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ECONOMIC INTEGRATIONS AND PURCHASING POWER PARITY ASSUMPTION

Abstract

The goal of the paper is to investigate in which way economic integration and economic relations affect mean reverting properties of real exchange rates. We have employed unconstrained and constrained augmented Dickey-Fuller unit root test and Im Pesaran Shin panel unit root test in order to investigate mean reverting properties of real exchange rates in transition, ASEAN, MERCOSUR countries and China vis à vis Germany and the USA. Our analysis is interesting due to the fact that it provides evidence of the impact of (further) integration on the problems with price competitiveness in EU and EMU periphery countries. Evidence suggests that economic relations of ASEAN and MERCOSUR countries vis à vis the USA and transition countries vis à vis Germany are affecting mean reverting properties of relative exchange rates. In all three groups of countries evidence of stationarity of real exchange rates is much stronger vis à vis major economic partner.

Keywords: *regional integrations, PPP, LOOP, the border effect, the power proble*

1. INTRODUCTION

The goal of this paper is to investigate the effect of regional economic integrations on mean reverting properties of real exchange rates in the second half of the twentieth century in Latin American, Asian and East European countries vis à vis the USA and Germany.

Having in mind Euro crises and problems with price competitiveness in periphery EU and EMU countries, estimated impact of economic integration on mean reverting properties might result with a clear policy recommendations. In the case that stronger integration results with stronger/faster mean reverting properties of real exchange rates, stronger economic integration might be suggested as a remedy for price divergence problems.

The paper is based on a comprehensive literature on testing the long-run validity of Purchasing Power parity (PPP), or equivalently the stationarity of the real exchange rate (RER) (Rogoff 1996, Sarno and Taylor 2002), and literature based on border effect on trade flows and law of one price (LOOP) (Engel and Rogers 1996).

According to the theories of PPP, LOOP and "border effect", stronger economic links and trade flows between countries should result in a faster convergence of relative prices. Methodology is based on the comparisons of number of the cointegrating vectors in constrained and unconstrained time series and panel tests between China, transition, ASEAN and MERCOSUR countries. In order to test for mean reverting properties of real exchange rates,

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we have employed augmented Dickey-Fuller (constrained) test and Johansen cointegration technique (unconstrained) test for each country bilaterally and Im-Pesaran-Shin (IPS) panel test for ASEAN, CEEC and MERCOSUR group of countries together with the USA and Germany as numeraire countries.

The remainder of the paper is divided into four sections. Section 2 provides a theoretical justification of real exchange rate convergence and border effect. Section 3 discusses the data and provides an overview of statistical methodology. Section 4 presents and discusses the results and Section 5 concludes.

2. PPP AND REGIONAL INTEGRATIONS

Mean reverting properties of real exchange rates (PPP assumption) are traditionally tested with unit root tests and cointegration tests. Rejection of the null hypothesis of unit root or zero cointegrating vectors is usually accepted as a proof of mean reverting properties of real exchange rates. Due to persistence of deviations and volatility of real exchange rates, both tests are faced with the lack of power to reject null hypothesis when performed on small number of observations – the Power Problem (Rogoff 1996, Sarno and Taylor 2002).

2.1. THE POWER PROBLEM

The basic idea behind the power problem was that if the real exchange rate reverts toward its mean over long periods of time, then the examination of one real exchange rate over a period of twenty-five years or so may not yield enough information to detect slow mean-reversion towards PPP. Artificially generated processes have indicated that for the speed of mean-reversion typically recorded in the literature (half-life of 2.5-7.3 years), the probability of rejecting the null hypothesis of a random walk real exchange rate, in the case when the real exchange rate is mean reverting, would only be between 5 and 7.5% for 15 years of data (Sarno and Taylor 2002, Lothian and Taylor 1997).

The first approach considered in the literature to circumventing the low power problem of conventional tests was to employ long-span data. Frankel (1986) rejected the null hypothesis for dollar-sterling real exchange rate using annual data from 1869 to 1984, Edison (1987) over 1890-1978 and Abuaf and Jorion (1990) rejected the random walk for eight countries during 1901-1972.

The alternative response to the power problem was the use of panel data studies to expand the range of countries (real exchange rates) being considered. The study of Abuaf and Jorion (1990) has stimulated a strand of literature which employs multivariate generalization of unit-root tests in order to solve the power problem. Abuaf and Jorion (1990) tested the null hypothesis for ten series in the float period. Results indicated a marginal rejection of the null hypothesis of joint nonstationarity at conventional nominal levels of significance.[3]

Prevailing consensus in both types of studies is that despite of some limitations to both the long-horizon and cross-section results on long-run convergence to PPP, it is possible to conclude that deviations tend to dump out, although only at the slow rate with half-life of 2.5-7.3 years (Rogoff, 1996; Sarno and Taylor, 2002).

3 See (Rogoff, 1996) and (Sarno and Taylor, 2002) for complete list of empirical tests

2.2 THE BORDER EFFECT AND TRADE REDIRECTION

Together with PPP studies, another string of research based on LOOP testing developed – "the border effect". Basic idea behind the approach is the fact that international and intranational borders distort relative prices and trade flows.

Engel (1993) discovered strong empirical regularity that the consumer price of a good relative to a different good within a country tends to be much less variable than the price of that good relative to a similar good in another country. This fact holds for all goods except for very simple, homogenous products. Engel suggested that models of the real exchange rate are likely to predict this relation, therefore this fact may provide a useful gauge for discriminating among models.

Parsley and Wei (1996) tested LOOP for 51 prices in 48 US cities. They found convergence rates substantially higher than what is typically found in cross-country data: that convergence occurs faster for larger price differentials and that rates of convergence are slower in cities situated farther apart from one another. Engel and Rogers (1996) discovered that distance between cities can explain the considerable amount of the price differential between 14 categories of consumer prices between US and Canadian cities. Furthermore, they found evidence that price differentials are considerably larger in two cities of different countries than in two equidistant cities of the same country.

The estimates of Engel and Rogers (1996) suggest that crossing the national border – the so called "border effect" – increases the volatility of price differentials by the same order of magnitude as would be generated by the addition of between 2,500 and 23,000 extra miles to the distance between cities considered. Rogers and Jenkins (1995) find similar results providing evidence that "the border effect" increases not only the volatility of price differentials but also their persistence. Gorodnichenko and Tesar (2009) show that border effect might be driven by intranational heterogeneity of prices and that there is not a clear benchmark we can use to separate the effect of border from the country heterogeneity effect.

McCallum (1995) showed that intranational trade flows are, ceteris paribus, 22 times larger than international trade flows. In a similar way to national borders, intranational borders account for a significant fraction of the decreased trade flows across states (Wolf 2000) and provinces (Helliwell and Verdier 2001).

2.3 THEORETICAL EXPECTATION

Empirical studies performed on LOOP and the "border effect" testing suggest that intra and international borders affect trade flows (home bias) and relative price. Closed borders dampen market mechanisms and increase volatility and persistence of price and the real exchange rate deviations. Economic integrations and cooperation, on the other hand, indicate opposite effects. Having in mind that there is a stronger bound between ASEAN and MERCOSUR countries to the US, this theory suggests that mean reverting properties in these countries should converge much faster vis à vis the US. Naturally, it is expected that transition countries should exhibit stronger convergence vis à vis Germany.

In order to test the hypothesis that regional integrations and trade help to eradicate persistence and volatility of real exchange rates, mean reverting properties of real exchange rates between MERCOSUR, ASEAN and transition countries (vis à vis Germany and the USA) are tested. If the theory is correct, mean reverting properties of real exchange rate are going to be stronger within groups of countries that are major economic partners or countries which are in the process of economic integration.

According to available data for 2010, EU27 share in MERCOSUR trade is 20.3% and 10.3% for ASEAN countries. USA share is 11.7% for MERCOSUR and 9.4% for ASEAN trade (DG Trade 2011). When it comes to Central and Eastern Europe, trade share of the entire North America was between 1.6 and 6%, while share of EU-15 was 49 and 60% in 2003 (ITS 2004).[4]

Obviously, the biggest difference between trade shares between EU and USA is present in the case of Eastern Europe. Therefore, it is reasonable to expect much faster and much significant convergence of relative prices between Germany (EU-15) and Central and Eastern Europe, compared to ASEAN and MERCOSUR countries, where inter-trade shares with EU are much smaller (compared to CEE). When it comes to USA shares in ASEAN, and MERCOSUR, EU-27 has slightly larger share of trade, but without CEE the opposite is the case.

Additional point emerges if we analyze inter and intra trade patterns of ASEAN, MERCOSUR and EU-27 during 2001-2010 (Figure 1, Figure 2 and Figure 3). There is one peculiar difference between EU-27 and two other regional integrations. Intra export and import are much larger in EU compared to ASEAN and MERCOSUR where majority of trade is still outside of the integration. Having in mind that most of the intra trade between EU-12 and EU 15 is euro based trade and most of the global trade is still dollar based trade, it is reasonable to expect that stronger mean reverting properties MERCOSUR and ASEAN vis a vis dollar and in transition countries vis a vis euro.

3. THE DATA AND STATISTICAL ANALYSIS

In order to test the validity of Purchasing Power Parity assumption relating to various economic integrations we used a large data set referring to 29 countries. The nominal exchange rate with respect to USD and DM and domestic price level (CPI) were compiled for each country. Exchange rate series are expressed in direct quotation, and CPI data is in indices form (2000=100). All series are in monthly frequencies, spanning at most from 1960:1 to 2007:10, and expressed in natural logarithms.

Countries were classified into 3 groups: ASEAN, MERCOSUR countries and transition countries. Argentina, Brasil, Chile, Paraguay and Uruguay were set as MERCOSUR countries. ASEAN group consisted of Singapore, Malaysia, Thailand, Indonesia, Japan, Cambodia, Vietnam and Laos. The most numerous group of countries are transition countries: Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Macedonia, Poland, Romania, Slovakia and Slovenia. As an outlier, data for China was tested separately.

Unconstrained approach tests for cointegration between price levels of each country (generally measured by CPI) and the exchange rate expressing the domestic currency price

4 The last year with available data for CE Europe/BIS/CIS countries in regional trade section. In 2004 eight EE countries joined European Union.

of foreign exchange (or vice versa). Hence, the observed real exchange rate function can be expressed in the following log-linear form:

$$q_t = e_t + p_t - p_t^* \quad (1)$$

where q represents the real exchange rate vis à vis a certain currency, e is the nominal exchange rate, and p and p* are the domestic and foreign price level measured by CPI.
If put in a regression model frame, the observed function takes the following form:

$$q_t = \alpha + \beta_1 e_t + \beta_2 p_t - \beta_3 p_t^* + \varepsilon_t \quad (2)$$

where ε_t is a white noise process. In case of right-hand side variables from equation (2) being cointegrated, one can say that PPP holds.

Constrained approach, so-called "strong" PPP assumption test implies proportionality between the obtained coefficients ($\beta_1 = -\beta_2 = \beta_3 = 1$), and it is based on the unit root test of the real exchange rate series. Both methods (unrestricted and restricted model) were used in the paper.

As the first step of the analysis the Augmented Dickey-Fuller (thereinafter ADF) unit root test was applied to every series of interest. Concurrently, the following procedure, introduced by (Dolado, Jenkinson and Sosvilla-Rivero, 1990), was used.

Firstly, each series in levels was tested with the least restrictive model, including a trend and an intercept. If the null hypothesis was not rejected, the analysis would be preceded with the model including only a constant. Otherwise, it was concluded that the observed process contains a unit root. If the second model showed that the drift term also is not significant, the procedure continued through a model without a drift, or a deterministic trend. In case the null hypothesis could not be rejected at any of the three steps of the analysis, it was concluded that the sequence of interest is stationary.

Afterwards, the procedure was developed in two directions. On one hand, the intention was to question the existence of long-run relationship between each country's price level, the USA price level and the exchange rate vis à vis USD. On the other hand, the same principle was employed for each country's relationship vis à vis Germany.

In order to circumvent the power problem of individual unit root tests during 1960:1 to 2007:10 period, panel approach was employed as well. Real exchange rates of countries grouped according to their affiliation to economic integrations were used in order to perform a panel unit root test. To be more precise, Im-Pesaran-Shin (IPS) panel unit root test was applied. This test is based on individual unit root test statistics obtained from the Augmented Dickey-Fuller unit root test.

Thereby, IPS test implies the application of the following ADF regression on each observed real exchange rate series[5]:

5 A deterministic time trend was not included in individual ADF regressions because the PPP does not allow real exchange rates to be trend stationary.

$$\Delta y_{it} = \alpha_{i0} + \gamma_i y_{it-1} + \sum_{j=1}^{p_i} \beta_{ij} \Delta y_{it-j} + e_{it}; \quad i = 1,...,n \tag{3}$$

That way a t-bar statistic can be estimated as a simple arithmetic mean of the individual ADF statistics:

$$t - bar_{NT} = \frac{\sum_{i=1}^{N} t_{it}}{N} \tag{4}$$

According to the (Im, Pesaran, Shin, 2003) paper, t-bar statistic can then be standardized in order to follow an asymptotic normal distribution:

$$W = \frac{\sqrt{N}\{t - bar_{NT} - N^{-1}\sum_{i=1}^{N} E(t_{iT})}{\sqrt{N^{-1}\sum_{i=1}^{N} Var(t_{iT})}} \tag{5}$$

where N is the number of cross sections and T is series length. $E(t_{iT})$ and $Var(t_{iT})$ are ADF regression t-statistic's expected value and variance, provided in (Im, Pesaran, Shin, 2003) using Monte Carlo simulations.

What we are interested here is to test the null hypothesis implying the existence of unit roots:

$$H_0 : \gamma_j = 0 \text{ for all i,}$$

against the alternative

$$H_1 : \begin{cases} \gamma_j < 0; & i = 1,2,...N_1 \\ \gamma_j = 0; & i = N_1 + 1, N_1 + 2,...,N \end{cases}$$

The adequacy of applying IPS over a variety of other available tests (Quah, 1994; Levin and Lin, 1993) can be argued by its better finite sample performance, as proven by stochastic simulations[6]. Also a glance at the alternative hypothesis reveals that it allows a fraction of individual series to be mean reverting, which is not the case in (Levin and Lin, 1993), e.g.

4. RESULTS

Table 1 and Table 2 summarize the cointegration analysis results for all the observed countries and economic integrations. In the second column the available data span is given for each country of interest. The following four columns show the ADF test results for each country's CPI and the exchange rate vis à vis numeraire country[7]. The results of the unrestricted test (guided by max-eigen value and trace statistics) are given in the following three columns. Finally, real exchange rate series were formed (restricted RER) and tested for mean-reverting properties with results presented in the last two columns. The results vis à vis USA are presented in and vis à vis Germany in Table 2[8].

6 For a complete review of different unit root tests in heterogenous panels see (Baltagi and Kao, 2000).

7 The reported ADF test statistics (t-statistics that rejected the null hypothesis of unit root) refer to series in levels. Namely, it is sufficient to prove that variables of interest are not stationary in levels to perform the Johansen's procedure (order of integration is not essential for the analysis performed here). If the null hypothesis could not be rejected, the t-statistics from the most restrictive ADF regression (no constant or trend) was reported.

8 Reffering to CEE countries cointegration analysis (Table 2 and 3), it can be seen that the time span used for Hungary is much wider than for other countries (as a result of other countries being a part of larger entitites before the 1990's). Hence, as a kind of

Figure 4, Figure 5 and Figure 6 show the number of cointegrating vectors for ASEAN, transition and MERCOSUR countries vis à vis the USA. It is obvious that MERCOSUR countries indeed exhibit a strong long-run relationship with the USA. On the other hand, real exchange rate in Croatia, Estonia, Lithuania, Poland and Slovenia do not form a long-run relationship with the USA.

Figure 7, Figure 8 and Figure 9 show the number of cointegrating vectors for ASEAN, transition and MERCOSUR countries vis à vis Germany. It is more than obvious that the largest number of cointegrating vectors is in the group of transition countries. Here again the Johansen's procedure resulted in spurious regression for Croatia, Estonia, Lithuania, Poland and Slovenia.

In total, five ASEAN countries turned out to be cointegrated to the USA, in contrast to only three of them vis à vis Germany. With MERCOSUR countries similar findings have been found (four countries vs. two of them)[9]. As far as transition countries are concerned, they are strongly connected to Germany (six countries cointegrated to Germany vs. three cointegrated to the USA).

In order to circumvent the power problem, a panel approach had been conducted in order to increase the power of the unit root test to reject null hypothesis. IPS panel unit root test was conducted on three groups of countries and are presented in the Table 3[10]. Results suggest that countries from different economic integrations are very much related to the USA or Germany as global economic leaders. In ASEAN countries the PPP assumption holds with respect to the USA at 10% significance level and in MERCOSUR at 5% significance level. On the other hand, for transition countries stationarity can be proven only vis à vis Germany. Obviously, rejection of the null hypothesis for the transition countries in panel approach suggest that short sample of newly found countries is the reason of spuriousity in time series analysis.

CONCLUSIONS

In this paper we have investigated the relationship between trade or economic cooperation in general and strength of evidence of mean reverting properties of real exchange rates. Results have supported the thesis that the level of economic cooperation or international trade is closely connected with the strength of evidence of stationarity of real exchange rates.

ASEAN and MERCOSUR countries have much stronger evidence of PPP assumption vis à vis the USA, on the other hand, in transition countries there is much stronger evidence of stationarity of real exchange rates vis à vis Germany.

Results suggest that economic cooperation and trade improve the functioning of international market mechanisms and convergence of real exchange rates. The more countries trade, the more evidence of cointegration of relative prices is to be found. In terms of policy recommendations, our results imply that stronger economic integration between

robustness check, the analysis was repeated using shorter series for Hungary (see Appendix)

9 Chile would be the fifth country cointegrated to the USA according to the trace statistic, but max-eigen criterion is dominant over the trace statistics (Enders, 2004).

10 As real exchange rate series significantly vary for different countries, a balanced panel was used, with the time span set at 1995:1 to 1999:1.

countries might improve mean reverting properties of real exchange rates. In terms of present competitiveness problems in EMU and EU, our results might be used as supportive for stronger economic integration within EMU and EU.

Recommendation for further research is to apply structural break unit root tests on the same sample of countries in order to investigate connection between identified potential structural break dates with structural breaks in trade or investment flows and/or institutional reforms such as establishments of tree trade, monetary and/or fiscal unions.

