterize a brand, such as what the consumer thinks the brand is or has and what is involved with its purchase or consumption. Benefits are personal values that consumers attach to the brand, namely what consumers think the brand can do for them (Keller 1993). A value is an enduring belief that a specific mode of conduct or end-state of existence is personally or socially preferable to an opposite or converse mode of conduct or end-state of existence (Rokeach 1973). Values provide guidance about a desired behavior. A set of agreed-upon brand values or principles can help employees to know how to behave in the company and consequently fulfill and deliver the brand's promises to target customers (De Chernatony 2010). Culture considers the way a brand can achieve a unique position through a particular type of staff behavior related to the brands' values, which characterize the organization's culture. Brand personality is described as a set of human characteristics associated with a brand (Aaker 1997). These human characteristics should be applicable to and relevant for brands. By using the metaphor of brand as personality, which can be manifested through a celebrity or people from ordinary life, customers find it easier to relate with and appreciate a brand (Ruzzier and Ruzzier 2015). The relationship between the customer and a brand helps the customer to better understand what the brand offers (De Chernatony 2010) and co-create the brand (Cova, Ford, and Salle 2009). Dynamic branding, in addition to the idea of listening to your customer, incorporates the idea of inviting customers to talk and to express their thinking about the brand (Busche 2014; Ruzzier and Ruzzier 2015). As dynamic branding evolves into brand-building relationships, brand communities are becoming common practice among startups, which are able to form and build communities even before the official launch of the brand (Ruzzier and Ruzzier 2015).

Visual elements include those elements that make the brand most visible and through which the consumers can better understand the brand. They often include elements such as name, symbol (logo, packaging), slogan and domain. When choosing the visual elements of a brand, Keller

(1998) suggests that they should be: memorable, meaningful, likable in the eyes of target customers, transferable, adaptable and protectable, both from the legal and competitive point of view.

Spreading brand knowledge within the company is the main idea of internal branding, which can be achieved through internal communication, training and qualification (Miles and Mangold 2004; Terglav, Kaše, and Konecnik Ruzzier 2012). Burmann, Jost-Benz, and Riley (2009) argue, that only the integration of an internal perspective through the employee's attachment to the brand enables an accurate assessment of the entire brand. In startups, most activities are done very informally at the beginning, on a personal basis and as part of a special culture in the company. 'CEOs and co-founders are surely the best startup brand ambassadors, but they are not the only ones. Turning other members of the team into brand ambassadors is of great importance for the startup and its journey in brand building' (Ruzzier and Ruzzier 2015, 117). The rules of cost-effective marketing communications (Kotler and Keller 2012) particularly come to the forefront for startups. Ruzzier and Ruzzier (2015, 121) therefore proposed further marketing communication tools for startups: word-of-mouth marketing, interactive marketing, public relations, advertising, personal selling and direct marketing. The goal is to find the most suitable and cost-effective mix, which will result in marketing the brand in a more innovative and attractive way to target consumers as compared to its competitors. The basic task of marketing channels is to reach the target customers, either directly (direct marketing channel) and/or with the help of intermediaries (indirect marketing channel). Many startups use both approaches, while some start with one approach only (in many cases with direct marketing channels).

The validation and evaluation building block finally results in brand equity, as a concept of how customers perceived the brand. In general, a customer's evaluation of a brand can be measured with brand awareness, image, perceived quality and loyalty (Keller 1993; Konecnik Ruzzier and Gartner 2007). To the previous four elements, some authors add others, such as market share (Aaker 1996). Because startups need to have immediate feedback on their brand, these traditional measures should be upgraded and combined with other relevant key metrics (Croll and Yoskovitz 2013).

Research Methodology

Data were collected with the help of online survey. The questionnaire was addressed to founders or CEOs of legal and formally established

young Slovenian innovative companies with a strong growth potential. The companies needed to be up to 6 years old. The study instrument can be divided into three parts in terms of content. The first part of the questionnaire contains entrepreneurial questions. In the second part of the questionnaire, marketing questions, with a specific focus on branding perspective, were posed. The third part of the questionnaire included characteristics of startup companies as well as sociodemographic characteristics of participants.

Branding questions, which are in the focus of this paper, were prepared according to previously analyzed literature, mainly according to the recently proposed startup branding funnel methodology (Konecnik Ruzzier and Ruzzier 2015). For each startup branding funnel building block (Konecnik Ruzzier and Ruzzier 2015), several statements were posed. Statements were measured on a 5-point Likert Scale anchored by 1 – strongly disagree to 5 – strongly agree.