Tables

Table 1: Cointegration analysis for countries and economic integrations vis à vis- the USA

	vis à vis the USA		CPI		ER		Unrestricted RER			Restricted RER	
		Data span	ADF	No. Of lags	ADF	No. Of lags	mex-	trace rank	No. Of lags	ADF	No. Of lags
ASEAN	Singapore	1961:1-2007:9	2,571217	16	-2,226613	0	1	0	7	-1,9206	1
	Malaysia	1960:1-2007:9	3,360015	16	0,485751	17	1	1	2	-0,8853	7
	Thailand	1965:1-2007:10	2,714215	15	0,763108	7	0	0	8	-1,5286	7
	Philippines	1960:1-2007:10	3,150424	15	2,602730	0	0	0	8	-3,0313**	0
	Indonesia	1968:1-2007:9	2,540996	15	2,252134	14	1	1	6	-1,1756	14
	Japan	1960:1-2007:9	1,273809	14	-1,545648	8	1	1	7	-2,0304	13
	Cambodia	1994:10-2007:10	1,470280	12	1,846842	9	0	0	4	-2,3895	7
	Vietnam	1995:1-2007:5	1,661380	13	0,781815	0	0	0	3	-1,253	1
	Laos	1987:12-2007:10	0,904744	14	0,682702	0	1	1	3	-3,0252**	2
Central and Eastern Europe	China	1987:1-2007:8	-2,221772	13	-2,221772	13	multicollinearity			-1,722225	15
	Bulgaria	1991:1-2007:10	1,024152	1	-2,021692	1	0	0	4	-2,3317	4
	Croatia	1992:1-2007:10	-8,802750***	14	-4,161554***	3	spurious			-5,6426***	1
	Czech	1993:1-2007:10	1,307459	13	-0,943541	0	0	0	7	-0,2094	0
	Estonia	1992:6-2007:10	-6,712423***	13	-0,357567	0	spurious			-3,5831***	1
	Hungary	1976:1-2007:10	0,685063	14	1,011881	11	2	1	3	0,5266	0
	Latvia	1992:2-2007:10	2,520711	14	0,161986	1	1	1	8	0,1919	13
	Lithuania	1992:1-2007:10	-6,038950***	12	1,264329	14	spurious			-4,4178***	14
	Macedonia	1993:12-2007:10	2,346201	12	-0,159692	0	1	0	3	-1,5024	13
	Poland	1988:1-2007:10	-6,419933***	14	-3,290852*	5	spurious			-1,3172	7
	Romania	1990:10-2007:10	0,144694	10	-1,876975	7	0	0	8	-0,7495	8
	Slovakia	1993:1-2007:10	1,907081	12	-0,600190	1	0	0	3	0,8771	1
	Slovenia	1990:1-2006:12	-9,244395***	14	-4,710412***	9	spurious			-2,4886	9
MERCOSUR	Argentina	1960:1-2007:10	-1,763602	13	-2,105528	8	1	1	8	-3,0131**	8
	Brazil	1979:12-2007:10	-1,784455	4	-2,079151	2	1	1	3	-1,7607	0
	Chile	1960:1-2007:10	-1,612300	18	-0,861487	14	0	1	8	-1,9021	16
	Paraguay	1960:1-2007:10	2,128640	12	2,884553	3	2	2	2	-1,5586	0
	Uruguay	1964:1-2007:10	-1,534118	8	-2,955238	0	1	0	8	-2,5503	2
	Germany	1960:1-2007:10	4,375648	0	-1,678737	0	1	1	2	-1,349619	0

Notes: *** 1%, **5%, *10% significance level

Source: Author calculation

Table 2: Cointegration analysis for countries and economic integrations vis à vis-Germany

	vis à vis Germany		CPI		ER		Unrestricted RER			Restricted RER	
		Data span	ADF	No. Of lags	ADF	No. Of lags	mex-	trace rank	No. Of lags	ADF	No. Of lags
ASEAN	Singapore	1961:1-2007:9	2,571217	16	-0,489257	0	1	1	1	-1,0701	0
	Malaysia	1960:1-2007:9	3,360015	16	-0,052574	7	0	0	6	-0,7055	17
	Thailand	1965:1-2007:10	2,714215	15	2,467086	13	0	0	4	-0,6633	13
	Philippines	1960:1-2007:10	3,150424	15	2,489234	0	0	0	6	-2,0371	0
	Indonesia	1968:1-2007:9	2,540996	15	2,493822	12	0	0	4	-0,9059	12
	Japan	1960:1-2007:9	1,273809	14	0,710287	3	0	0	4	-1,3941	0
Central and Eastern Europe	Cambodia	1994:10-2007:10	1,470280	12	1,855709	8	1	1	2	-1,1493	0
	Vietnam	1995:1-2007:5	1,661380	13	0,555858	0	0	0	5	-1,2346	0
	Laos	1987:12-2007:10	0,904744	14	1,028564	0	0	0	2	-1,2152	8
	China	1987:1-2007:8	-2,221772	13	1,251341	0	1	1	3	-2,3711	5
	Bulgaria	1991:1-2007:10	1,024152	1	-1,964428	1	1	1	5	-3,2743**	3
	Croatia	1992:1-2007:10	-8,802750***	14	-4,827013***	3		spurious		-4,9102***	0
	Czech	1993:1-2007:10	1,307459	13	0,396507	0	0	2	7	-1,9785	0
	Estonia	1992:6-2007:10	-6,712423***	13	0,845365	0		spurious		-4,9826***	0
	Hungary	1976:1-2007:10	0,685063	14	3,111774	0	0	0	2	-2,2116	0
	Latvia	1992:2-2007:10	2,520711	14	-1,621752	0	1	1	5	-4,0364***	0
	Lithuania	1992:1-2007:10	-6,038950***	12	-3,929974**	0		spurious		-5,4183***	0
	Macedonia	1993:12-2007:10	2,346201	12	1,093103	0	1	1	4	-0,9819	0
	Poland	1988:1-2007:10	-6,419933***	14	-3,480132***	1		spurious		-2,4604	0
	Romania	1990:10-2007:10	0,144694	10	-1,786952	7	2	2	8	-3,8062***	8
	Slovakia	1993:1-2007:10	1,907081	12	0,741746	0	1	1	7	-1,5033	0
	Slovenia	1990:1-2006:12	-9,244395***	14	-0,980238	0		spurious		-2,155	0
MERCOSUR	Argentina	1960:1-2007:10	-1,763602	13	-2,152546	8	1	1	6	-2,2644	11
	Brazil	1979:12-2007:10	-1,784455	4	-1,867952	4	0	0	3	-1,8545	0
	Chile	1960:1-2007:10	-1,612300	18	-0,968632	14	0	0	6	-1,8095	7
	Paraguay	1960:1-2007:10	2,128640	12	4,050932	0	1	1	1	-0,9754	0
	Uruguay	1964:1-2007:10	-1,534118	8	-2,362019	0	0	0	7	-2,3005	2
	USA	1960:1-2007:10	1,682718	13	-1,390181	0	1	1	2		0

Notes: *** 1%, **5%, *10% significance level

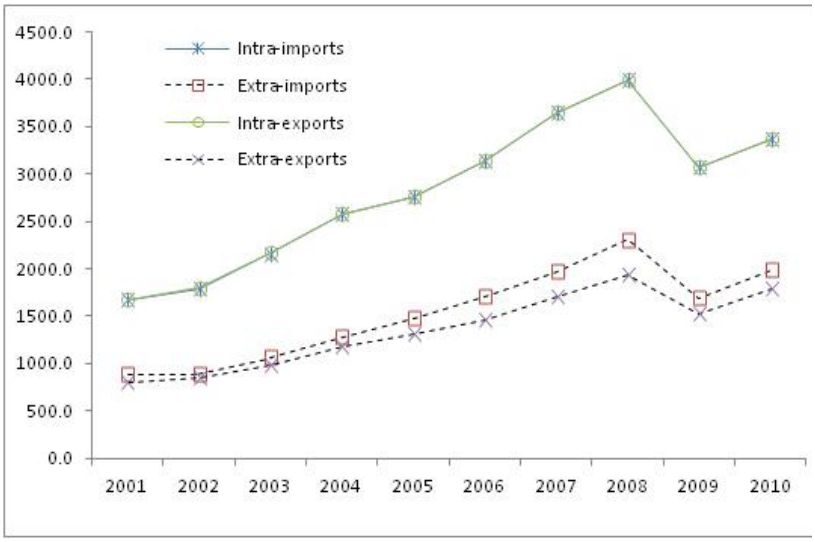
Source: Author calculation

Table 3: IPS test results

Im Pesaran Shin panel unit root test	*t-bar*	*w-stat*	*p-value*
ASEAN vis à vis USA	-1,9155	-1,43269	**0,0760**
CEE vis à vis USA	-1,7206	-0,87528	0,1907
MERCOSUR vis à vis USA	-2,157	-1,6770	**0,0468**
ASEAN vis à vis Germany	-1,1528	1,1795	0,8809
CEE vis à vis Germany	-3,1432	-6,5026	**0,0000**
MERCOSUR vis à vis Germany	-1,8409	-0,8647	0,1936

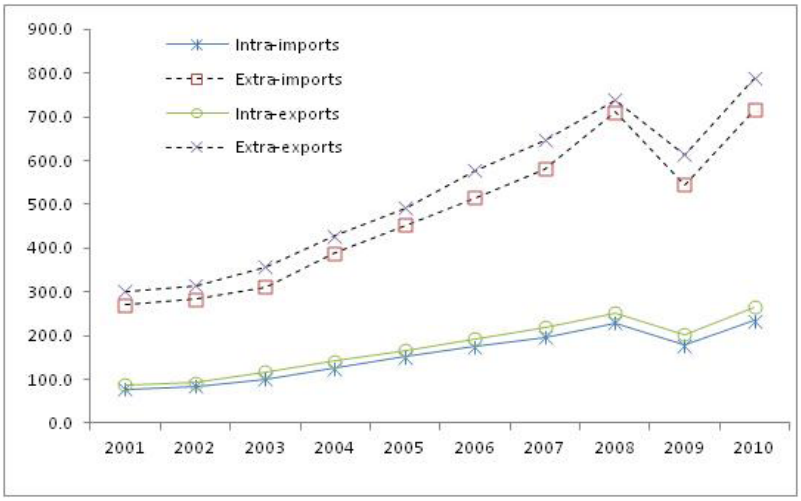
Source: Author calculation

Figure 1: Intra and extra trade of EU-27 (billion dollars)



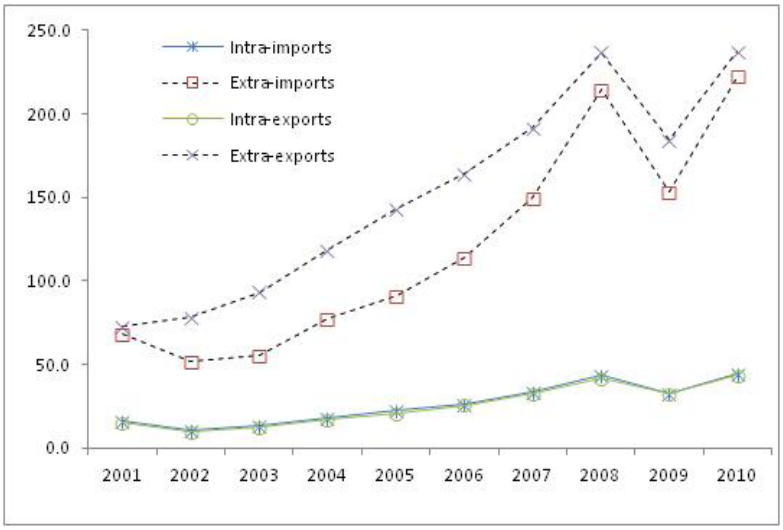
Source: ITS (2011)

Figure 2: Intra and extra trade of ASEAN (billion dollars)



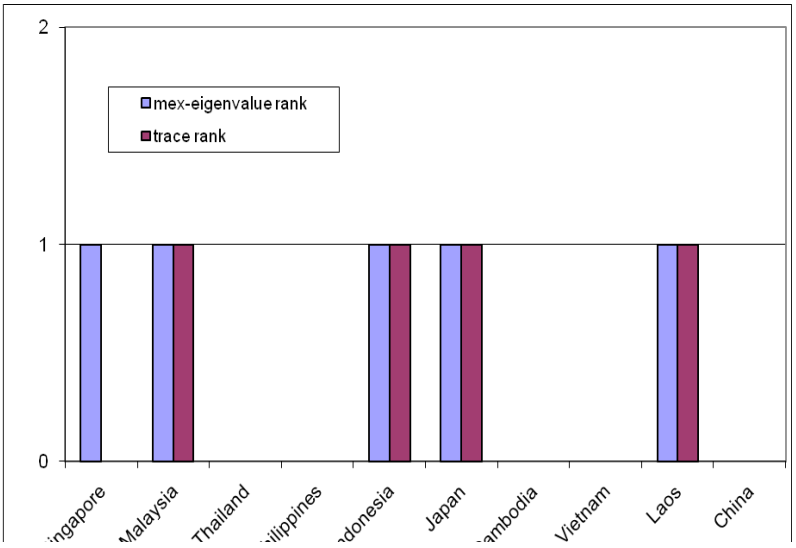
Source: ITS (2011)

Figure 3: Intra and extra trade of MERCOSUR (billion dollars)



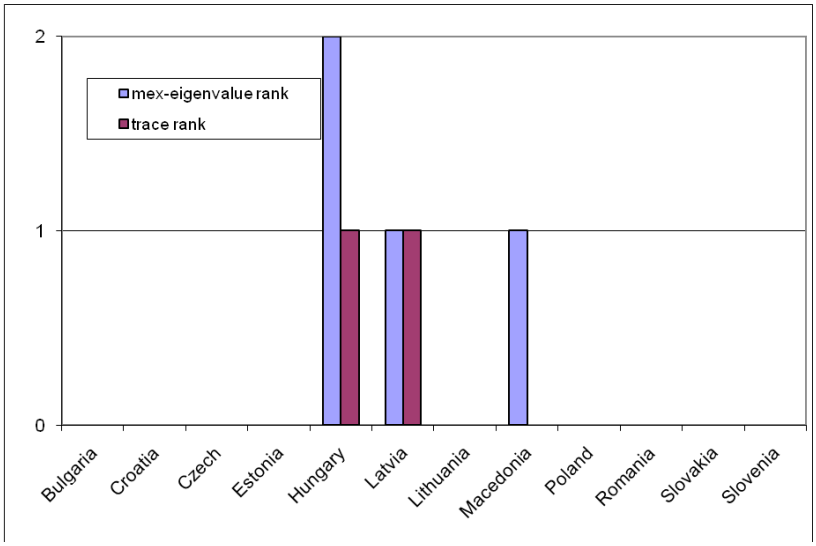
Source: ITS (2011)

Figure 4: The number of cointegrating vectors in ASEAN and China vis à vis USA



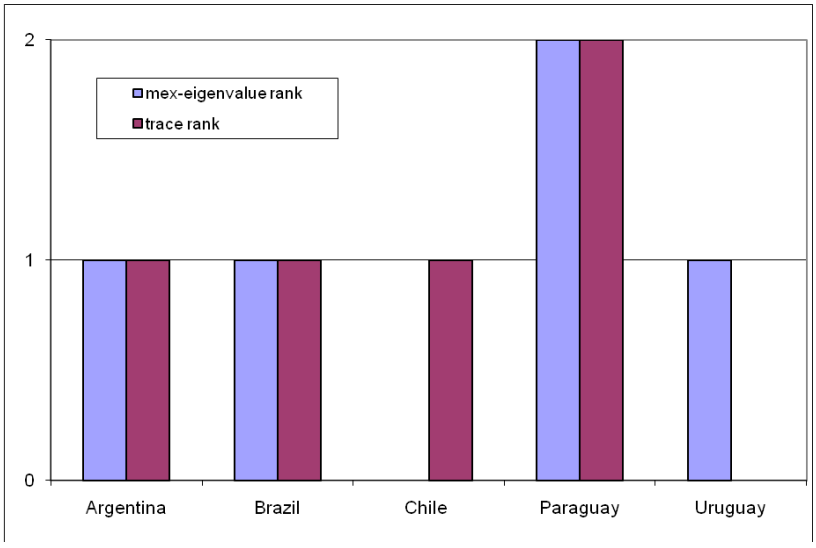
Source: Author calculation

Figure 5: The number of cointegrating vectors in transition countries vis à vis USA



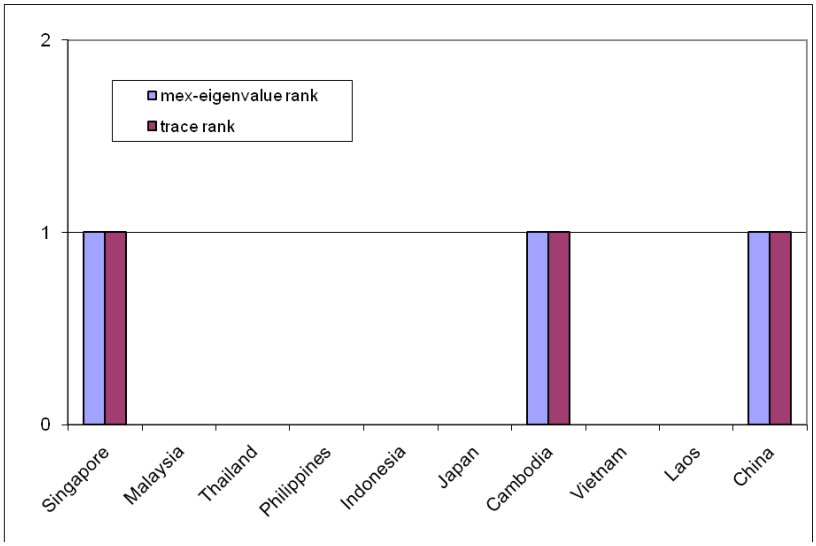
Source: Author calculation

Figure 6: The number of cointegrating vectors in MERCOSUR vis à vis USA



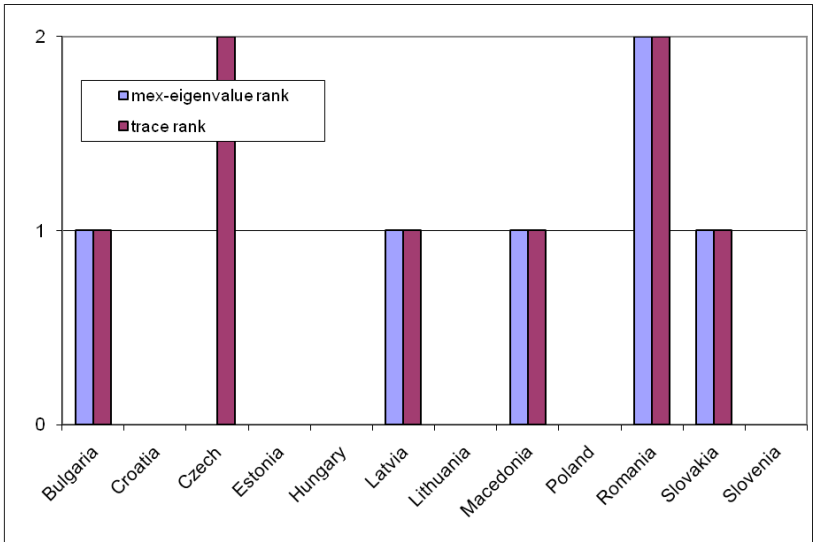
Source: Author calculation

Figure 7: The number of cointegrating vectors in ASEAN and China vis à vis Germany



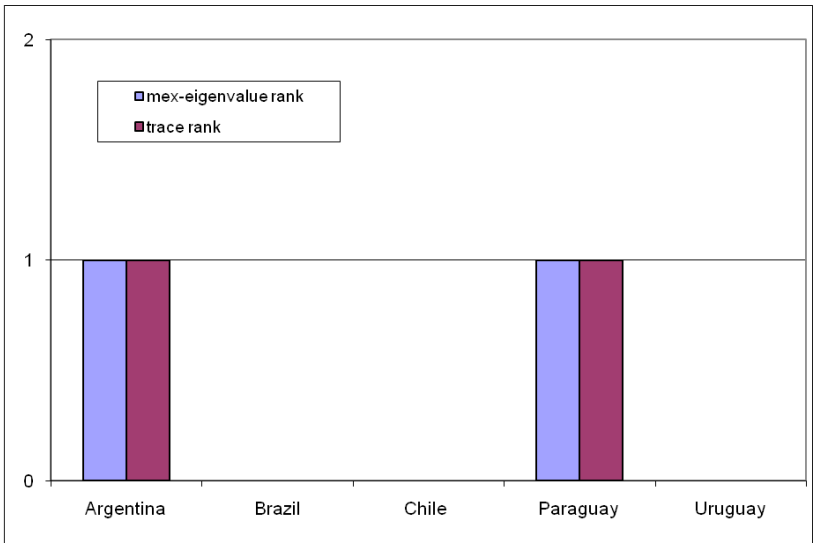
Source: Author calculation

Figure 8: The number of cointegrating vectors in transition countries vis à vis Germany



Source: Author calculation

Figure 9: The number of cointegrating vectors in MERCOSUR vis à vis Germany



Source: Author calculation

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Appendix: Cointegration analysis for countries and economic integrations: Hungary vis à vis-the USA and Germany

vis à vis the USA		CPI		ER		Unrestricted RER			Restricted RER	
	Data span	ADF	No. Of lags	ADF	No. Of lags	mex-eigenvalue rank	trace rank	No. Of lags	ADF	No. Of lags
Hungary	1990:1-2007:10	0.219978	14	2.141613	0	1	1	3	-0.629639	0
vis à vis Germany		CPI		ER		Unrestricted RER			Restricted RER	
	Data span	ADF	No. Of lags	ADF	No. Of lags	mex-eigenvalue rank	trace rank	No. Of lags	ADF	No. Of lags
Hungary	1990:1-2007:10	0.219978	14	2.395821	0	1	1	3	-0.571145	1

EKONOMSKE INTEGRACIJE I PRETPOSTAVKA PARITETA KUPOVNE MOĆI

Sažetak

Cilj rada je istražiti na koji način ekonomske integracije i ekonomski odnosi utječu na trend kretanja prosječnih vrijednosti stvarnog tečaja. Koristili smo neograničeni i ograničeni prošireni Dickey-Fullerov test jediničnog korijena i Im Pesaran Shin panelni test jediničnog korijena kako bismo istražili trendove kretanja prosječnih vrijednosti stvarnog tečaja u tranzicijskim zemljama, zemljama ASEAN-a, MERCOSUR-a i Kini u odnosu na Njemačku i SAD. Naša je analiza interesantna stoga što pruža dokaze o utjecaju (daljnje) integracije oko problema s konkurentnosti cijena u perifernim zemljama EU-a i EMU-a. Dokazi upućuju na to da gospodarski odnosi zemalja ASEAN-a i MERCOSUR-a s SAD te tranzicijskih zemalja s Njemačkom utječu na trend kretanja prosječnih vrijednosti relativnog tečaja. U sve tri grupe zemalja dokaz o stacionarnosti stvarnog tečaja je puno jači u usporedbi s najvećim ekonomskim partnerom.

Ključne riječi: *regionalne integracije, PPP, LOOP, granični efekt, problem moći*

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UDK 339.72.053.1(560)

THE SUSTAINABILITY OF TURKISH EXTERNAL DEBT: EVIDENCE FROM FRACTIONALLY INTEGRATED APPROACH UNDER STRUCTURAL BREAKS

Abstract

This paper examines the external debt sustainability in Turkey over the period 1970-2010 by using fractionally integrated approach. As a first step, possible structural breaks in the data are not taken into consideration. The findings from Robinson(1994a) test reveal that the process is non-stationary with long memory, therefore, there is no evidence of external debt sustainability in Turkey. In the second step, structural breaks identified by Bai and Perron (1998, 2003) multiple structural break test, are included in the Robinson test. The results in the context of structural breaks still show that the external debt in Turkey is not sustainable.

Keywords: *External debt, Sustainability, Fractional integration, Multiple structural breaks.*

1. INTRODUCTİON

The issue of external debt sustainability is widely debated in the theoretical and empirical literature since 1970s. This issue has become much more important since 1996, as debt relief initiatives for some low income countries have for the first time been based partly on the aim of making countries' debt "sustainable", rather than on the lowest common denominator of what creditors are willing to provide. Debt sustainability refers to a country's ability to service its borrowing, foreign and domestic, public and public guaranteed, private non-guaranteed, including both short and long term debt, without compromising its long term development goals and objectives. International Monetary Fund (IMF) describes the debt sustainability as follows: "a situation in which a borrower is expected to be able to continue servicing its debts without an unrealistically large correction to the balance of income and expenditure" (IMF, 2002).

A country's external debt is sustainable when two conditions are satisfied (Pradelli, 2006): (i) the expected foreign exchange flows associated with foreign trade and finance are balanced for a given time horizon, ii) the foreign exchange flow mismatches that may arise within that horizon are expected to be financed by international capital markets. These conditions are related to the solvency and liquidity notions. Here, it is important to note that solvency, liquidity and vulnerability are sub-components which debt sustainability incorporates. Solvency is a situation in which the present discounted value of the government's primary surpluses is greater than the present discounted value of its debt servicing. On the other hand, the liquidity is a situation in which the liquid assets and available private financings are sufficient to roll over its maturing liabilities while vulnerability is the risk that liquidity will be interrupted by an economic shock. In the model of external debt sustainability, a debtor country is solvent

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when it satisfies an intertemporal budget constraint.

There may be mainly three reasons for non-repayment of the external debt of a country (Eaton, 1989; Utkulu, 1994). These are illiquidity, insolvency and unwillingness to pay. Under the illiquidity approach, the debt crisis is temporary and it should be met by new financing arrangements designed to buy time until the situation improves. According to the solvency approach, the debtor country repays the debt as long as it is able to pay. Finally, the debtor country may be liquid and able to pay its debt, but unwilling to do it.

There are many alternative indicators for external debt sustainability in assessing insolvency. Three most commonly used indicators are the external debt to GDP ratio, the external debt to export ratio and the external debt to government revenues ratio (Roubini, 2001). In this ratios, a non-increasing external debt to GDP ratio is seen as a practical sufficient condition for sustainability. According to this condition, a country is likely to remain solvent as long as the ratio is not growing. If the debt to GDP ratio in a country is growing, the difference between the current trade balance and the trade surplus is required to stabilize the debt to GDP ratio. In order to stabilize this ratio, a larger trade surplus is required when a real depreciation increases the debt to GDP ratio. It can be stated that while a real depreciation increases the debt stock, it may also improve the external balance and does help to improve sustainability (Roubini, 2001).

While searching sustainability, the stationarity of the external debt is essential for the validity of the intertemporal budget constraint. Unit root and cointegration tests provide useful tools for implication of a government's or nation's intertemporal solvency. These tests determine whether a government or country is able to sustain its budget or external deficits without defaulting on its debt (Önel and Utkulu, 2006). In this point, Diebold and Rudebusch(1991) and Sowell(1990) argue that conventional unit root tests may have low power against fractional alternatives.

The aim of this paper is to examine the external debt sustainability of Turkey over the period 1970-2010. There are some studies in the literature which investigate the sustainability of the external debt for Turkey. Bahmani-Oskooee and Domac(1995) use a methodology to the growing Turkish external deficits and they are able to find evidence for external debt sustainability. Özatay(1994, 1997) examines the sustainability of the Turkish public sector deficits and fiscal policy and rejects the sustainability. Following the methodology of Hakkio and Rush(1991), Utkulu(1998) examines the long run tendency of the Turkish exports and imports and finds no evidence of cointegration between exports and imports implying that the external debt of Turkey is not sustainable. Önel and Utkulu(2006) investigate the external debt sustainability in Turkey by using usual intertemporal budget constraint in the contexts with and without structural breaks. They conclude that Turkish external debt is weakly sustainable. Mohammadi et al.(2007) search the extent of capital mobility and foreign debt sustainability in Turkey over the 1962-2003 period based on cointegration, error correction models and threshold and momentum threshold autoregressive models. Their findings are consistent with the existence of capital mobility and the strong form of foreign debt sustainability.

The difference of this paper from the others is that the sustainability of Turkish external debt is investigated by means of fractionally integrated approach instead of classical approaches based on $I(0)$ or $I(1)$ integration. For this purpose, we use Robinson(1994a) test which has several distinguishing features compared with other procedures for unit and/or fractional roots. In particular, the test has a standard null limit distribution and it is the most efficient one when directed against the alternatives. This paper concentrates on the following points: First, we investigate the sustainability of the external debt without taking into account possible structural breaks in the data. Since Granger and Hyung(1999) and Diebold and Inoue(2001) argue that the long memory property in the data may be due to the presence of structural breaks or regime switches, in other words, the structural breaks and long memory properties are related concepts, we determine the potential structural breaks by using Bai and Perron (1998, 2003) multiple structural break test. Then, we also examine the Turkish external debt sustainability by taking into account determined structural breaks.

The plan of the paper is constructed as follows: Section 2 presents the fractional integration procedure of Robinson(1994a) and multiple structural break test of Bai and Perron (1998, 2003). Section 3 describes the data and gives empirical results. Finally, Section 5 contains conclusions.

2. METHODOLOGY

This section describes the Robinson(1994a) test for fractional integration and Bai and Perron (1998, 2003) test for multiple structural breaks.

2.1. ROBİNSON TESTS FOR FRACTİONAL INTEGRATİON

As reported before, the external debt sustainability of Turkey is investigated by using different versions of fractional integration test suggested by Robinson(1994a). The main advantage of this procedure is that it tests unit and fractional roots with a standard null limit distribution, which is unaffected by inclusion or not of deterministic trends. Robinson(1994a) considers the following regression model,

$$y_t = \beta' z_t + x_t \quad , \quad t = 1,2,.... \tag{1}$$

where y_t is the observed time series for $t = 1,2,...T$, $\beta = (\beta_1,...,\beta_k)'$ is a $(k \times 1)$ vector of unknown parameters, z_t is a $(k \times 1)$ vector of deterministic regressors such as an intercept or a linear trend. And the regression errors x_t can be explained as follows:

$$(1-L)^d x_t = u_t \quad , \quad t = 1,2,.... \tag{2}$$

where L is the lag operator and u_t is an $I(0)$ process. Here, d can take any real value. If $d > 0$, x_t is said to be long memory (Granger and Joyeux, 1980; Hosking, 1981). The process is nonstationary and exhibits long memory if $0.5 < d < 1$. Clearly, the unit root case corresponds to $d = 1$ in (2). If $0 < d < 0.5$, the process is stationary and exhibits long memory. When $d < 0.5$, the process is stationary as well as mean reverting with the effects of the shocks dying away in the long run. On the other hand, the process is non-stationary even if the fractional parameter is significantly less than 1, when $0.5 \le d$.

The Lagrange Multiplier (LM) test suggested by Robinson(1994a) tests unit roots and other

forms of nonstationary hypotheses, embedded in fractional alternatives. The null hypothesis of the test is as follows:

$$H_0 : d = d_0 \tag{3}$$

The test statistic can be described by:

$$\hat{r} = \frac{T^{1/2}}{\hat{\sigma}^2} \hat{A}^{1/2} \hat{a} \tag{4}$$

Here, T is the sample size and

$$\hat{a} = \frac{-2\pi}{T} \sum_{j=1}^{T-1} \psi(\lambda_j) g(\lambda_j;\hat{\tau})^{-1} I(\lambda_j) \quad ; \quad \hat{\sigma}^2 = \sigma^2(\hat{\tau}) = \frac{2\pi}{T} \sum_{j=1}^{T-1} g(\lambda_j;\hat{\tau})^{-1} I(\lambda_j) \quad ;$$

$$\hat{A} = \frac{2}{T} \left(\sum_{j=1}^{T-1} \psi(\lambda_j)^2 - \sum_{j=1}^{T-1} \psi(\lambda_j) \hat{\varepsilon}(\lambda_j)' \times \left(\sum_{j=1}^{T-1} \hat{\varepsilon}(\lambda_j) \hat{\varepsilon}(\lambda_j)' \right)^{-1} \times \sum_{j=1}^{T-1} \hat{\varepsilon}(\lambda_j) \psi(\lambda_j) \right)$$

$$\psi(I_j) = \log \left| 2 \sin \frac{I_j}{2} \right| ; \quad \hat{\varepsilon}(\lambda_j) = \frac{\partial}{\partial \tau} \log g(\lambda_j;\hat{\tau}_j) ; \quad \lambda_j = \frac{2\pi j}{T} ; \quad \hat{\tau} = \arg\min_{\tau \in T^*} \sigma^2(\tau)$$

where $I(\lambda_j)$ is the periodogram of u_t and T^* is a compact subset or the Euclidean space. Robinson(1994a) showed that the test statistic under certain regularity conditions is as below:

$$\hat{r} \to_d N(0,1) \text{ as } T \to \infty. \tag{5}$$

Thus, a one sided $100a\,\%$ level test of Eq(3) against the alternative $H_1 : d > d_0$ is given by the rule "Reject H_0 if $\hat{r} > z_\alpha$" where the probability that a standard normal variate exceeds z_α is a and conversely, a one sided $100a\,\%$ level test of Eq(3) against the alternative $H_1 : d < d_0$ is given by the rule "Reject H_0 if $\hat{r} < -z_\alpha$".

Several works including Granger and Hyung(1999) and Diebold and Inoue(2001) argue that structural breaks or regime switchings can generate spurious long memory behaviour in an observed time series. In other words, the long memory property in the data may be due to the presence of structural breaks or regime switches. This is called "the spurious long memory process". In order to avoid spurious long memory problem, we also determine the possible structural breaks in the data by using Bai and Perron (1998, 2003) multiple structural break test.

2.2. BAİ AND PERRON TESTS FOR MULTİPLE STRUCTURAL BREAKS

Bai and Perron(1998, 2003) consider the following multiple structural break model with m breaks ($m+1$ regimes):

$$\begin{aligned}
&y_t = x_t'\beta + z_t'\delta_1 + u_t, \quad t = 1,\ldots,T_1 \\
&y_t = x_t'\beta + z_t'\delta_2 + u_t, \quad t = T_1 + 1,\ldots,T_2 \\
&\ldots\ldots\ldots\ldots\ldots\ldots \\
&y_t = x_t'\beta + z_t'\delta_{m+1} + u_t, \quad t = T_m + 1,\ldots,T.
\end{aligned} \tag{6}$$

where y_t is the observed dependent variable at time t, x_t is $(p \times 1)$ and z_t is $(q \times 1)$ and b and d_j $(j = 1,\ldots,m+1)$ are the corresponding coefficient vectors, and u_t is the disturbance term at time t. Here, T is the sample size and $T_1 < T_2 < \ldots < T_m < T$. The break points $(T_1,\ldots,T_m)$

are treated as unknown and are estimated together with the unknown coefficients when T observations are available. The estimation method is based on least squares principle. For each m - partition ($T_1,\ldots,T_m$), denoted $\{T_j\}$, the associated least squares estimate of δ_j is obtained by minimizing the sum of squared residuals

$$\sum_{i=1}^{m+1}\sum_{t=T_{i-1}+1}^{T_i}(y_t - z_t'\delta_i)^2.$$

Bai and Perron(1998, 2003) suggest several statistics for consistent estimation of the number and location of breakpoints ($T_1,\ldots,T_m$) and the parameters ($\delta_1',\ldots,\delta_{m+1}'$):

- $SupF_T(k)$ test, i.e., a $SupF$ - type test of the null hypothesis of no structural break versus the alternative of a fixed number of breaks k.

- Two maximum tests of the null hypothesis of no structural break versus the alternative of an unknown number of breaks given some upper bound, i.e., $UD_{\max}$ test, an equal weighted version, and $WD_{\max}$ test, with weights that depend on the number of regressors and the significance level of the test.

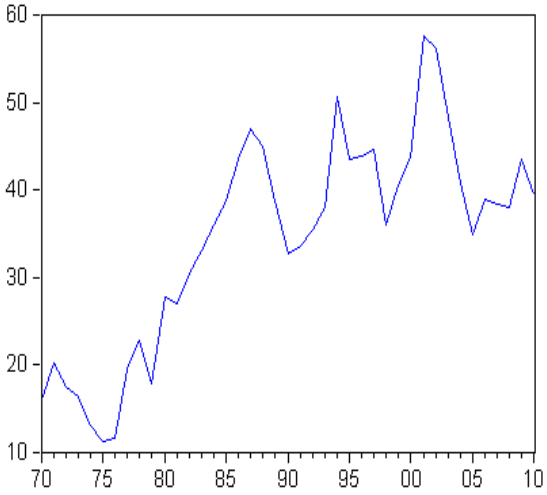
- The $SupF_T(l+1|l)$ test, i.e., a sequential test of the null hypothesis of l breaks versus the alternative of ($l+1$) breaks.

The asymptotic distributions of these three tests are derived in Bai and Perron(1998) and asymptotic critical values are tabulated in Bai and Perron(1998, 2003) for $\varepsilon = 0.05$ $(M=9)$, 0.10 $(M=8)$, 0.15 $(M=5)$, 0.20 $(M=3)$, and 0.25 $(M=2)$. The procedure of Bai and Perron follows these steps: First, calculate the $UD_{\max}$ and $WD_{\max}$ statistics. These tests are used to determine if at least one structural break is present. In addition, the $SupF_T(k)$ test is calculated for the hypothesis of 0 break versus k breaks. If these tests show evidence of at least one structural break, then the number of breaks can be determined by the $SupF_T(l+1|l)$ test. The number of breaks can also be chosen by the Bayesian information criterion, BIC (Yao, 1988); and the Schwarz modified criterion, LWZ (Liu, Wu and Zidek, 1997).

3. DATA AND EMPİRİCAL RESULTS

This paper investigates the sustainability of external debt in Turkey by using external debt to GDP ratio (%) over the period from 1970 through 2010. The annual data is obtained from the World Development Indicators database of World Bank and Economic and Social Indicators database of Ministry of Development of Turkish Republic. The plot of the external debt to GDP ratio can be seen in Figure 1.

Figure 1: The plot of the external debt to GDP ratio (%)



As can be seen from the figure, the ratio of external debt to GDP shows a nonstationary behavior and includes structural breaks. Since the plot is only suggestive of the behavior of the series, we focus on this in the context of different techniques. Before the analysis, it is considered that descriptive statistics and Augmented Dickey Fuller (ADF) and Philips and Perron (PP) unit root tests give some information about the series. Table 1 reports the descriptive statistics and the results of the mentioned unit root tests.

Table 1: Descriptive statistics and unit root test results for the ratio of external debt to GDP

Panel A: Descriptive statistics		
Mean		34.47
Median		38.00
Maximum		57.60
Minimum		11.30
Standard deviation		12.15
Skewness		-0.364
Kurtosis		2.322
Jarque Bera statistic		1.692
Probability		0.429
Panel B: Unit root test results		
ADF	Level: -1.99	
	First differences: -5.89***	
PP	Level: -2.125	
	First differences: -5.90***	

The Jarque Bera corresponds to the test statistic for the null hypothesis of normality.