Results

SAMPLE

The online mail survey resulted in 195 usable responses from Slovenian startups. Almost half of the interviewed startups (49.2%) were under two years old, with 27.2% of them under one year and 22.1% under the age of two. 15.4% were under three years old and 11.8% younger than four years. The rest of them were younger than five or six years. Most, namely 41% of startups, had two co founders, 23.6% one founder and 19% had three co-founders. The rest of them were founded by four (9.2%), five (5.1%) or even more co-founders.

Among 195 startups, 26.7% of them are in the so-called ‘seed stage,’ where they are dealing with the challenges of developing and testing the concept of a product, and developing and testing a business model on the market, but not yet generating revenue. The next phase, i.e. the ‘startup stage,’ was the most numerous, as 41.5% of participating startups have already completed the development of their first selling product and are generating the first revenue. The third, so called ‘growth stage,’ consisted of 27.7% of startups, which in fact are already being transformed into established companies and leaving the status of a startup company. In the third group of startups, the market potential of the product and business model have been successfully validated on the market. At this stage, they are already ripe for an enhanced investment in market performance and the rapid growth of sales. 4.1% of startups did not identify the development stage in which they were currently.

TABLE 2 The Most Important Business Strategies

Business strategy	M	SD
Brand development	4.16	0.969
Product development	4.11	1.034
Organization development (processes, structure, communication ...)	3.86	1.024
Strengthening employees' motivation and their development	3.70	1.164
Fast growth	3.61	1.127
Strengthening the organizational culture (norms, standards, values ...)	3.45	1.249
Profitability	3.36	1.114

NOTES M – mean, SD – standard deviation. $N = 195$.

Startup companies are predominantly, but not exclusively, related to high technologies, so it is not surprising that as many as 17.4% of analyzed startups work in the field of industrial technology and hardware or software. Software development is followed by 10.8%, software as a service model (SaaS) by 9.7% and 6.7% by green technologies. 5.6% of startups deal with online or mobile applications or solutions. It is clear from the data that significantly more than half of all startups work in ICT or ICT-related fields. An important share of 4.6% of the startups operate in the fields of bio- or nanotechnology and medical technologies, which are among the more demanding and promising sectors of the economy. The same percentage (4.6%) of startups operate as consulting companies.

STARTUP BRANDING FUNNEL BUILDING BLOCKS

The various 'development' startup stages within the branding funnel require the entrepreneur to focus on some kind of business strategies or key activities. We asked respondents to evaluate the most important business strategy for their startup. Among all proposed business strategies (table 2), brand development was chosen as the most important one ($M = 4.16$, $SD = 0.969$) and was closely followed by product development ($M = 4.11$, $SD = 1.034$). In third place, the organization development was chosen ($M = 3.86$, $SD = 1.024$) and was followed by strategies for strengthening employee motivation and their development ($M = 3.70$, $SD = 1.164$). Due to the relatively small share of enterprises in the growth stage, it is quite understandable that fast-growing activities in the sample of surveyed startups are only in fifth place ($M = 3.61$, $SD = 1.127$). The least important strategy for startups was profitability ($M = 3.36$, $SD = 1.114$).

As can be seen from table 3, startup founders agreed that they had a

TABLE 3 Vision Statements

Building block o: Vision statements	M	SD
When we founded the startup, we had a clear vision.	3.93	1.008
Throughout our business, our vision is being upgraded and cleaned.	4.45	0.697

NOTES M – mean, SD – standard deviation. $N = 195$.

TABLE 4 Context Building Block Statements

Context building blocks statements	M	SD
We knew the industry we entered well.	3.68	1.198
At the time of entering the market, we did not have direct competition.	3.03	1.416
When we entered the market, we knew who our customers would be.	3.83	0.978
Our customers today are different from those we anticipated when entering the market.	2.63	1.234
Our team covered diverse knowledge (tech., business, marketing, ...).	4.22	0.872
We outsource the lacking knowledge.	3.71	1.172

NOTES M – mean, SD – standard deviation. $N = 195$.

clear vision when they founded their startups ($M = 3.93$, $SD = 1.008$) and even more so that their vision is being upgraded and cleaned throughout their business ($M = 4.45$, $SD = 0.697$).