*** indicates the rejection of the unit root null hypothesis at the 1% significance level.

Panel A of the table shows that the mean, median, maximum, minimum and standard deviation of the external debt to GDP ratio are 34.47, 38, 57.60, 11.30 and 12.15 respectively. The skewness (-0.364) and kurtosis (2.322) values are close to the skewness (0) and kurtosis (3) values for normal distribution. According to the Jarque Bera statistic (1.692), the distribution of the series is found normal. Additionally, Panel B of Table 1 provides the results of ADF and PP unit root tests. The results show that the ratio of external debt to GDP is nonstationary in level. Large negative values for the ADF and PP test statistics reject significantly the unit root null hypothesis, implying that the ratio of external debt to GDP is stationary after first differencing. Since the concept of traditional unit root tests are too restrictive, we consider to investigate the sustainability of the external debt for Turkey by using different versions of Robinson(1994a) test. As a first step in our analysis, we examine the Turkish external debt sustainability without taking into account possible structural breaks in the data. Under the null hypothesis $H_0(3)$, we examine the cases with an intercept and a linear time trend and model the $I(0)$ disturbances to be AR(1) process. In Robinson test, significantly positive values of $\hat{r}$ are consistent with the orders of integration higher than d_0, whereas significantly negative ones consistent with the orders of integration smaller than d_0. A notable feature is the fact that $\hat{r}$ monotonically decreases with d_0 since it is a one sided test statistic. The one sided test statistics $\hat{r}$ with $d_0 = 0, 0.05, 0.10, 0.15, 0.20, 0.25, \ldots, 1.10$, thus testing for a unit root ($d = 1$), but also including a test for stationarity ($d = 0.5$) and for other fractional alternatives are reported in Table 2.

Table 2: Robinson test results under AR(1) disturbances before determining structural breaks

d_0	An intercept	Linear trend
0	24.676	12.293
0.05	23.259	11.316
0.10	21.666	10.358
0.15	19.887	9.428
0.20	17.951	8.533
0.25	15.925	7.680
0.30	13.892	6.873
0.35	11.938	6.112
0.40	10.127	5.395
0.45	8.500	4.717
0.50	7.067	4.074
0.55	5.816	3.458
0.60	4.719	2.863
0.65	3.742	2.281
0.70	2.848	1.708
0.75	2.006	1.138**
0.80	1.192**	0.570**
0.85	0.394**	**0.004****
0.90	**-0.388****	-0.558**
0.95	-1.142**	-1.112**
1.00	-1.851	-1.653
1.05	-2.501	-2.175
1.10	-3.084	-2.674

In bold: The smallest value across the different values of d_0. ** indicates nonrejection values of the null hypothesis at the 95% significance level.

According to the results in the table, $H_0(3)$ cannot be rejected for $_0 = 0.80, 0.85, 0.90$ and 0.95 in the case of intercept. On the other hand, the non-rejection values take place at

$d_0 = 0.75, 0.80, 0.85, 0.90$ and 0.95. The lowest statistic across the different values of d_0 occurs when $d_0 = 0.90$ in the intercept case and when $d_0 = 0.85$ in the trend case. These findings indicate that the ratio of external debt to GDP is a non-stationary process with long memory when we ignore potential structural breaks in the data. Therefore, it can be concluded that Turkish external debt is not sustainable. It is known that Granger and Hyung(1999) and Diebold and Inoue(2001) claim the long memory property in the data may be due to the presence of structural breaks or regime switches. Since the structural breaks and long memory properties are related concepts, we consider that the ratio of external debt to GDP may be affected by structural breaks over the sample period and determine potential structural breaks by using Bai and Perron (1998, 2003) multiple structural break test. This procedure allows to test for multiple breaks at unknown dates, so that each break point is successively estimated by using a specific-to-general strategy in order to determine consistently the number of breaks. The maximum permitted number of breaks is set at $M = 5$ and a trimming $\varepsilon = 0.15$ is used to determine the minimal number of observations in each segment [$h = [\varepsilon T]$ with the sample size T]. The finding results by implementing a Gauss programme are tabulated in Table 3.

Table 3: The results of Bai and Perron tests

Specifications		
$z_t = 1 \quad q = 1 \quad p = 0 \quad h = 6 \quad M = 5 \quad \varepsilon = 0.15$		
Tests	**Hypothesis**	**Statistics**
SupF$_T$ (k) Test:	H_0 : 0 break *vs*	22.058***
	H_1 : 1 break	
	H_0 : 0 break *vs*	22.047***
	H_1 : 2 breaks	
	H_0 : 0 break *vs*	25.047***
	H_1 : 3 breaks	
	H_0 : 0 break *vs*	14.927***
	H_1 : 4 breaks	
	H_0 : 0 break *vs*	15.972***
	H_1 : 5 breaks	
UD$_{max}$ Test:	H_0 : 0 break *vs*	25.047***
	H_1 : an unknown break	
WD$_{max}$ Test:	H_0 : 0 break *vs*	40.504***
	H_1 : an unknown break	

$SupF_T(l+1 \mid l)$ Test:	$SupF_T(2 \mid 1)$	1.446
	$SupF_T(3 \mid 2)$	0.413
	$SupF_T(4 \mid 3)$	0.077
	$SupF_T(5 \mid 4)$	0.000
Number of Breaks:	BIC: 2	
Break Dates:	1979 and 1985	

*** denotes that the tests are significant at 1% level.

The reported results in the table indicate that all the $SupF_T(k)$ tests are significant, with k running between 1 and 5, so that at least one break would be present. On the other hand, both $UD_{\max}$ and $WD_{\max}$ statistics are highly significant which implies that at least one break is present in the data. Since the significance of these tests does not provide enough information about the exact number of breaks, we try to choose number of breaks by using $SupF_T(l+1|l)$ test or the BIC criterion. All the $SupF_T(l+1|l)$ statistics are found insignificant. After that we choose the number of break as 2 by using BIC criterion. The break dates are identified around 1979 and 1985. The first break refers to the structural change reform in Turkey. It is known that the date of January 1980 was a turning point for Turkish economy. In this time, import substitute industrialization strategy was replaced by an export-led growth strategy that relies more on the market-based economy. The policies based on adjustments upon tariffs rather than quantity restrictions were adopted, and also protection rates in imports regime were steadily lowered. Besides, export licenses were abolished, and export liberalization was put in effect as a major policy issue in the Turkish economy politics (Varol, 2003). So, the ratio of external deficit to GDP fell from 7 percent in 1980 to 1 percent in 1988. On the other hand, the second break refers to the years when Turkey's external debt stock increased. In 1982, it was 17.2 billion dolar, then it reached 25.6 billion dolar in 1985. We need to take into account these breaks in the analysis. Robinson(1994a) test permits us to include structural breaks in the model with no effect on its standard limit distributions. Following this way, we construct the dummy variables for the break dates (T_B) of 1979 (D_{1979}) and 1985 (D_{1985}) as below:

$$D_{1979} = \begin{cases} 1 & for \quad I(t > T_B), T_B = 1979 \\ 0 & otherwise \end{cases} \quad , \quad D_{1985} = \begin{cases} 1 & for \quad I(t > T_B), T_B = 1985 \\ 0 & otherwise \end{cases}$$

Then, we again apply the Robinson(1994a) tests in the cases with an intercept and a linear trend by including constructed dummy variables in the following model:

$$External\ Debt/GDP_t = \beta_0 + \beta_1 t + \beta_2 D_{1979} + \beta_3 D_{1985} + x_t \quad , \quad t = 1, 2, ... \tag{7}$$

By obtaining x_t regression errors, the equation is constructed as below:

$$(1-L)^d x_t = u_t \quad , \quad t = 1, 2, ... \tag{8}$$

Then, the one sided test statistics $\hat{r}$ are calculated and their results are reported in Table 4[2].

2 Since the BIC criterion in the Bai Perron multiple structural break test gives two significant breaks in 1979 and 1985, we also

Table 4: Robinson test results under AR(1) disturbances after including structural breaks

d_0	An intercept	Linear trend
0	5.501	5.447
0.05	5.075	5.035
0.10	4.668	4.641
0.15	4.278	4.260
0.20	3.904	3.893
0.25	3.542	3.537
0.30	3.191	3.190
0.35	2.849	2.851
0.40	2.514	2.518
0.45	2.184	2.190
0.50	1.856	1.864
0.55	1.530**	1.538**
0.60	1.203**	1.212**
0.65	0.874**	0.883**
0.70	0.541**	0.551**
0.75	0.204**	0.213**
0.80	**-0.140****	**-0.130****
0.85	-0.489**	-0.478**
0.90	-0.844**	-0.833**
0.95	-1.203**	-1.192**
1.00	-1.566**	-1.555**
1.05	-1.931	-1.920
1.10	-2.294	-2.283

In bold: The smallest value across the different values of d_0. ** indicates nonrejection values of the null hypothesis at the 95% significance level.

The results in the table show that the non-rejection values take place at $d_0 = 0.55, 0.60, 0.65, 0.70, 0.75, 0.80, 0.85, 0.90$ and 1 and the smallest statistic across the different values of d_0 occurs when $d_0 = 0.80$ in both cases with an intercept and a linear trend. These results mean that we still find evidence of nonstationary long memory behavior in the ratio of external debt to GDP after including the effects of structural breaks in the models. Therefore, there is no evidence of sustainability in the external debt of Turkey. This finding indicates the ineffectiveness of fiscal, monetary and exchange rate policies of Turkey. For a sustainable debt

apply Lee and Strazicich(2003a, b) minimum LM unit root test with two structural breaks and find significant breaks in 1983 and 2000. After detrending these breaks, we again repeat the Robinson test and find that the non-rejection values take place at $d_0 = 0.55, 0.60, 0.65, 0.70, 0.75$ and 0.80 and the smallest statistic across the different values of d_0 occurs when $d_0 = 0.70$ in both cases with an intercept and a linear trend. According to these results, it can be said that external debt in Turkey is not sustainable. These results are not reported here but they can be given on request.

strategy, preventing a debt crisis is a crucial policy concern. External debt crises prevention hinges on one condition, that the debt payment capacity of debtor countries is fully supported by its export capacity. Hence, trade plays a critical role in external debt sustainability of Turkey. On the other hand, Turkey should also build and improve institutional framework for debt management. Within this framework, it is important to assign specific roles and responsibilities to different government entities: the ministry of finance, the central bank and the debt management agency. This framework should be adapted to the administrative capacity of Turkey.

4. CONCLUSİONS

This paper investigates the sustainability of Turkish external debt in the context of fractionally integrated approach over the period from 1970 through 2010. In the first step of the analysis, the Robinson(1994a) test for fractional integration is applied without taking into account possible structural breaks in the data. The results show that ratio of external debt to GDP is a non-stationary process with long memory when the potential structural breaks are ignored. In this case, the sustainability of the Turkish external debt is not valid. Since Granger and Hyung(1999) and Diebold and Inoue(2001) argue that the long memory property in the data may be due to the presence of structural breaks or regime switches, we consider to determine possible structural breaks by using Bai and Perron (1998, 2003) multiple structural break test in the second step. According to the BIC criterion of the test, two break dates are identified around 1979 and 1985. By including the dummy variables for these breaks, we again repeat the Robinson(1994a) test. In the context of structural breaks, the findings still indicate that the ratio of external debt to GDP follows nonstationary long memory behavior. It can be concluded that the external debt of Turkey is not sustainable. This kind of finding shows that fiscal, monetary and exchange rate policies in Turkey is not effective. For a sustainable debt strategy, Turkey should prevent debt crises by improving her trade capacity. In addition, Turkey should also build and improve institutional framework for debt management by assigning specific roles and responsibilities to different government entities: the ministry of finance, the central bank and the debt management agency.

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ODRŽIVOST TURSKOG VANJSKOG DUGA: DOKAZI FRAKCIONARNO INTEGRIRANOG PRISTUPA PRI STRUKTURNIM PREKIDIMA

Sažetak

Rad istražuje održivost vanjskog duga Turske u periodu od 1970. do 2010. koristeći frakcionarno integrirani pristup. Prije svega, mogući strukturni prekidi u podacima se ne uzimaju u obzir. Razultati Robinsonovog (1994a) testa otkrivaju da je proces nestacionaran s dugom memorijom i stoga nema dokaza održivosti vanjskog duga Turske. Nakon toga, strukturni prekidi uočeni Bai i Perron (1998, 2003) višestrukim testom strukturnog prekida, uključeni su u Robinsonov test. Rezultati u kontekstu strukturnih prekida još uvijek pokazuju da je vanjski dug Turske neodrživ.

Ključne riječi*: Vanjski dug, održivost, frakcionarna integracija, višestruki strukturni prekidi.*

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TRANSFER PRICING MODEL BASED ON MULTIPLE-FACTOR TRANSFER PRICING MODEL USING THE TRANSACTIONAL NET MARGIN METHOD

Abstract

Decision-making process on the optimization of transfer pricing has two dimensions that need to be considered: optimization dimension in terms of available capacity, tax laws of countries, available market and other indicators of the individual company, and dimension of transfer pricing regulation at the international level in accordance with the OECD Guidelines. Current multiple-factor transfer pricing model examines only the first dimension of transfer pricing between related parties. Transfer price method, expressed in a form of transfer pricing model using the transactional net margin method, is built in a multiple-factor transfer pricing model in order to meet the conditions of transfer prices at arm's length principle. In this way a new transfer pricing model is formed; a model that optimizes the operations of multinational companies and is in line with the OECD Guidelines on transfer prices.

Keywords: *transfer pricing model, OECD Guidelines, business optimization*

1. INTRODUCTION

The role of international companies in world trade has increased dramatically in the last twenty years. This increase causes an increase in the complexity of issues of allocation of profit deriving from international transactions, as well as the issue of profit taxation, given the fact that the rules of individual countries for taxation of international companies can not be considered separately, but rather in a broader international context. OECD member countries have selected the individual approach to companies as the most appropriate way to achieve fair results and minimize the risk of double taxation. Applying that principle, each group member is the subject of profit taxation that arises in this company, under the principle of taxation based on residency and on source. To ensure the proper functioning of the single company approach, OECD member countries have adopted a principle of independence, according to which the influence of special conditions of the profit should be eliminated (Zgombić et al., 2005).

International regulations on transfer pricing issues are:

- OECD treaty model on avoidance of double taxation
- OECD Transfer Pricing Guidelines for Multinational Companies and Tax Administrations.

Companies need to document and analyze transfer pricing not only for reasons to defend the historical accounting transactions, but also to optimize current and future operations. The above includes the evaluation of current transfer pricing, as well as assessing the possibilities of current organizational and tax structures (PricewaterhouseCoopers, 2009).

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2. TRANSFER PRICING GOALS AND METHODS

Formation of transfer pricing is done in order to realize certain goals. Transfer pricing policy objectives are maximizing consolidated profit, minimizing tax liabilities, increasing the market share and reducing the impact of economic constraints.

The effect of transfer pricing within the group at the international level has the following features (Perčević, 2009):

- Companies within the group operate in different tax systems,
- Benefits and shortcomings of the tax systems of individual countries could be taken advantage of,
- Profit spill-over into companies that operate in a more favourable tax environment,
- Maximization of the consolidated profit,
- Minimization of the tax liability at the group level.

It is necessary to find the appropriate benchmark. Prices between related parties should be as close as possible to identified benchmark. Identification required for benchmarking is done using the database. Tax administrations and international companies are using AMADEUS database, exclusively owned by the company Bureau van Dijk, for benchmarking and comparable analysis. AMADEUS database contains financial and operating information on more than 18 million European public and private companies. The data include standardized annual financial statements of companies and consolidated financial statements, financial ratios, activities and ownership of companies in Europe. In addition, the database contains descriptive information, market research, news and indicators of the country. Database can be searched by hundreds of relevant criteria (Bureau van Dijk, 2011).

In the years 2005-2008 most of companies has achieved business growth, while the years 2009 and 2010 were recessionary. In preparing the analysis and comparison of setting the transfer prices, it is desirable to perform adjustment of financial data for the impact of the recession, or calculate the difference between the operating margins in the period of growth and operating margins achieved in the recessionary period (Scholz, 2009).

Performed analysis of comparability in the documentation of transfer pricing can show the existence of space to increase or decrease transfer prices in order to achieve maximum profit at group level. Transfer pricing can be optimized in order to maximize profit on the consolidation level, especially in times of global economic crisis. Well-prepared transfer pricing documentation with included benchmarking market analysis represents the basis for decision-making process in transfer pricing optimizing.

OECD Guidelines on transfer pricing represent an international standard for regulating transfer pricing at the international level. Republic of Croatia has implemented the OECD Guidelines in its tax legislation, which resulted in an explicit definition of five different methods that can be used in determining and assessing whether business transactions between related parties are agreed at market prices (Croatian corporate income tax law, 2005). These methods are discussed below in the form of transfer pricing models.

2.1. TRANSFER PRICING MODEL BASED ON THE COMPARABLE UNCONTROLLED PRICE METHOD

One of the most important principles of the OECD guidelines for transfer pricing is the fact that the related parties profit should reflect the functions, risks and economic business conditions. It is necessary to find a transfer pricing method that appropriately reflects these three conditions, and, once achieved, the transfer pricing system should be stable over a longer period. The economic recession represents exceptional conditions in terms of unstable economic business conditions, which may have implications on the international allocation of functions and risks in a multinational company (Scholz, 2009).

Price of goods or services between related parties is compared with the price of similar goods or services applied between two unrelated parties. Sometimes it is necessary to make adjustments in accordance with the functional analysis. Internal comparable prices can reduce the cost of preparing the study (Scholz, 2009).

Transfer price can be expressed as a function of determinants as follows:

$$Tc = f(X_{1,t}, X_{2,t}, X_{3,t}, R) \quad (1)$$

Where:

Tc = transfer price

X_1 = determinant of functional analysis

X_2 = determinant of asset analysis

X_3 = determinant of risk analysis

t = time period

R = recession influence

The influence of recession can be expressed as the difference between operating margins achieved in the period of growth and in the recessionary period (Deloitte Savjetodavne Usluge, 2011).

Proper determination of transactions, functions and risks is essential for the proper selection of method for determining transfer prices. In determining the transaction it is important to determine what happens in a particular transaction, create cash flow for transactions between related parties and analyze functions, risks and assets that related party has / bears in a certain transaction. The starting point for determining the comparability of transactions is the functional analysis. The purpose of functional analysis is to determine the role of each party in the transaction. Functional analysis is based on an assessment of (Deloitte, 2009):

- functions (activities) carried out by each company in the transaction,
- tangible and intangible assets used in carrying out activities, and
- business risks arising from transactions.

Functions that need to be compared and identified are business functions such as procurement, production, sales, marketing, research and development, finance and accounting and other business functions. The company that performs low-risk functions should expect a

lower level of profitability in comparison to the company that performs high-risk function, and vice versa.

Table 1: The role of functional analysis in the correct transfer pricing determination: Analysis of functions (X_1)

	Transaction number 1. (manufacturer – related party distributer)		Transaction number 3. (manufacturer – unrelated party customer)	
Function	Manufacturer	Distributer	Manufacturer	Customer
Raw materials	YES	NO	YES	NO
Production equipment	YES	NO	YES	NO
Production knowledge	YES	NO	YES	NO
Raw material warehouse	YES	NO	YES	NO
Transport	NO	YES	YES	NO
Finished products warehouse	NO	YES	YES	NO
Selling personel	NO	YES	YES	NO
Marketing and distribution	NO	YES	YES	NO
Advertising and promotion	NO	YES	YES	NO
Branding	NO	YES	YES	NO

Source: Deloitte: Transferne cijene – primjena u praksi, Presentation, Zagreb, 16.10.2009.