Among context building blocks statements (table 4), participants most agreed with the statement that their team covered diverse knowledge ($M = 4.22$, $SD = 0.872$) and partly also that they outsource the knowledge they lack. As can be seen, the majority of startups agreed that they knew quite well who their customers would be ($M = 3.83$, $SD = 0.978$) and the industry ($M = 3.68$, $SD = 1.198$) when they entered the market. Participants had a diverse opinion about competition ($M = 3.03$, $SD = 1.416$), also seen from the high standard deviation, as some thought that they had direct competitors, while others believed, that they didn't have any direct competition at the time of entering the market. Even less agreement and more diverse opinion is recognized in the customers they have today versus those they anticipated.

Participants strongly agreed that for market success, more than just a technically advanced product is needed ($M = 4.76$, $SD = 0.555$) as well as that they created a product with the help of their prospective users ($M = 4.10$, $SD = 0.966$). They understand the brand primarily as a good story ($M = 4.44$, $SD = 0.819$) and not as visual elements ($M = 2.79$, $SD = 1.253$). This was the only development building block statement (table 5) that had

TABLE 5 Development Building Block Statements

Development building blocks statements	M	SD
For market success, more than just a technically advanced product is needed.	4.76	0.555
We understand brand primarily as visual elements (name, logo, slogan, domain, ...).	2.79	1.253
We also understand brand as a good story.	4.44	0.819
Our story seems to be important and crucial to our success.	4.04	1.009
The values and culture we live contribute to our success.	4.16	0.876
We created a product (or service) with the help of our prospective users.	4.10	0.966

NOTES M – mean, SD – standard deviation. $N = 195$.

TABLE 6 Implementation Building Block Statements

Implementation building blocks statements	M	SD
We know how to fulfill our promise to our customers.	4.29	0.725
We carefully fulfill our promise to our customers.	4.32	0.807
Communication is an important part of our success.	4.45	0.760
We adapt the communication according to the target group of customers.	4.36	0.802
Communities are important for our success.	4.02	1.030
Mostly we combine direct (our website) and indirect (through the intermediaries) market channels.	3.46	1.211

NOTES M – mean, SD – standard deviation. $N = 195$.

a mean value below 3, while others were evaluated above 4. Their brand story seems to be important and crucial to their success ($M = 4.04$, $SD = 1.009$), also with a combination of values and the culture that they live in the company ($M = 4.16$, $SD = 0.876$).

Similarly, high agreement was recognized among implementation building block statements (table 6). Participants agreed, that they know how to fulfill their promise to their customers ($M = 4.29$, $SD = 0.725$) and that is important that they fulfill the promise carefully ($M = 4.32$, $SD = 0.807$). Communication seems to be a very important part of their success ($M = 4.45$, $SD = 0.760$), and they adapt it according to the target group of customers ($M = 4.36$, $SD = 0.802$). It looks like communities are also important for their success ($M = 4.02$, $SD = 1.030$). However, some startups combine direct and indirect markets channels, while others use only either the direct or the indirect approach to reach their customers.

Conclusion

As can be seen from recent academic and practical literature, branding is also becoming an important topic among newly established companies that are entering today's hyper competitive market. This is especially evident in companies that are innovative and have high growth potential or so-called startup companies.

Our empirical research, conducted among 195 Slovenian startups, confirmed that branding is very important among newly established companies. Startup founders/CEOs evaluated brand development as the most important business strategy in their startup, followed by product and organization development.

In addition to understanding the current circumstances on the market (industry, competitors) as well as target customers, startup founders and CEOs are convinced that more than just a technically advanced product is needed for market success. In addition, they understand brand primarily as a good story and not so much as visual elements. This understanding goes in line with modern brand conceptualization (De Chernatony 2010; Konecnik Ruzzier and Ruzzier 2013). In this regard, the brand story should originate from product or services uniqueness, but should be upgraded with emotional appeal, which invites potential customers to be not only buyers of a brand, but also its co-creators. Treating customers as co-creators was confirmed as an important issue in our research.

Startup founders/CEOs are convinced that correct and appropriate implementation is necessary for today's success on the market. Innovative and target oriented communication becomes a must for startups: it doesn't only raise awareness among their target customers but also consequently leads to the customers' emotional involvement, and hopefully ends with the purchase of a brand.