The analysis of function enables determination of the fact which function is performed by which company in the transaction.

Table 2: The role of functional analysis in the correct transfer pricing determination: Analysis of assets (X_2)

	Transaction number 1. (manufacturer – related party distributer)		Transaction number 3. (manufacturer – unrelated party customer)	
Assets	Manufacturer	Distributer	Manufacturer	Customer
Production process organization	YES	NO	YES	NO
Production	YES	NO	YES	NO
Quality control	YES	NO	YES	NO
Occupational health and safety	YES	NO	YES	NO
Warehouse	YES	NO	YES	NO
Transport	NO	YES	YES	NO
Marketing and advertising	NO	YES	YES	NO
Services	NO	YES	YES	NO

Source: Deloitte: Transferne cijene – primjena u praksi, Presentation, Zagreb, 16.10.2009.

The analysis of assets enables determination of the fact what assets are used by which company in the transaction.

Table 3: The role of functional analysis in the correct transfer pricing determination: Analysis of risks (X_3)

	Transaction number 1. (manufacturer – related party distributer)		Transaction number 3. (manufacturer – unrelated party customer)	
Risk	Manufacturer	Distributer	Manufacturer	Customer
Quality risk	YES	NO	YES	NO
Risk of deviation from business plans	YES	NO	YES	NO
Risk of stock	YES	NO	YES	NO
Transport risk	NO	YES	YES	NO
Market risk	NO	YES	YES	NO
Receivables collection risk	NO	YES	YES	NO

Source: Deloitte: Transferne cijene – primjena u praksi, Presentation, Zagreb, 16.10.2009.

The analysis of risk enables determination of the fact what risk is beared by which company in the transaction. The more functions that determine the profit in production and distribution chain the company performs, the more assets the company uses and the more risks it bears, the higher level of profitability can the company expect. Functional analysis is a prerequisite and basis for selection of appropriate transfer pricing method.

2.2. TRANSFER PRICING MODEL BASED ON THE RESALE PRICE METHOD

Resale price method tests the market character of the transaction by comparing the resale margin to the margin realized in comparable uncontrolled transactions - analysis of margins comparability is performed. This method is applicable in cases where goods are bought from related party and resold to unrelated party (eg, distributors). It is usually applied in situations where the seller does not add significant value to goods by changing them partially or use valuable intangible assets in order to improve those goods. Requirements for comparability according to the resale price method are less stringent and more dependent upon functions and risks undertaken, rather than upon the similarity of goods traded (Zgombić et al., 2005).

The technique of calculating comparable prices using the resale price method is appropriate for situations in which goods are procured from related parties, and sold to third parties (Guzić, 2009).

$$Tc = Pc_t - M_{t,m} - R \quad (2)$$

Where:

Pc = selling price of goods to unrelated parties procured from related parties

M = gross trading margin under current market conditions

t = time period

m = market conditions

R = recession influence

Pc determinants are:

- net sales
- quantity sold
- production costs
- customs, excise
- costs of goods sold

Relevant is the period closer to procurement of goods or services (the longer is the period, the less convincing are the results of this method due to numerous factors that can influence the transaction, such as financing, exchange rate fluctuations and changes in market expectations).

2.3. TRANSFER PRICING MODEL BASED ON THE COST PLUS METHOD

Cost plus method is based on the costs incurred by supplying goods or services, which are increased for a certain margin in order to obtain profit (Žic, 2010). It tests the market principle in terms of "margin" added to the costs incurred in the comparable uncontrolled transactions. Comparability depends primarily upon the similarity of functions performed and risks taken, and not upon the similarity of respected material goods or services (Zgombić et al., 2005).

$$Tc = P - T - EBIT - R \quad (3)$$

Where:

Tc = transfer price of product on the certain market

P = wholesale price

P determinants:

- net sales
- quantity sold
- production costs
- customs, excise
- costs of goods sold.

T = expenses

T determinants:

- sales, marketing and transportation expenses
- management and administration expenses

EBIT = earnings before interest and tax

R = recession influence

2.4. TRANSFER PRICING MODEL BASED ON THE PROFIT SPLIT METHOD

Profit split method compares the distribution of profit in the related parties transactions with the profit split that would be achieved by unrelated parties – participants in one or more transactions. The contribution of each related party to the transaction based on functional

analysis is assessed. It is used in situations where it is difficult to identify each transaction (Zgombić et al., 2005). Profit split method is applicable in transactions so closely interacted that they can not be separated and analyzed individually and compared with each other. The process of determining transfer pricing takes place in three steps:

- identification of profit made in controlled transactions of related parties,
- profit split of related parties according to the functions performed, risks taken and assets invested,
- in certain circumstances, when companies can not split the total profit based on the operations performed because it can not be determined which function's credit the profit would be, the remaining profit is to be divided arbitrarily. Such circumstances occur primarily in highly innovative products and other intangible assets (OECD Guidelines 1997. point 3.5.) (Kuhar, 2005).

The contribution of each related party to the joint profit must be based on functional analysis completed and available external data on profit split between unrelated parites with comparable features (functions). For part of the profit not directly attributable to a certain company a residual analysis must be carried out, taking into account residual circumstances that could be basis for splitting the profit in unrelated parties. In the U.S. transfer pricing regulations it is to be distinguished:

- split of comparable income, and
- split of residual income.

$$Tc = f\,(Y_{1,t}, Y_{2,t}, R) \tag{4}$$

Where:

Y_1 = comparable profit

Y_2 = residual profit

t = time period

R = recession influence

2.5. TRANSFER PRICING MODEL BASED ON THE NET INCOME IN RELATION TO A CERTAIN BASIS METHOD (TRANSACTIONAL NET MARGIN METHOD)

By applying this method, the net income in relation to a certain basis (total cost, net sales, assets or equity) that company earned in a business relation to one or more related parties, is compared with a net net income in relation to a certain basis that would be earned in a non-controlled transaction. This method is similar to the cost plus method or resale price method. It is used in situations where it is difficult to identify each transaction (Zgombić et al., 2005). A prerequisite for using this method is the starting point that the company earned in a comparable uncontrolled transaction the same net income as in the controlled transaction. The method consists in the computation formula of net income in relation to a certain basis, such as the total cost, net sales, assets or equity, which is realized in transactions with related parties.

It is believed that it is better to include operative income in the comparison, which reduces the impact of different functions. In applying the net income method it should be taken into consideration the influence of other elements on the net income, such as individual strategies, competitive position, performance management, the difference in the cost of capital (interest, foreign exchange gains), stage of project development (beginning, maturity or descent) and etc (Guzić, 2009).

$$Tc = f\left(\frac{D}{Z}, R\right) \quad (5)$$

Where:

D = Operating profit = EBIT

D Determinants:

- net sales
- costs of goods sold
- administration costs
- distribution costs
- other operational charges.

Z = basis chosen for comparison

Z determinants:

- total cost
- net sales
- assets
- capital

R = recession influence

These five transfer pricing models can be used in determining and assessing whether transactions between related parties are agreed at market prices, but they can not enable decision making process in multinational operations in terms of optimizing operation on the consolidation level. A model that was developed precisely in order to achieve optimal results of the Group is described below.

3. MULTIPLE-FACTOR TRANSFER PRICING MODEL

Authors of the multiple-factor transfer pricing model (Shi et al., 1998) created linear multiple-factor model that would make easier decision-making process to the multinational companies' management in terms of optimizing the operations of the Group in whole. Model is based on the technique called multiple-transfer linear programming (MC^2). This model, using the MC^2 technique, maximizes the overall company's profit on the consolidation level, maximizes the market share goal and the utilized production capacity of the company, respecting at the same time given limits of the utilized capacity, budget defined and initial stock. Basic assumptions of

the model are:

$$\max \sum_{i=1}^{k} \sum_{j=1}^{t} p_{ij} x_{ij} \quad (6)$$

$$\max \sum_{i=1}^{k} \sum_{j=1}^{t} m_{ij} x_{ij} \quad (7)$$

$$\max \sum_{i=1}^{k} \sum_{j=1}^{t} s_{ij} x_{ij} \quad (8)$$

$$\max \sum_{i=1}^{k} \sum_{j=1}^{t} c_{ij} x_{ij} \quad (9)$$

$$\sum_{i=1}^{k} \sum_{j=1}^{t} b_{ij} x_{ij} \leq (b_{ij}^{1}, \ldots\ldots b_{ij}^{h}) \quad (10)$$

$$\sum_{j=1}^{t} x_{ij} \leq (d_{i}^{1}, \ldots\ldots d_{i}^{h}) \quad (11)$$

$$x_{ij} \leq (d_{ij}^{1}, \ldots\ldots d_{ij}^{h}) \quad (12)$$

$$- x_{ij} + x_{i+1,j} \leq (e_{ij}^{1}, \ldots\ldots e_{ij}^{h}) \quad (13)$$

$$x_{ij} \geq 0,\ i=1,\ldots,k,\ j=1,\ldots,t \quad (14)$$

Where:

x_{ij} = units of the product made in a certain company's division,

j = product,

i = division / related party in a defined country,

p_{ij} = unit overall profit generated from the jth product made by the ith division,

m_{ij} = market share value for the jth product made by the ith division / related party,

s_{ij} = related party profit generated from the jth product made by the ith division / related party,

c_{ij} = unit utilized production capacity of the ith division / related party to produce the jth product,

b_{ij} = budget allocation rate for producing the jth product by the ith division / related party,

b_{ij}^{s} = budget availability level believed by the sth manager for producing the jth producht by the ith division / related party; s= 1,....,h,

d_{ij}^{s} = production capacity level believed by the sth manager for the ith division / related party to produce the jth product; s= 1,....,h,

e_{ij}^{s} = initial inventory level believed by the sth manager for the ith division / related party to hold the jth product; s= 1,....,h.

Multiple-factor transfer pricing model does not determine whether transactions are contracted at market prices. This model does not have built-in any of the principles deriving from the five allowed transfer pricing methods that are used for determining whether transactions between related parties are performed according to the market principles.

4. TRANSFER PRICING MODEL BASED ON THE MULTIPLE-FACTOR TRANSFER PRICING MODEL USING THE TRANSACTIONAL NET MARGIN METHOD THROUGH THE AMADEUS DATA BASE

Model based on multiple-factors transfer pricing model is proposed below. The model facilitates decision-making process to managers of multinational corporations by respecting the assumption of the consolidated profit maximization, tax-optimization of business relationships among related parties, with establishment of conducting transactions between related parties at market prices. The model combines the setting of multiple-factor transfer pricing model and transactional net margin method. Two variables used in the model are operating margin and add-on costs. Further to the above model, the following basic settings are taken-over, and new settings are added, as follows:

$$\max \sum_{i=1}^{k} \sum_{j=1}^{t} p_{ij} x_{ij} \tag{15}$$

$$\max \sum_{i=1}^{k} \sum_{j=1}^{t} m_{ij} x_{ij} \tag{16}$$

$$\max \sum_{i=1}^{k} \sum_{j=1}^{t} s_{ij} x_{ij} \tag{17}$$

$$\max \sum_{i=1}^{k} \sum_{j=1}^{t} c_{ij} x_{ij} \tag{18}$$

$$x_{ij} \geq 0,\ i=1,\ldots,k,\ j=1,\ldots,t \tag{19}$$

$$Tc = f\,(X_{1(t,r)}\ X_{2(t,r)}\ X_{3(t,r)})\ i \qquad (20)$$

$$Tc = f\left(\frac{D}{Z}, R\right);\ Z = M, DT \qquad (21)$$

$$M = \frac{D}{P};\quad DT = \frac{D}{T} \qquad (22)$$

Where:

Tc = transfer price defined as a function of operating profit and selected variable Z

Z = selected variable = operating margin and add-on costs

D = operating profit of the related party = EBIT

M = operating margin

P = net sales

DT = add-on costs

T = operating costs

$$\text{Operating margin} = \frac{\text{Operating profit}}{\text{Net sales}} \times 100\% = \frac{D}{P} \times 100\% \qquad (23)$$

$$\text{Add-on costs} = \frac{\text{Operating profit}}{\text{Operating costs}} \times 100\% = \frac{D}{T} \times 100\% \qquad (24)$$

By using publicly available database AMADEUS it is possible to calculate average operating margin and add-on costs indicators for companies. These indicators are expressed as percentages and are based on financial information for the past three to five years (the average is calculated). Larger number of years is desirable because of elimination of the recession impact and other extremely positive and negative economic trends. AMADEUS database enables selecting the sample of comparable unrelated parties. Comparable companies are selected based on industry, analysis of functions and territoriality. The OECD Guidelines state that unrelated parties engaged in comparable transactions under comparable circumstances will not necessarily determine the same price for the transaction compared, leading to generally accepted principle that there is a range of market prices to be determined (Deloitte Savjetodavne Usluge, 2011).

5. PRACTICAL APPLICATION OF TRANSFER PRICING MODEL

The proposed model will be clarified on the specific example below. Using the AMADEUS database and based upon the functional analysis performed, five comparable companies with

data available for the last five years, including years of growth and recession years, are selected. It is necessary to calculate the difference between operating margins in the period of growth and operating margins in the recession period, to correct operating margin in the recession period and calculate average operating margin. It is also necessary to calculate the difference between add-on cost in the period of growth and add-on cost in the recession period, to correct add-on cost in the recession period and calculate average add-on cost.

Financial indicators of these companies, whose transactions are non-controlled, are calculated as follows:

Table 4: Average operating margin for five comparable companies for the five-year period corrected for the recession influence

	Average operating margin
Minimum	0,49%
First quartile	2,35%
Median	5%
Third quartile	8,44%
Maximum	15,9%

Source: AMADEUS data base; publisher Bureau van Dijk

Usuall operating margin of comparable companies ranges between results of the first and third quartile, after rejection of marginal values (minimal and maximal results), meaning between 2,35% and 8,44%.

Table 5: Average add-on costs for five comparable companies for the five-year period corrected for the recession influence

	Average add-on costs
Minimum	0,23%
First quartile	1,77%
Median	4,68%
Third quartile	5,93%
Maximum	11%

Source: AMADEUS data base; publisher Bureau van Dijk

Usuall add-on costs of comparable companies ranges between results of the first and third quartile, again after rejection of marginal values, between 1,77% and 5,23%.

Results obtained can be interpreted as model limitations.

Table 6: Model limitations

	1. quartile	**3. quartile**
Average operating margin of comparable companies	2,35%	8,44%
Average add-on cost of comparable companies	1,77%	5,93%

Source: Author calculation

Calculated values obtained using the AMADEUS database represent basic model limitations. Basic model assumptions are shown below.

Table 7: Basic model assumptions

	Related party 1		Related party 2	
	Product x_1	Product x_2	Product x_1	Product x_2
Unit profit	8	6	70	50
Transfer price	358	223	-	-
Market price			390	240
Unit costs	350	217	320	190
Optimal yearly capacity	600.000	450.000	700.000	500.000
Tax rate	20%		8%	

Source: Author calculation

The objectives of the model are as follows:

1. maximize the overall company's profit,
2. maximize the market share goal of products on their markets,
3. optimize the yearly utilized production capacity of the company.

In order to clearly demonstrate the maximization of the overall company's profit, model assumes that the companies produce only the respected products x_1 and x_2.

It is evident that Related party 1 transfers profit to the Related party 2 and with that action maximizes the profit on the consolidation level, considering the fact that market price of the Related party 2 is greater than transfer price of the Related party 1, and tax rate is significantly lower than in Related party 2.

Using the model, it is necessary to examine whether the applied transfer prices of products in the transaction from Related party 1 to Related party 2 are in the allowed range, considering the performance measured through defined indicators and comparison to indicators in comparable companies in unrelated transactions. Basic model assumptions are as follows

$$\max 8x_{11}+6x_{12}+70x_{21}+50x_{22} \quad (25)$$

$$\max 358x_{11}+223x_{12}+390x_{21}+240x_{22} \quad (26)$$

$$2{,}35\% \leq \frac{8x_{11}+6x_{12}}{358x_{11}+223x_{12}} \leq 8{,}44\% \quad (27)$$

$$2{,}35\% \leq \frac{70x_{21}+50x_{22}}{390x_{21}+240x_{22}} \leq 8{,}44\% \quad (28)$$

$$1{,}77\% \leq \frac{8x_{11}+6x_{12}}{} \leq 5{,}93\% \quad (29)$$

$$350x_{11}+217x_{12}$$

$$1{,}77\% \leq \frac{70x_{21}+50x_{22}}{320x_{21}+190x_{22}} \leq 5{,}93\% \quad (30)$$

$$x_{i,j} \geq 0,\ i = 1,2;\ j = 1,2$$

Results obtained by using the model and the information from the AMADEUS database are as follows:

	Related party 1
Net sales	315.150.000,00
Operating costs	307.650.000,00
EBIT	7.500.000,00
Operating margin	2,38%
Add-on costs	2,44%

Operating margin of the Related party 1 amounts to 2,38% and is in the allowed range obtained through AMADEUS database. Operating add-on costs amounts to 2,44% and is in the allowed range, as well. Considering these results, it can be concluded that the arranged transfer prices can be applied in transactions toward related party and in that way optimize business operations of the Group on the consolidation level (overall company's profit). Moreover, usage of the proposed model and linear programming enables calculation of the range of movements in market prices (minimum and maximum values) with the given constraints, and thus further, by adapting transfer prices, optimize operations.

CONCLUSION

In order to optimize operations on a consolidated basis, companies analyze the complex issues of transfer pricing from two aspects: optimization of operating parameters and the compliance of transfer prices with OECD guidelines.

Transfer pricing establishment is in direct correlation with maximization of consolidated profit. Model that uses linear programming technique achieves maximization of consolidated profit, market share and utilization of available production capacity, with some budgetary constraints, is a multiple-factor transfer pricing model. The model, however, does not examine whether transactions among related parties are agreed at market prices, according to the OECD transfer pricing guidelines.

Republic of Croatia implemented in its legislation the OECD guidelines on transfer pricing in a way that it gave the definition of five different methods that can be used in determining whether the transactions between related parties are agreed at market prices. These methods are: comparable uncontrolled price, resale price, cost plus, profit split and net income in relation to a selected basis (transactional net margin method). These methods are expressed in mathematical relations. Prerequisite and basis for the use of the adequate transfer pricing

method is functional analysis of the relevant transaction.

Transfer pricing model using the net income in relation to the chosen basis (transactional net margin method) can be incorporated into a model of multiple factors, in order to create new model that can not only optimize operations, but also examine and ensure that transfer prices are defined at market prices and in line with OECD transfer pricing guideliness. Identification of transfer pricing alignment with market prices is performed using AMADEUS database that contains financial and operating information on more than 18 million European companies.

Using a new transfer pricing model based on multiple-factor transfer pricing model using the transactional net margin method and linear programming technique, backed up with AMADEUS database, it is possible to calculate a range of market prices and choose the best variant in the direction of achieving the final goal of maximizing the total profit of the company.

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MODEL TRANSFERNIH CIJENA TEMELJEN NA MODELU VIŠESTRUKIH ČIMBENIKA UZ PRIMJENU METODE NETO DOBITI U ODNOSU NA NEKU OSNOVU

Sažetak

Donošenje odluke o optimizaciji transfernih cijena ima dvije dimenzije koje je potrebno sagledati: dimenziju optimizacije u smislu raspoloživih kapaciteta, poreznih propisa zemalja, raspoloživog tržišta i ostalih individualnih pokazatelja pojedinog društva, te dimenziju reguliranja transfernih cijena na međunarodnoj razini sukladno Smjernicama OECD-a. Postojeći model višestrukih čimbenika transfernih cijena ispituje prvu dimenziju optimizacije transfernih cijena između povezanih osoba, bez uvažavanja druge dimenzije. Metoda transfernih cijena izražena u obliku modela formiranja transferne cijene korištenjem metode neto dobitka u odnosu na određenu osnovu, ugrađena je u model višestrukih čimbenika transfernih cijena u cilju zadovoljavanja uvjeta formiranja transfernih cijena po principu produžene ruke. Na taj je način dobiven novi model transfernih cijena koji optimizira poslovanje multinacionalne kompanije i sukladan je Smjernicama OECD-a o tranfernim cijenama.

Ključne riječi*: model transfernih cijena, OECD Smjernice, optimizacija poslovanja*

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RELATIONSHIPS BETWEEN NETWORKING, ENTREPRENEURIAL SELF-EFFICACY AND FIRM GROWTH: THE CASE OF SLOVENIAN COMPANIES

Abstract

Social networks represent the immediate environment in which entrepreneurs are embedded and they therefore have a great influence on entrepreneurs' behavior. Entrepreneurs' social networks can provide entrepreneurs and their firms with information, support and access to resources. The support of the environment is important for reinforcing self-efficacy which is recognized as a predictor of firm performance. In this study, we developed and empirically tested hypotheses about the relationships between networking, entrepreneurial self-efficacy and small firm growth. The findings show that entrepreneurs can enhance entrepreneurial self-efficacy through network support, and consequently contribute to relative firm growth. The study provides significant contributions to entrepreneurship network theory and holds important implications for theory and practice.

Keywords: *Entrepreneurship, networking, entrepreneurial self-efficacy, small firm, growth*
JEL Classification: L26

1. INTRODUCTION

Entrepreneurship by itself can be seen as a networking activity since entrepreneurs have to use their personal contacts to assemble diverse resources in order to successfully run their businesses (Dubini and Aldrich, 1991). As the immediate environment in which entrepreneurs are embedded, social networks represent an influencing factor in the entrepreneurial process. Social networks can be defined as patterns of ties between individuals, groups or organizations (Dubini and Aldrich, 1991), and have the ability to facilitate or inhibit activities of people or groups (Aldrich and Zimmer, 1986). Entrepreneurs' personal networks as a type of social networks can provide entrepreneurs and their firms with information, support and access to resources (Ostgaard and Birley, 1994; Liao and Welsch, 2003; Reynolds, 1991). Through networks entrepreneurs can access resources that could otherwise be unavailable or expensive to obtain. Therefore, entrepreneurs often establish relationships in order to compensate for a lack of knowledge and capabilities (Coviello and Munro, 1995). In fact, Aldrich and Herker (1997) argued that it is through networks that the environment enters the firm. Furthermore, networks help entrepreneurs recognize new opportunities (Birley, 1985), obtain initial credibility and acquire new knowledge (Chetty and Holm, 2000). Birley (1985) found that in the initial phase of a new firm's development the informal network that includes family members

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and friends is the most important source of resources, information and support. Past research also showed that social networks are helpful in recognizing and pursuing opportunities in foreign markets (Hansen and Witkowski, 1995), which can stimulate the internationalization of companies.

Besides the social perspective on entrepreneurship and the impact of social networks in entrepreneurship, the psychological perspective on entrepreneurship also attracted the massive interest of entrepreneurship researchers in the last few decades. There is an extensive body of research that addresses the psychological characteristics of entrepreneurs and its role in the entrepreneurial process (Brockhaus, 1982; Gartner, 1988; Stewart et al., 1998; Baron, 1998; Shaver and Scott, 1991; Singh and De Noble, 2003). Recently there has been greater interest in research into self-efficacy in entrepreneurship. Self-efficacy is one of several personality traits that were related to entrepreneurship (e.g. need for achievement, locus-of-control, risk-taking propensity, need for independence) and it can be defined as a person's conscious belief in his or her capabilities of successfully performing a task (Bandura, 1997). It affects how people feel, think and behave, therefore it was found to be related to a person's performance. In fact, persons with higher sense of self-efficacy have a stronger commitment to accomplish goals, which can result in better performance (Bandura, 1997). Past research showed that support in terms of acquiring resources, information and skills can favor the development of self-efficacy and its reinforcement (Bandura, 1997; Chen et al., 1998). Social networks that represent an important source of social support can therefore facilitate the development of self-efficacy (Bandura, 1986).

Self-efficacy was also often related to the individual's choice of becoming an entrepreneur (Sequeira, 2004; Lee et al., 2004; Chen et al., 1998; Zhao et al., 2005, Sequeira et al., 2007 etc.). For example, people who believe they do not have appropriate skills to start a business will not become entrepreneurs, even though they do not necessarily lack the skills required. Based on these findings, Chen et al. (1998) proposed a new form of self-efficacy, namely entrepreneurial self-efficacy. Entrepreneurial self-efficacy can be defined as the individual's belief in his or her capabilities of successfully performing specific tasks in the entrepreneurial process. The result of their study confirmed that entrepreneurial self-efficacy is an individual characteristic that is distinctively entrepreneurial. In fact, as shown in their study entrepreneurship students scored higher in entrepreneurial self-efficacy than students from management and organizational psychology. Another interesting finding is that business owners had higher levels of entrepreneurial self-efficacy in innovation and risk-taking than non-founders (Chen et al., 1998).

Chen et al. (1998) found that a supportive environment and the supply of resources can contribute to the reinforcement of entrepreneurial self-efficacy. Therefore, just like self-efficacy also entrepreneurial self-efficacy can be trained by ensuring an encouraging environment. It is therefore important to enhance it for people who lack entrepreneurial self-efficacy for a specific task in entrepreneurship (Chen et al., 1998). Thus, we can assume that by providing diverse resources and opportunities, social networks can contribute to the reinforcement of entrepreneurial self-efficacy. Since past research on self-efficacy supported a

strong correlation between self-efficacy and the individual's performance (Bandura, 1997), it is necessary to explore whether there is also a correlation between entrepreneurial self-efficacy and firm performance.

In fact, it is still quite unclear how social networks affect entrepreneurial self-efficacy and whether entrepreneurial self-efficacy affects firm performance. The purpose of this paper is to explore the relationships between entrepreneurs' personal networks, entrepreneurial self-efficacy and firm growth. The aim of this study is to empirically test whether network support affects the level of entrepreneurial self-efficacy, and further if higher levels of entrepreneurial self-efficacy result in higher firm growth.

2. THEORY AND RESEARCH HYPOTHESES

Past research showed that social networks are related to self-efficacy beliefs (Bandura, 1986). Entrepreneurs' personal networks as a type of social networks represent the entrepreneurs' immediate environment. As such, they hold an important role in the entrepreneurial process as a source of support for entrepreneurs and their firms. While networks in general can be seen as a tool for making the transition from a small and resource-weak firm to a resource-strong firm, in this research a particular emphasis is given to entrepreneurs' personal networks, which consist of entrepreneurs' personal and business contacts. Through personal and business contacts firms can gain many advantages like credibility, advice, financing, information, customer access and innovations (Zhao and Aram, 1995), which can accordingly to the findings of past research (Bandura, 1997) reinforce self-efficacy beliefs. Besides the beneficial influence of social networks on the development and reinforcement of self-efficacy, Chen et al. (1998) found that a supportive environment and the supply of resources are also very important for reinforcing entrepreneurial self-efficacy. Therefore, it is possible to expect also a positive relationship between social networks and entrepreneurial self-efficacy.

Findings of past research showed that entrepreneurs who perceived that their strong ties could provide the resources, information and skills needed to start a business felt more confident in starting a business (Sequeira, 2004). According to Bandura (1986, 1998), one can enhance self-efficacy through experiences provided by social models which can also be found in the entrepreneur's personal networks. Acquiring competencies and knowledge from others can contribute to the perceived level of self-efficacy. In general, people are attracted to persons who possess skills and capabilities to which they aspire. Observing people similar to ourselves who succeed by putting effort into accomplishing tasks reinforces an individual's beliefs that he or she can also similarly succeed. Peers are thus very important in the process of developing the knowledge and awareness of one's capabilities. For example, entrepreneurs can acquire skills, competencies and learn strategies through developing personal contacts. Moreover, networking with established entrepreneurs can expose potential entrepreneurs to entrepreneurial experiences that they might not have yet. Role models can thus change one's self-efficacy, and influence an entrepreneur's behavior (Bandura, 1986).

The support in terms of resources, advice and information that entrepreneurs acquire

through their personal networks can enhance their level of self-efficacy. On the basis of the above research and our expectations regarding entrepreneurial self-efficacy, the following hypothesis is postulated:

H1: Networking will be positively related to the level of entrepreneurial self-efficacy.

Self-efficacy affects all aspects of people's lives, and it determinates how people will be motivated to face with difficulties that arise from every-day life. Self-efficacy can determine what people will do with their knowledge and skills (Bandura, 1997), and further it determines the effort that a person will put in accomplishing of a task. Consequently, people's accomplishments might be predicted by their levels of self-efficacy. In fact, self-efficacy was considered a predictor of firm performance in past research (Chandler and Jansen, 1997; Drnovsek and Glas, 2002; Baume and Locke, 2004; Segal et al., 2005; Hmielesky and Baron, 2008; Chen et al., 1998). People with higher levels of self-efficacy are more assured in their capabilities and believe that the accomplishment of a particular task depends on their efforts and skills. They have a stronger commitment to their goals, and see difficult tasks as challenges. On the contrary, people with low levels of self-efficacy easily lose trust in their abilities to accomplish a task, have low aspirations and weak commitment to their goals. Self-efficacy was also found to be associated with higher levels of concentration and with a more efficient use of cognitive resources in performing different tasks (Bandura, 1997). Consequently, there is a strong correlation between self-efficacy and the individual's performance (Bandura, 1997).

Based on the above findings, we can expect that self-efficacy influences also the behavior and decisions of entrepreneurs in the entrepreneurial process and the performance of their firms as well. The latter motivated entrepreneurship researchers to apply self-efficacy research in entrepreneurship and define it as entrepreneurial self-efficacy (Chen et al., 1998; DeNoble et al., 1999; Ehrlich et al., 2000; Alvarez et al., 2006). The main purpose of the research was to explore whether there exists a relationship between entrepreneurial self-efficacy and firm performance (Chen et al., 1998). The research results indicated that entrepreneurial self-efficacy is an individual characteristic that is distinctively entrepreneurial and affects intentions to start a business (Chen et al., 1998).

The assumption on which self-efficacy is based is that higher levels of self-efficacy lead to setting higher goals, and consequently lead to a better performance. Based on these findings and our expectations regarding entrepreneurial self-efficacy, the following hypothesis is proposed:

H2: Entrepreneurial self-efficacy will be positively related to firm growth.

3. METHODS

The methods will be discussed in terms of sample characteristics, data collection and methods of analysis.

3.1 SAMPLE CHARACTERISTICS AND DATA COLLECTION

The model was tested on 161 usable responses from face-to-face, interaction-based, structured-questionnaire survey data from a sample of small firm entrepreneurs from Slovenia (68.5% male and 31.5% female). The average entrepreneur in the sample was more than 30 to 40 years old; married; had a university degree, and had more than 10 to 20 years of work and entrepreneurial experience. The average firm in the sample was small (less than 50 employees – full-time equivalent, the majority of firms, 50.3%, had 0 to 10 employees), was 11-20 years old, had EUR 400,000 or less in sales, and operated in the service industry.

The distribution of the sample firms was found to somewhat differ from the population in terms of the small firm size distribution (a lower percentage of responses in the sample than in the population was received from micro firms with 0 to 9 employees – 50.6% vs. 79.5% – and a higher percentage from small firms with 10 to 49 employees – 41.3% vs. 13.8%). However, when taken together, small firms (less than 50 employees) are well represented (91.9% in the sample, 93.4% in the population). Some minor differences were also found in the industry distribution (population industries were well represented, with a slightly higher percentage of responses, in comparison to the population, from service (sample 49.4%, population 47.3%) and manufacturing firms (25.6%, 16.0%), and at the same time a lower percentage from trade (16.9%, 26.5%) and construction firms (8.1%, 10.9%). Overall, we are convinced that the sample can be considered adequately representative of the population of Slovenian small firms.

Data were collected about entrepreneurs' networking and entrepreneurial self-efficacy. The data collection was conducted using a structured questionnaire. The key informant was the entrepreneur. In addition to questions pertaining to social networks and entrepreneurial self-efficacy, each entrepreneur was asked to provide some information about himself or herself (mostly demographic data), and about the firm (age, size, industry, growth) which he or she owns.

3.2 MEASURES

Entrepreneurial self-efficacy was measured with the scale of Chen et al. (1998) which has 22 items. Respondents had to rate their certainty that they can perform specific tasks in the entrepreneurial process. A Likert-type scale with anchors from 1-very untrue to 5-very true was used. In this study, the entire entrepreneurial self-efficacy scale had a Cronbach alpha reliability coefficient of 0.88. We conducted an exploratory factor analysis on the 22 items. The number of factors to be extracted was determined on the basis of the scree plot and the latent root (eigenvalue) criterion (above 1). Five factors were identified (60.6% cumulative variance explained). The Bartlett test of sphericity, which statistically tests for the presence of correlations among the underlying variables, showed that the correlation matrix has significant correlations (significant at 0.000). The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.83 (just below the 0.9 threshold). The identified factors slightly differ from the factors identified by Chen et al. (1998). One item was deleted (Conduct market analysis) since it loaded

on several factors. Two items (Reduce risk and uncertainty; Strategic planning and develop information system) were added to the Risk management factor instead of the Management factor, and one item (Expand business) loaded on Innovation instead of Marketing. The five factors as independent variables were calculated as an average of retained and properly reversed items. The Cronbach Alpha reliability coefficient was calculated for each derived factor. All four factors had a Cronbach Alpha value above 0.70.

The Networking variable was measured using an 11-item, 5-point Likert-type scale (see Appendix 1). Based on the value of the Cronbach Alpha reliability coefficient two network items were deleted (V303 and V304). We conducted an exploratory factor analysis on the remaining nine network items (Cronbach Alpha 0.80). The number of factors to be extracted was determined on the basis of the scree plot and the latent root (eigenvalue) criterion (above 1). Two network factors were identified (54.9% cumulative variance explained). The Kaiser-Meyer-Olkin measure of sampling adequacy showed that the derived factor structure is moderately appropriate (0.79). The two identified network factors are as follows:

- Factor 1 (Content of exchange): V307, V308, V309, V310.
- Factor 2 (Network support): V301, V302, V311.

Factor 1 focuses on the importance of personal contacts for acquiring material, human and financial resources. It is related to the content of exchange. In contrast, Factor 2 is related to the importance of personal contacts for business success in general, and to the ability to efficiently use the support of personal contacts.

Firm growth was assessed with two variables: average firm sales growth in the last three years from Antoncic and Hisrich (2001, 2004) (a 6-point scale with anchors ranging from less than 0% to more than 50%) and growth of the market share in the past three years (a 5-point scale from decreasing to substantially increasing). Since absolute firm growth may differ from relative firm growth, we measured firm growth in terms of absolute growth (growth in sales) and relative growth (growth of market share).

Based on the findings of past research (Antoncic et al., 2007), firm size was taken into consideration as a control variable. According to the control variable, the sample was split into two separate groups for the analyses:

- Micro firms (0-10 employees).
- Other firms (more than 10 employees).

3.3 METHODS OF ANALYSIS

Two exploratory factor analyses were conducted. First, an exploratory factor analysis was conducted on entrepreneurial self-efficacy items to derive the entrepreneurial self-efficacy factors. Second, we conducted an exploratory factor analysis on network items to derive the network factors.

A multiple regression analysis was performed by using entrepreneurial self-efficacy as a dependent variable and network factor scores as independent variables. The second multiple regression analysis was performed by using sales growth as a dependent variable and entrepreneurial self-efficacy factor scores as independent variables, while the third multiple regression analysis was performed by using market share growth as a dependent variable

and entrepreneurial self-efficacy factor scores as an independent variable. Altogether, three multiple regression analyses were conducted. The impacts of firm size as a control variable were assessed by splitting the file into two groups.

4. FINDINGS

The research findings are related to the multiple regression analysis linking:

- the derived network factors to entrepreneurial self-efficacy; and
- the derived entrepreneurial self-efficacy factors to firm growth in terms of firm sales growth and market share growth.

4.1 REGRESSION ANALYSIS (DEPENDENT VARIABLE: ENTREPRENEURIAL SELF-EFFICACY)

Two network factor scores were used in the multiple regression analysis as independent variables, while entrepreneurial self-efficacy was used as a dependent variable. Based on past research we expected a positive relationship between the network factors and entrepreneurial self-efficacy (content of exchange – entrepreneurial self-efficacy; network support – entrepreneurial self-efficacy).The findings of the regression analysis indicate that both factors have a moderate impact on entrepreneurial self-efficacy. Contrary to the expectations, Factor 1 (Content of exchange) (standardized coefficient -0.173, sig. 0.036) was found to be negatively related to entrepreneurial self-efficacy. A possible explanation of this result may be due to the scale that we used to measure the content of exchange. Besides material, financial and human resources, other types of content of exchange may be important for developing entrepreneurial self-efficacy. In contrast, as we predicted Factor 2 (Network support) (standardized coefficient 0.183, sig. 0.026) was found to have a moderate positive impact on entrepreneurial self-efficacy. These findings show that entrepreneurs tend to achieve higher levels of entrepreneurial self-efficacy when they have network factor scores higher on network support and lower on content of exchange. Hypothesis 1 therefore received partial support. Results of the regression analysis are shown in Appendix 2. When the impact of firm size was tested, no significant effects were detected.

4.2 REGRESSION ANALYSIS (DEPENDENT VARIABLE: FIRM SALES GROWTH; MARKET SHARE GROWTH)

The five entrepreneurial self-efficacy factor scores were used in the multiple regression analysis as independent variables, where firm sales growth and market share growth were used as dependent variables. As shown in the research hypotheses section, we expected a positive relationship between entrepreneurial self-efficacy factors and firm growth in terms of firm sales growth and market share growth. Contrary to the expectations, no significant association was detected between entrepreneurial self-efficacy factor scores and firm sales growth (Model: R-squared 0.024, sig. 0.626). Results of the regression analysis are shown in Appendix 3.

However, the findings offer partial support for Hypothesis 2 since a significant association was detected between entrepreneurial self-efficacy factors and market share growth. Yet the results of the regression analysis on the whole sample were moderate (R-squared 0.113, sig. 0.003). When the impact of firm size as a control variable was tested, no significant

effects were detected.

The findings of the regression analysis indicate that Factor 1 (Marketing) (standardized coefficient 0.193, sig. 0.037) and Factor 3 (Management) (standardized coefficient 0.215, sig. 0.032) have a moderate positive association with market share growth. A moderate but non-significant negative relationship to market share growth was found for Factor 5 (Financial control) (standardized coefficient -0.123, sig. 0.157). The relationships between Factor 2 (Innovation) and Factor 4 (Risk-taking) to market share growth were found non-significant (standardized coefficient 0.023, sig. 0.807; standardized coefficient 0.032, sig. 0.739).