The above presented research findings guide many practical implications not only for startup companies, but also for other companies that operate in today's fierce competition. Today, we are witnessing many cases when larger or multinational companies are buying startups in order to gain new knowledge, including in the areas of brand development and its innovative marketing. In addition, brand building activities should be incorporated in the supporting activities on the policy level to support startup development not only in regards to development of innovative products, but also in support of other marketing and brand related activities. Firstly, good brand development and its maintenance on the market

require a holistic approach toward brand building, where a unique and emotional brand story represents the core of brand building. Secondly, branding in startups is a dynamic activity that requires daily activities, but it should be also strategically driven with a clear focus on a long term vision. Thirdly, appropriate and up to date implementation of a brand is a must among companies. Understanding the brand inside the company, innovative, cost-efficient and targeted communication as well as the combination of appropriate market channels play an important role in brand development. Fourthly, potential target customers should not be treated only as buyers, but also as brand co-creators and its ambassadors.

The presented study is not free of limitations. As a new research topic, startup branding phenomena should be further investigated, from a theoretical as well as empirical point of view. More replications of the study are needed to confirm the importance of brand building activities of startups among other countries. We suggest also replications of the model on other companies, as model presents a dynamic approach to brand building. From the empirical point of view, additional statements should be added to separate funnel building blocks.

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Upad in upočasnitev trgovine: primeri iz nekaterih držav Srednje in Vzhodne Evrope

Marco Giansoldati in Tullio Gregori

Obseg svetovne trgovine se je po stečaju Lehman brothers in kasnejšem zlomu finančnih trgov v zadnjem četrtletju leta 2008 nenadoma zmanjšal. Tudi v primeru uspešnega okrevanja so trgovinski trendi opazno nižji. Šibek zagon glede obsega izvoza v svetovnem merilu poraja vprašanje, ali je finančna kriza trajno spremenila področje trgovine. V tem dokumentu obravnavamo elastičnost trgovine v nekaterih srednjeevropskih in vzhodnoevropskih gospodarstvih z oceno enačbe standardne uvozne funkcije. Uporabljamo dinamični panelni ARDL model s CCEMG cenilko glede na presečno odvisnost. Model ustreza vzorcu osmih držav v obdobju 1995-2017. Ocenjujemo dolgoročno elastičnost uvoza glede na BDP in relativno uvozno ceno, sledi razlikovanje vzponov in upočasnjevanj. Rezultati potrjujejo, da se uvoz odziva v odvisnosti od časovne umeščenosti v poslovni cikel.

Gljučne besede: propad svetovne trgovine, elastičnost trgovine, države SVE, CCEMG cenilka

Klasifikacija JEL: F14, F41, D57, G01

Managing Global Transitions 16 (1): 3–18

Strukturne spremembe podjetij v času finančne krize: primer podjetij na Poljskem

Elzbieta Wrońska-Bukalska in Kamil Mazurkiewicz

Prispevek obravnava tematiko kapitalske strukture (lastniški in dolžniški odnos) poljskih podjetij. Namen prispevka je prepoznati spremembe v strukturi kapitala glede na nedavno finančno krizo. Hipoteza raziskave je, da naj bi se finančni vzvod v kriznem obdobju zmanjšal in se po krizi povečal. V prispevku je bil analiziran vpliv finančne krize na strukturo kapitala glede na štiri sklope podatkov: podatki za vsa podjetja v celotnem gospodarstvu, panelni podatki poljskih družb, ki kotirajo na borzi, panelni podatki poljskih družb, ki kotirajo na borzi in imajo najnižji delež dolga v letu 2005 (panel A) in panelni podatki poljskih družb, ki kotirajo na borzi, z najvišjim deležem dolga v letu 2005 (panel B). Uporabljene so bile deskriptivne statistike in statistično testiranje razlik. Multivariabilna regresijska analiza je bila uporabljena tudi za ugotavljanje, kako različni dejavniki vplivajo na strukturo kapitala. Glavna

ugotovitev je, da poljska podjetja v času finančne krize na splošno niso spremenila svoje strukture kapitala. To še posebej velja za vzorčni panel in panel B, medtem ko podjetja iz panela A povečujejo svoj delež dolga kljub finančni krizi.

Ključne besede: kapitalska struktura, donosnost, oprijemljivost, velikost, finančna kriza

Klasifikacija JEL: G01, G32

Managing Global Transitions 16 (1): 19–35

Teorija iger, uporabljena za sprejemanje poslovnih odločitev v okviru davčnega potrjevanja računov na Hrvaškem: analiza, ravnotežje in politična priporočila

Katarina Justić Jožičić, Katarina Kostelić in Marinko Škare

Hrvaški zakon o davčnem potrjevanju računov, ki je bil sprejet leta 2013, je ustvaril dinamično interakcijo in pomembne posledice za gospodarstvo in vlado. Preučujemo vpliv zakona o davčnem potrjevanju računov na odločanje podjetij in njihove posledice. V prispevku je predstavljen pregled in analiza procesa izvajanja, poslovnih odločitev, interakcij med gospodarstvom in davčno upravo ter posledic. Finančne koristi davčne utaje so jasna motivacija za podjetja, vendar bi neupoštevanje zakonodaje lahko povzročilo izgube zaradi kazni. Glede na tveganje pri odločanju bi bilo treba medsebojno sodelovanje med podjetji in davčno upravo oblikovati kot model igre, obogaten z empiričnimi podatki. Glede na empirične podatke se podjetja nagibajo k odstopanju, med tem ko vlada ustvarja dobiček. Zato je treba preučiti ravnovesje: koliko odstopanja bo vlada sprejela, preden bo povečala kazni in koliko tveganja bo podjetje pripravljeno sprejeti, da bi se izognilo davkom.

Ključne besede: teorija iger, odločanje v tveganih razmerah, davčno potrjevanje računov

Klasifikacija JEL: C72, D81, H26

Managing Global Transitions 16 (1): 37–58

Izobraževanje in gospodarska rast: Empirični dokazi iz Nigerije

Perekunah B. Eregha, Roland I. Irughe in Joel Eadefe

Strokovnjaki menijo, da izobraževanje vpliva na družbo, tako na mikro, kot na makro ravni. Vendar pa izobraževanju v Nigeriji ni bil pripisan dovolj velik pomen, kar se odraža v proračunskih sredstvih države. Ta študija je preučila vpliv različnih ravni izobraževanja na različne komponente rasti v Nigeriji. Podatki so bili pridobljeni iz statističnega biltena CBN (glej <http://www.cbn.gov.ng/documents/statbulletin.asp>), nigerijskega statističnega urada (glej <http://www.nigerianstat.gov.ng>) in

Svetovne banke (glej <http://www.worldbank.org>) v obdobju 1970–2015. Uporabljena je bila popolnoma modificirana OLS cenilka, rezultati pa so pokazali, da različne stopnje izobrazbe v Nigeriji različno vplivajo na vsako izmed komponent rasti, vendar je obseg vpliva precej višji od končnega deleža. Delež dokončanja pojasnjuje rast, ki je v Nigeriji višja od deleža vpisa, zato bi si morala vlada na različne načine prizadevati za zmanjšanje deleža osipa v šolskem sistemu, kar bi delovalo kot ukrep za povečanje deleža dokončanja in olajšalo rast.

Ključne besede: izobraževanje, rast izven področja pridobivanja nafte, rast na področju pridobivanja nafte, popolnoma modificirana OLS cenilka

Klasifikacija JEL: I2, J24, O4

Managing Global Transitions 16 (1): 59–77

Oblikovanje blagovnih znamk start-up podjetij: empirični dokazi med slovenskimi start-upi

Matej Rus, Maja Konecnik Ruzzier in Mitja Ruzzier

Zdi se, da je oblikovanje blagovnih znamk pomembna tema v vseh podjetjih, tudi v novoustanovljenih in mladih podjetjih z visokim potencialom rasti – tako imenovanih start-upih. To smo potrdili tudi v empirični raziskavi, izvedeni v 195 slovenskih start-up podjetjih. Ustanovitelji start-upov/glavni izvršni direktorji vidijo oblikovanje blagovne znamke kot najpomembnejšo poslovno strategijo v svojih podjetjih. Kot pomembni so bili ocenjeni različni gradniki oblikovanja blagovne znamke v novonastalih podjetjih, od vizije blagovne znamke in gradnikov konteksta do razvoja blagovne znamke in njene implementacije. Te ugotovitve prinašajo pomembne vodstvene posledice ne le za novoustanovljena podjetja, temveč tudi za druga podjetja, ki želijo svoje blagovne znamke obravnavati in vzdrževati kot dinamične in razvijajoče se subjekte.

Ključne besede: oblikovanje blagovne znamke, start-up, zgodba, inovacije

Klasifikacija JEL: M31, M39

Managing Global Transitions 16 (1): 79–94