These findings indicate that entrepreneurs tend to achieve higher market share growth when they have entrepreneurial self-efficacy factor scores higher on marketing and innovation, and perhaps lower on financial control.

In the next section, a discussion is presented, conclusions are drawn, implications are presented for theory and practice and recommendations for future research are suggested.

5. DISCUSSION

The relationships between networking, entrepreneurial self-efficacy and firm growth were examined in this study. The first hypothesis predicted a positive association of networking with entrepreneurial self-efficacy, while the second hypothesis predicted a positive relationship between entrepreneurial self-efficacy and firm growth. The empirical testing of the hypotheses provided interesting findings.

Findings of the first multiple regression analysis (dependent variable: Entrepreneurial self-efficacy) indicated that entrepreneurs tend to achieve higher levels of entrepreneurial self- efficacy when they have network factor scores higher on network support and lower on content of exchange. Contrary to the expectations, Factor 1 (Content of exchange) was found to be negatively associated with entrepreneurial self-efficacy. Factor 2 (Network support), which was related to the importance of personal contacts for business success in general, was found to be positively related to the level of entrepreneurial self-efficacy. The latter may indicate that entrepreneurial-self-efficacy could be enhanced by receiving support from personal contacts in terms of advice, information and moral support, while the acquiring of specific resources like material, financial and human resources may not necessarily be beneficial for entrepreneurial self-efficacy development. As Bandura (1977, 1998) affirmed, entrepreneurial self-efficacy can be reinforced through experiences provided by social models. Observing and listening to people similar to ourselves who succeed by putting effort into accomplishing tasks could be the element that reinforces a person's entrepreneurial self-efficacy. Factor 2 also included the ability to efficiently use the support received through personal contacts. Therefore, besides receiving the necessary support from personal contacts it is also important to have appropriate abilities to use the acquired support efficiently. Past research showed that networking can be seen as a social skill that can be learned (Dubini and Aldrich, 1991; Johannison, 1986). Therefore, entrepreneurs can acquire networking skills through learning which can contribute to the efficiency of their networking activities, and consequently to the level of their entrepreneurial self-efficacy. The findings showed that the actual acquisition of resources does not contribute

to entrepreneurial self-efficacy. Perhaps, resource acquisition may be directly related to firm growth. However, this relationship was not examined in this study.

Findings of the second multiple regression analysis (dependent variable: Firm growth) indicated that, among the five identified entrepreneurial self-efficacy factors, two factors (Marketing and Management) were found to be positively related to relative firm growth which was measured as market share growth. Having high levels of self-efficacy in tasks related to marketing (e.g. set and meet market share goals, establish position and product market, conduct market analysis) and management (e.g. strategic planning, establish and achieve goals and objectives) could contribute to market share growth. Entrepreneurs with higher levels of self-efficacy in marketing and management set higher goals related to the market position, are more committed to their goals and, consequently, achieve a better performance. On the other hand, high levels of self-efficacy in tasks related to financial control (e.g. perform financial analysis, develop financial and internal controls) could negatively contribute to market share growth. Devoting too much time to financial analysis and internal controls could lead to a more cautious and conservative growth and expansion strategy.

The impacts of firm size as a control variable were assessed. Firm size was not found to be an influential control variable in the investigated relationships.

6. CONCLUSION AND IMPLICATIONS

The findings of this research provide an important contribution to knowledge about the role of network support in the process of developing entrepreneurial self-efficacy, relevant to both science and practice. First, the study represents the first tentative to explore the mutual relationships between entrepreneurs' personal networks, entrepreneurial self-efficacy and firm performance. Therefore, two different perspectives on entrepreneurship were considered in this study, namely social perspectives and psychological perspectives on entrepreneurship. Second, the relationships between entrepreneurs' personal networks, entrepreneurial self-efficacy and firm performance were empirically tested. The key scientific novelty is therefore the development of new knowledge about the impact of network support on entrepreneurial self-efficacy and the impact of entrepreneurial self-efficacy on firm performance. The research results show that by having the necessary skills to efficiently use the support acquired through personal relationships it is possible to enhance entrepreneurial self-efficacy. Further, higher levels of entrepreneurial self-efficacy in marketing and management may result in better performance in terms of higher market share growth. The research findings therefore provide the basis for future research in this under-researched area. Entrepreneurship researchers may like to consider studying entrepreneurial self-efficacy as a mediator variable in the relationship between network support, acquired through social networks, and firm performance.

Besides the implications for theory, the research results may lead to the following implications for practicing entrepreneurs: 1) Entrepreneurs should develop and maintain relationships with people who can be of support for the entrepreneur and the business. Entrepreneurs' personal networks should include diverse people who are successful in performing their tasks and could thus represent a good example for entrepreneurs; 2)

Entrepreneurs should reinforce their networking skills. Networking could be seen as a social skill, therefore entrepreneurs can learn how to network and how to use the support acquired through personal contacts. By enhancing networking skills it is possible to reinforce entrepreneurial self-efficacy; 3) Entrepreneurs should reinforce their entrepreneurial self-efficacy in tasks related to marketing and management in order to increase the market share growth. Besides the support acquired through personal contacts, experiences and perseverant effort in overcoming obstacles (Bandura, 1994) can contribute to a strong sense of entrepreneurial self-efficacy. Entrepreneurs who have a high level of assurance in their capabilities will view difficult tasks as challenges, and will have a high commitment to their goals.

Some limitations of this study are recognized. A cross-sectional study design was conducted. For a better insight into the dynamicity of the relationships it may be more appropriate to use a longitudinal study design. Further, the study was limited to only one dependent performance variable (firm growth). However, in order to gain additional information firm growth was measured in terms of relative firm growth and absolute firm growth. The data collection was limited to one country – Slovenia. Networking was measured by indirect measures. The examination of the entrepreneurs' network structure and its impact on entrepreneurial self-efficacy was not taken into consideration. Finally, the data were collected mostly from the entrepreneurs of micro and small firms.

Future research should be directed toward a longitudinal research which could provide additional insights into the relationship between networking and entrepreneurial self-efficacy. Another suggestion is to investigate the relationship between network structure and entrepreneurial self-efficacy. Besides firm growth, future research should include other important dependent performance variables (e.g. firm profitability, internationalization, new value creation). Further, a cross-cultural research could provide interesting findings by comparing findings cross-nationally.

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PODUZETNIČKE MREŽE: ODNOS IZMEĐU SOCIJALNOG UMREŽAVANJA, PODUZETNIČKE SAMOEFIKASNOSTI I RASTA PODUZEĆA

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Sažetak

Socijalne mreže predstavljaju okruženje u kojemu se poduzetnici međusobno povezuju na taj način značajno utječu na poduzetničko ponašanje. Poduzetničke socijalne mreže omogućuju poduzetniku i njegovom poduzeću da koristi nove informacije, koristi širu podršku i pristup brojnim resursima. Podrška okruženja vrlo je važna za poticanje samoefikasnosti kao preduvjeta poslovanja poduzeća. U ovoj studiji razvili smo i empirijski testirali hipotezu o odnosu socijalnog umrežavanja, poduzetničke samoefikasnosti i rasta poduzeća. Rezultati pokazuju da poduzetnici mogu unaprijediti samoefikasnost kroz podršku vlastite socijalne mreže i tako značajno koristiti relativnom rastu vlastitog poduzeća. Ova studija značajno doprinosi teoriji poduzetničkog umrežavanja i teoretski te praktički značajno uvodi brojne implikacije.

Ključne riječi: *poduzetništvo, umrežavanje, poduzetnička samoefikasnost, mala poduzeća, rast*

JEL klasifikacija: L26

APPENDIXES

Appendix 1: Questions used to measure Networking

The respondents had to indicate on a 5-point Likert-type scale the degree to which they agree with each of the 11 statements (1 - strongly disagree, 5 - strongly agree).

Table 1. Used questions

Item No.	Item Name	Item
1.	V301	Personal contacts are crucial for the success of a business.
2.	V302	Personal contacts are important for making deals.
3.	V303	There is no successful business without personal contacts.
4.	V304	Even without personal contacts one can succeed in business.
5.	V305	Friendship ties are important for the development of my firm.
6.	V306	Information and advises from other people are important to my business.
7.	V307	Other persons are important for the acquisition of material resources for my firm.
8.	V308	Other persons are important for the acquisition of financial resources for my firm.
9.	V309	Other persons are important for the acquisition of human resources for my firm.
10.	V310	In general, other persons are important for acquiring resources for my company.
11.	V311	I can use my personal contacts for the benefit of my firm.

Source: Author calculation

Appendix 2: Results of regression analysis (Dependent variable: Entrepreneurial self-efficacy; Independent variables: Network factor scores)

Table 2. Results of regression

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	3,627	0,242		14,977	0,000
	F1_Net	-0,094	0,045	-0,173	-2,117	0,036
	F2_Net	0,133	0,059	0,183	2,241	0,026

Dependent variable: Entrepreneurial self-efficacy

Model: R-squared=0.044, Adjusted R-squared=0.032, F=3.629, sig.=0.029

Source: Author calculation

Appendix 3: Results of regression analysis (Dependent variable: Firm sales growth - V2102; Independent variables: Entrepreneurial self-efficacy factor scores)

Table 3. Results of regression

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	2,999	1,165		2,573	0,011
	F1_Marketing	0,204	0,240	0,083	0,850	0,397
	F2_Innovation	-0,033	0,276	-0,012	-0,119	0,905
	F 3 _ Management	0,042	0,269	0,016	0,155	0,877
	F4_RiskTaking	0,166	0,268	0,062	0,618	0,538
	F 5 _	-0,339	0,194	-0,161	-1,745	0,083

Dependent variable: Firm sales growth

Model: R-squared=0.024, Adjusted R-squared=-0.010, F=0.698, sig.=0.626

Source: Author calculation

Appendix 4: Results of regression analysis (Dependent variable: Market share growth-V2103; Independent variable: Entrepreneurial self-efficacy factor scores)

Table 4. Results of regression

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	0,721	0,765		0,942	0,348
	F1_Marketing	0,329	0,157	0,193	2,105	0,037
	F2_Innovation	0,044	0,180	0,023	0,245	0,807
	F3_Management	0,378	0,175	0,215	2,163	0,032
	F4_RiskTaking	0,058	0,174	0,032	0,334	0,739
	F 5 _ FinancialControl	-0,180	0,126	-0,123	-1,423	0,157

Dependent variable: Market share growth

Model: R-squared=0.113, Adjusted R-squared=0.083, F=3.753, sig.=0.003

Source: Author calculation

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QUALITY CONTROL MANAGER SELECTION BASED ON AHP- COPRAS-G METHODS: A CASE IN IRAN

Abstract

Due to the increasing competition of globalization and fast technological improvements and world markets, demands of companies to have professional human resources are increasing too. It is an important problem of an organization to select the most appropriate personnel among the candidates. Quality control manager is important personnel in organizations and it's so important to select the best candidate for this work. In this paper we proposed a personnel selection system based on Analytic Hierarchy Process (AHP) and Complex proportional assessment of alternatives with grey relations (COPRAS-G) method. At first seven criteria is identified including: knowledge of product and raw material properties, Experience and educational background, Administrative orientation, Behavioral flexibility, Risk evaluation ability, Payment and Team work and after that AHP applied for calculating weight of each criteria and finally using COPRAS- G method for selecting the best candidate for this job. This study can be used as a pattern for personnel selection and future researches.

Keywords: *Quality Control Manager, Personnel selection, Analytic Hierarchy Process (AHP), COPRAS-G method*

JEL Classification: *M12, C01, C44, C51, C61, D7, D81, J24*

1. INTRODUCTION

In the international market, modern organizations face high levels of competition. In the wake of increasingly competitive world market the future survival of most companies, depends mostly on the appropriate dedication of their personnel to companies. Employee or personnel performances such as capacity, knowledge, skill, and other abilities play an important role in the success of an organization. One of the most important goals of organizations is to seek more powerful ways of ranking of a set employee or personnel who have been evaluated in terms of different competencies. The objective of a selection process depends mainly on assessing the differences among candidates and predicting the future performance (Gungor et al., 2009).

Nowadays, quality and related topics become one the important issues for every organization. Quality is important because it ensures the viability and successfulness of a

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business. Without quality, a business may stay alive, but won't/can't reach its optimal earning potential. The quality of the product or service that is being made or presented by the company is very important for its customer's satisfaction. As you know, there are many types of processes that are carried out in the company and it is a familiar fact that the most important aspect for the success and increased demand of products is quality control. This is a major process that has to be given significance to, in order to make sure the quality of products is the best for consumer satisfaction. The professional that deals in all aspects of quality control is referred to as a quality control manager. A quality control manager is a very important person in the company and distribution chain. This expert has a precise eye for detail to determine faults in products or services and suggest methods to better them and sustain maximum quality control. Consequently selecting proper quality control manager in company can improve the production process, increase productivity and enhance system reliability. There are no studies that have looked into the method of quality control manager selection, and this is where this study hopes to fill the gap.

Personnel selection is one of the chief phases of human resources management process. Basic function of personnel selection operations is determining, among the candidates applying for specific jobs in the company, the ones having the necessary knowledge, skill, and ability in order to be able to perform the requirements of the job successfully (Kaynak, 2002). Impartiality in personnel selection depends on fulfillment of two conditions, first of which is the necessity of specifying the criteria that can properly value the qualities of the personnel needed. At this stage, the factors which are qualified to become the criteria are established. Second condition is to assess and evaluate the knowledge, skills, and abilities of an applicant in the frame of the criteria established (Dagdeviren and Yuksel, 2007).

Many potential criteria must be considered in the selection procedure of a quality control manager. Therefore quality control manager can be viewed as a multiple criteria decision making (MCDM) problem. The MCDM methods deal with the process of making decisions in the presence of multiple criteria or objectives (Shi et al., 2010). Priority based, outranking, distance-based and mixed methods could be considered as the primary classes of the MCDM methods (Önüt et al., 2008).In this research a hybrid MCDM model encompassing analytic hierarchical process (AHP) and the complex proportional assessment of alternatives with grey relations (COPRAS-G method) is used for quality manager selection. Specifically, AHP is initially used for calculating the weight of each criterion and COPRAS-G method is used for ranking and selecting the alternatives.

2. LITERATURE REVIEW

In literature, there exist numerous studies conducted with the aim of performing personnel selection within the boundaries of objective criteria (Dagdeviren and Yuksel, 2007). Gargano et al. (1991) combined genetic algorithm and artificial neural networks for the purpose of selecting the personnel to be employed in finance sector. In this study, fundamental criteria were personality, social responsibility, education level, economics knowledge, finance

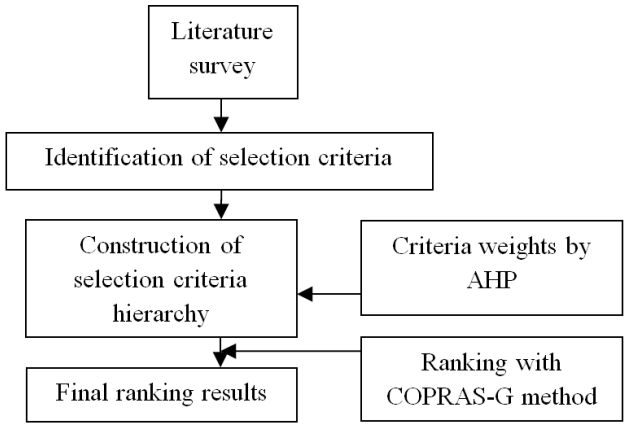
knowledge, and experience factors. On the other hand, Miller and Feinzig (1993) suggested the fuzzy sets theory for the personnel selection problem. Liang and Wang (1994) developed an algorithm which also uses the fuzzy sets theory. In this algorithm, subjective criteria, such as personality, leadership, and past experience, along with some objective criteria, such as general aptitude, and comprehension were made use of Karsak et al. (2003) modeled personnel selection process by using fuzzy multiple criteria programming and evaluated qualitative and quantitative factors together via membership functions in this model. Capaldo and Zollo (2001) built up a model to improve the effectiveness of personnel selection processes in major Italian companies. First step of the study developed decision formulations and decision samples to be used on the basis of the evaluation method adopted by the companies. Second step was to build an evaluation method by utilizing fuzzy logic. Personnel selection factors taken into consideration were classified in three groups, each one of which being professional skills, managerial skills, and personnel characteristics. Multi-criteria analyses are other personnel selection methods reported in literature (Bohanec et al.1992; Timmermans and Vlek 1992, 1996; Gardiner and Armstrong-Wright 2000; Spyridakos et al. 2001; Jessop 2004). These methods can be effectively employed while evaluating a multitude of factors together in the solution of especially large and complicated problems (Dagdeviren and Yuksel, 2007). Roth and Bobko (1997) reviewed some of the issues surrounding the use of multi-attribute methods in human resources management. Hooper et al. (1998), however, developed an expert system named BOARDEX. American army has used this system to employ its personnel. Personnel selection factors, such as grade, military education level, civilian education level, height, weight, and assignment history are incorporated in this expert system.

Some of the recent applications of MCDM method in personnel selection are listed below:

- Dagdeviren and Yuksel (2007) used ANP for personnel selection.
- Boran et al. (2008) used ANP for personnel selection.
- Gungor et al. (2009) used fuzzy AHP approach to personnel selection problem.
- Kelemenis and Askounis (2009) used fuzzy TOPSIS for personnel selection.
- Vainiunas et al. (2010) used AHP and ARAS for personal selection.
- Kersuliene, Turskis (2011a) fuzzy AHP and ARAS for architect selection.
- Kersuliene, Turskis (2011b) fuzzy AHP and ARAS for selection financial accountant offices.

Quality is the most important aspect of every organization in order to be successful; therefore quality control manager has a tremendous impact on quality of products being processed within the organization. Today's market environment is so competitive that quality of products has to meet the customers' expectation. Besides, the market is saturated with many products and the customer is looking for the best product in the marketplace. MCDM approaches deal with evaluation and selection problems with respected to qualitative and quantitative criteria. For these reasons, Quality control manager selection can be viewed as a MCDM problem. The purpose of this study is using AHP and COPRAS-G methods for evaluating and selecting quality control manager (Figure 1).

Figure 1. Process of quality control manager selection



Source: Author calculation

3. METHODOLOGY

Over the past decades the complexity of economic decisions has increased rapidly, thus highlighting the importance of developing and implementing sophisticated and efficient quantitative analysis techniques for supporting and aiding economic decision-making (Zavadskas and Turskis, 2011). Multiple criteria decision making (MCDM) is an advanced field of operations research, provides decision makers and analysts a wide range of methodologies, which are overviewed and well suited to the complexity of economical decision problems (Hwang and Yoon, 1981; Zopounidis and Doumpos, 2002; Figueira et al., 2005). Multiple criteria analysis (MCA) provides a framework for breaking a problem into its constituent parts. MCA provides a means to investigate a number of alternatives in light of conflicting priorities.

Over the last decade scientists and researchers have developed a set of new MCDM methods (Kaplinski and Tupenaite, 2011; Kapliński and Tamosaitiene, 2010; Tamosaitiene et al., 2010). They modified methods and applied to solve practical and scientific problems.

3.1. ANALYTIC HIERARCHY PROCESS

Analytic hierarchy process (AHP), proposed by Thomas L. Saaty in 1971, is a multiple criteria decision making method, applying to overcome problems that are under uncertain conditions or need to take several evaluation criteria into account for decision making, aiming to provide the decision maker a precise reference for adequately making decision and reducing the risk of making wrong decision through decompose the decision problem into a hierarchy of more easily comprehended sub-problems, each of which can be evaluated independently. The elements of the hierarchy can relate to any aspect of the decision problem such as tangible or intangible, carefully measured or roughly estimated, well- or poorly-understood; that is, anything at all that applies to the decision at hand. It has been well utilized in several fields (Saaty, 1980) that requires the chosen of alternatives and the weight exploration of evaluation indices like business (Angelou and Economides, 2009), industry (Chen and Wang, 2010),

healthcare (Liberatore and Nydick, 2008), and education.

During the past, there were 13 major conditions that have discovered to well fit the utilization of AHP such as setting priorities, generating a set of alternatives, choosing a best policy alternatives, determining requirements, allocating resources, predicting outcomes, measuring performance, designing system, Ensuring system stability, optimization, planning, resolving conflict, and risk assessment (Saaty,1980). Besides, recent conditions encompass to reduce the influence of global climate change (Berrittella et al., 2007), to quantify the quality of software systems (McCaffrey, 2005), to choose university faculty (Grandzol, 2005), to decide the location of offshore manufacturing plants (Walailakand McCarthy, 2002), to evaluate risk in conducting cross-country petroleum pipelines (Dey, 2003), and to manage U.S. watersheds (De Steiguer et al., 2003) and so on.

The recent applications of AHP method in shortly are listed below (Table 1):

Table 1. Recent applications of AHP

Reference	Considered problem
Amiri *et al,* 2010	Evaluating ICT business alternatives
Gungor *et al.* 2009	Personnel selection problem
Gumus, 2009	Forest road evaluation form
Chen and Wang, 2010	Information service industry
Sun *et al,* 2010	Assessment of sustainability
Kim, 2009	Surface of Spatial Urban Growth
Martinez *et al,* 2010	Optimal emplacement in buildings
Medineckiene *et al,* 2010	Sustainable construction
Podvezko, 2009	Application of AHP technique
Podvezko *et al,* 2010	Evaluation of contracts
Maskeliunaite *et al,* 2009	Quality of Passenger Transportation
Sivilevicius, 2011a	Modeling of Transport System
Sivilevicius, 2011b	Quality of technology
Sivilevicius and Maskeliunaite, 2010	Quality of transportation
Fouladgar *et al.,* 2011	Prioritizing strategies
Park, 2011	Soil erosion risk

Source: Author calculation

The calculation of AHP is adopted ratio scale for developing pair-wise comparison matrix. It typically can be categorized into 5 sub-scales based on different levels of importance: Equal importance, somewhat more important, much more important, Very much more important, and absolutely more important. There are still 4 sub-scales with each level of importance between above 5 major sub-scales. Therefore, there is an amount of nine sub-scales. The ratio values from 1 to 9 are given to each sub-scale as we summarized in Table 2.

Table 2. The ratio scale and definition of AHP

Intensity of importance	Definition	Description
1	Equal importance	Two factors contribute equally to the objective.
3	Somewhat more important	Experience and judgment slightly favor one over the other.
5	Much more important	Experience and judgment strongly favor one over the other.
7	Very much more important	Experience and judgment very strongly favor one over the other. Its importance is demonstrated in practice.
9	Absolutely more important	The evidence favoring one over the other is of the highest possible validity.
2,4,6,8	Intermediate values	When compromise is needed

Source: Saaty (1990)

The calculation steps of AHP are presented as follows (Saaty, 1990):

Step1. Establish the pair-wise comparison matrix A by using the ratio scale in Table1.

Step 2. Let $C_1, C_2, \ldots, C_n$ denote the set of elements, while a_{ij} represents a quantified judgment on a pair of elements C_i, C_j. This yields an n-by-n matrix A as follows:

$$A = [a_{ij}] = \begin{array}{c} \\ c_1 \\ c_2 \\ \vdots \\ c_n \end{array} \begin{array}{c} \begin{array}{cccc} c_1 & c_2 & \ldots & c_n \end{array} \\ \begin{bmatrix} 1 & a_{12} & \ldots & a_{1n} \\ \frac{1}{a_{12}} & 1 & \ldots & a_{2n} \\ \vdots & \vdots & \vdots & \vdots \\ \frac{1}{a_{1n}} & \frac{1}{a_{2n}} & \ldots & 1 \end{bmatrix} \end{array} \tag{1}$$

Where $a_{ij} = 1$ and $a_{ij} = \frac{1}{a_{ij}}$, $i = \overline{1, n}$ and $j = \overline{1, n}$

In matrix A, the problem becomes one of assigning to the n elements $C_1, C_2 \ldots C_n$ a set of numerical weights $W_1, W_2, \ldots W_n$ that reflects the recorded judgments. If A is a consistency matrix, the relations between weights W_i and judgments a_{ij} are simply given by $\frac{w_j}{w_i} = a_{ij}$ ($for = \overline{1, n}$ and $j = \overline{1, n}$). Saaty (1990) suggested that the largest eigenvalue λ_{max} would be

$$\lambda_{\max} = \sum_{j=1}^{n} a_{ij} \frac{w_j}{w_i} \tag{2}$$

If A is a consistency matrix, eigenvector X can be calculated by

$$(A - \lambda_{\max} I) X = 0 \tag{3}$$

Saaty proposed utilizing the consistency index (C.I.) and random index (R.I.) verify

the consistency of the comparison matrix (consistency ratio, C.R.). C.I. and C.R. are defined as follows (Saaty, 1990):

$$CI = \frac{\lambda - n}{n - 1} \tag{4}$$

$$CR = \frac{CI}{RI} \tag{5}$$

Where the R.I. represents the average consistency index, which is also named as the random index, was computed by Saaty (1997) as the average consistency of square matrices of various orders n which he filled with random entries. Average consistency values of these matrices are given by Saaty and Vargas (1991) as provided in Table 3. If the C.R<0.1, the estimate is accepted; otherwise, a new comparison matrix is solicited until C.R<0.1.

Table 3. Values for RI

n	2	3	4	5	6	7	8
RI	0.00	0.52	0.90	1.12	1.24	1.32	1.41

Source: Saaty and Vargas (1991)

3.2. COPRAS-G METHOD

In order to evaluate the overall efficiency of a project, it is necessary to identify selection criteria, to assess information, relating to these criteria, and to develop methods for evaluating the criteria to meet the participants' needs. Decision analysis is concerned with the situation in which a decision-maker has to choose among several alternatives by considering a particular set of criteria. For this reason Complex proportional assessment (COPRAS) method (Zavadskas and Kaklauskas, 1996) can be applied. This method was applied to the solution of various problems in construction (Tupenaite et al., 2010; Kaklauskas et al., 2010; Zavadskas et al,. 2010). The most of alternatives under development always deals with future and values of criteria cannot be expressed exactly. This multi-criteria decision-making problem must be determined not with exact criteria values, but with fuzzy values or with values in some intervals. Zavadskas et al. (2008) presented the main ideas of complex proportional assessment method with grey interval numbers (COPRAS-G) method. The idea of COPRAS-G method with criterion values expressed in intervals is based on the real conditions of decision making and applications of the Grey systems theory (Deng, 1982; Deng, 1988). The COPRAS-G method uses a stepwise ranking and evaluating procedure of the alternatives in terms of significance and utility degree.

The recent developments of decision making models based on COPRAS methods are listed below:

- Datta et al. (2009) solved problem of determining compromise to selection of supervisor;
- Bindu Madhuri et al. (2010) presented model for selection of alternatives based on COPRAS-G and AHP methods;
- Uzsilaityte and Martinaitis (2010) investigated and compared different alternatives for the renovation of buildings taking into account energy, economic and environmental criteria while evaluating impact of renovation measures during their life cycle;

– Chatterjee et al. (2011) presented materials selection model based on COPRAS and EVAMIX methods;
– Zavadskas et al. (2011) assessment of the indoor environment;
– Podvezko (2011) presented comparative analysis of MCDM methods (SAW and COPRAS).

The procedure of applying the COPRAS-G method consists in the following steps (Zavadskas et al. 2009):

1. Selecting the set of the most important criteria, describing the alternatives.

2. Constructing the decision-making matrix $\otimes X$:

$$\otimes X = \begin{bmatrix} [\otimes x_{11}] & \dots & \dots & [\otimes x_{1m}] \\ [\otimes x_{21}] & \dots & \dots & [\otimes x_{2m}] \\ \vdots & \dots & \ddots & \vdots \\ [\otimes x_{n1}] & \dots & \dots & [\otimes x_{nm}] \end{bmatrix} = \begin{bmatrix} [\underline{x}_{11}; \overline{x}_{11}] & [\underline{x}_{12}; \overline{x}_{12}] & \dots & [\underline{x}_{1m}; \overline{x}_{1m}] \\ [\underline{x}_{21}; \overline{x}_{21}] & [\underline{x}_{22}; \overline{x}_{22}] & \dots & [\underline{x}_{2m}; \overline{x}_{2m}] \\ \vdots & \vdots & \ddots & \vdots \\ [\underline{x}_{n1}; \overline{x}_{n1}] & [\underline{x}_{n2}; \overline{x}_{n2}] & \dots & [\underline{x}_{nm}; \overline{x}_{nm}] \end{bmatrix}; j = \overline{1,n}, i \quad (6)$$

Here $\otimes x_{ij}$ is determined b $\underline{x}_{ij}$ (the smallest value, the lower limit) and $\tilde{x}_j$ (the biggest value, the upper limit).

3. Determining significances of the criteria q_i q_i.

4. Normalizing the decision-making matrix ⊗X:

$$\tilde{\underline{x}} = \frac{\underline{x}_{ji}}{\frac{1}{2}\left(\sum_{j=1}^{n}\underline{x}_{ji} + \sum_{j=1}^{n}\overline{x}_{ji}\right)} = \frac{{}^{2}\underline{x}_{ji}}{\left(\sum_{j=1}^{n}\underline{x}_{ji} + \sum_{j=1}^{n}\overline{x}_{ji}\right)}, \tilde{\overline{x}} = \frac{\overline{x}_{ji}}{\frac{1}{2}\left(\sum_{j=1}^{n}\underline{x}_{ji} + \sum_{j=1}^{n}\overline{x}_{ji}\right)} = \frac{{}^{2}\overline{x}_{ji}}{\sum_{j=1}^{n}\left(\underline{x}_{ji} + \overline{x}_{ji}\right)}; j = \overline{1,n}; i = \overline{1,m} \quad (7)$$

In formula (7) $\underline{x}_{ji}$ is the lower value of the i criterion in the alternative j of the solution; $\overline{x}_{ji}$ is the upper value of the criterion i in the alternative j of the solution; m is the number of criteria; n is the number of the alternatives, compared. Then, the decision-making matrix is normalized:

$$\otimes \tilde{X} = \begin{bmatrix} [\tilde{\underline{x}}_{11}; \tilde{\overline{x}}_{11}] & [\tilde{\underline{x}}_{12}; \tilde{\overline{x}}_{12}] & \dots & [\tilde{\underline{x}}_{1m}; \tilde{\overline{x}}_{1m}] \\ [\tilde{\underline{x}}_{21}; \tilde{\overline{x}}_{21}] & [\tilde{\underline{x}}_{22}; \tilde{\overline{x}}_{22}] & \dots & [\tilde{\underline{x}}_{2m}; \tilde{\overline{x}}_{1m}] \\ \vdots & \vdots & \ddots & \vdots \\ [\tilde{\underline{x}}_{n1}; \tilde{\overline{x}}_{n1}] & [\tilde{\underline{x}}_{n2}; \tilde{\overline{x}}_{n2}] & \dots & [\tilde{\underline{x}}_{nm}; \tilde{\overline{x}}_{nm}] \end{bmatrix} \quad (8)$$

5. Calculating the weighted normalized decision matrix $\otimes \hat{X}$. The weighted normalized values $\otimes \hat{x}_{ij}$ are calculated as follows:

$$\otimes \hat{x}_{ji} = \otimes \tilde{x}_{ji} \cdot q_i \text{ or } \hat{\underline{x}}_{ji} = \tilde{\underline{x}}_{ji} \cdot q_i \text{ and } \hat{\overline{x}}_{ji} = \tilde{\overline{x}}_{ji} \cdot q_i \quad (9)$$

In formula (9), q_i is the significance of the i –th criterion.

Then, the normalized decision-making matrix is:

$$\otimes\hat{X}=\begin{bmatrix} [\otimes\hat{x}_{11}] & [\otimes\hat{x}_{12}] & \cdots & [\otimes\hat{x}_{1m}] \\ [\otimes\hat{x}_{21}] & [\otimes\hat{x}_{21}] & \cdots & [\otimes\hat{x}_{2m}] \\ \vdots & \vdots & \ddots & \vdots \\ [\otimes\hat{x}_{n1}] & [\otimes\hat{x}_{n2}] & \cdots & [\otimes\hat{x}_{nm}] \end{bmatrix}=\begin{bmatrix} [\underline{\hat{x}}_{11};\overline{\hat{x}}_{11}] & [\underline{\hat{x}}_{12};\overline{\hat{x}}_{12}] & \cdots & [\underline{\hat{x}}_{1m};\overline{\hat{x}}_{1m}] \\ [\underline{\hat{x}}_{21};\overline{\hat{x}}_{21}] & [\underline{\hat{x}}_{22};\overline{\hat{x}}_{22}] & \cdots & [\underline{\hat{x}}_{2m};\overline{\hat{x}}_{2m}] \\ \vdots & \vdots & \ddots & \vdots \\ [\underline{\hat{x}}_{n1};\overline{\hat{x}}_{n1}] & [\underline{\hat{x}}_{n2};\overline{\hat{x}}_{n2}] & \cdots & [\underline{\hat{x}}_{nm};\overline{\hat{x}}_{nm}] \end{bmatrix} \quad (10)$$

6. Calculating the sums P_j of criterion values, whose larger values are more preferable:

$$P_j=\frac{1}{2}\sum_{i=1}^{k}\left(\underline{\hat{x}}_{ji}+\overline{\hat{x}}_{ji}\right) \quad (11)$$

7. Calculating the sums R_j of criterion values, whose smaller values are more preferable:

$$R_j=\frac{1}{2}\sum_{i=k+1}^{m}\left(\underline{\hat{x}}_{ji}+\overline{\hat{x}}_{ji}\right);i=\overline{k,m} \quad (12)$$

In formula (12), (m- k) is the number of criteria which must be minimized.

8. Determining the minimal value of R_j as follows:

$$R_{\min}=\min_j R_j;j=\overline{1,n} \quad (13)$$

9. Calculating the relative significance of each alternatively Q_j the expression:

$$Q_j=P_j+\frac{\sum_{j=1}^{n}R_j}{R_j\sum_{j=1}^{n}\frac{1}{R_j}} \quad (14)$$

10. Determining the optimally criterion by K the formula:

$$K=\max_j Q_j;j=\overline{1,n} \quad (15)$$

11. Determining the priority order of the alternatives.

12. Calculating the utility degree of each alternative by the formula:

$$N_j=\frac{Q_j}{Q_{\max}}\times 100\% \quad (16)$$

Here Q_j and Q_{max} are the significances of the alternatives obtained from equation (14).

4. PERSONNEL SELECTION MODEL BASED ON AHP AND COPRAS-G METHOD

4.1. CRITERIA SELECTION AND DATA SURVEY

The aim of this study is to utilize a new hybrid model of MCDM methods in quality manager selection. A case company is Kalleh Company, the oldest and the most famous companies in food, meet and disposable containers industrials, in Iran. Kalleh Company tends to select

one quality manager among A_1, A_2 and A_3; they are three alternatives that thecompany wants to select one of them as a quality manager. This study, used seven criteria that theliterature and the senior manager of Kalleh company were determined, all the criteria presented in Table 4.Based on the nature of seven evaluation criteria, optimization directions for each evaluation criterion is determined as follows: $\otimes x_{1,2,3,4,5,7} \overrightarrow{optimaldirection(Max)}$ $\otimes x_6 \overrightarrow{optimaldirection(Min)}$

Table 4. Criteria for quality manager selection

	Criteria	References
$\otimes x_1$	Knowledge of product and raw material	Company managers
$\otimes x_2$	Experience and educational back ground	Gargano *et al.* (1991)
$\otimes x_3$	Administrative orientation	Boran *et al.* (2008)
$\otimes x_4$	Behavioral flexibility	Boran *et al.* (2008)
$\otimes x_5$	Risk evaluation ability	Boran *et al.* (2008)
$\otimes x_6$	Payment	Company managers
$\otimes x_7$	Team work	Boran *et al.* (2008)

Source: Author calculation

4.2. PRIORITIZATION CRITERIA FOR QUALITY MANAGER SELECTION

For pair wise comparison decision making in AHP, a questionnaire was sent to a group of 5 experts that are the senior manager of company, because they were responsible for quality manager selection. Information about experts is shown in Table 5:

Table 5. Background Information of Experts

Variable	Items	NO	Variable	Items	NO
1)Education background	Bachelor	2	3)Sex	Male	4
	Master	2		Female	1
	Ph.D.	1			
2)Service Tenure	6-10	2	4)Age	31-40	4
	11-20	3		41-50	1

Source: Author calculation

Paired comparison matrix criteria is one of the matrices which were completed with information of experts is shown in Table 6. AHP method is then used for prioritizing. After

all comparisons and weighing processes are done, the overall weights of each criterion are obtained (Table 6).

Table 6. Criteria paired comparison matrix

	Criteria							Weights
		x_1	x_2	x_3	x_4	x_5	x_6	x_7	
Criteria	x_1	1	2	1/2	3	2	3	3	0.208
	x_2	1/2	1	1/3	1/2	3	2	1/2	0.105
	x_3	2	3	1	3	2	5	3	0.287
	x_4	1/3	2	1/3	1	4	3	1	0.147
	x_5	1/2	1/3	1/2	1/4	1	3	2	0.105
	x_6	1/3	1/2	1/5	1/3	1/3	1	1/2	0.048
	x_7	1/3	2	1/3	1	1/2	2	1	0.100
	C.I. =0.125			*C.R. = C.I./R.I.=0.094*					

Source: Author calculation

According the weights in table 5, x_3, x_1, and x_4 were three of the most important considering criteria.

4.3. SELECTION OF THE BEST ALTERNATIVE

At this stage of the application, the group of experts evaluated each candidate according to each criterion and Table 7 developed. It indicates initial decision making matrix, with the criterion values described in intervals. For the weight q_i of criteria we used of weights in Table 6.

The initial decision making matrix, has been normalized first as discussed in section 2.The normalized decision making matrix is presented in Table 8.Using equations (11) to (16) for all the persons. These are furnished in Table 9.

Table 7. Initial decision making matrix with the criteria values described in intervals

	$\otimes x_1$	$\otimes x_2$	$\otimes x_3$	$\otimes x_4$	$\otimes x_5$	$\otimes x_6$	$\otimes x_7$
opt	max	max	max	max	max	min	max
q_i	0.208	0.105	0.870	0.147	0.105	0.048	0.100
Person	$\underline{x}_1, \overline{x}_1$	$\underline{x}_2, \overline{x}_2$	$\underline{x}_3, \overline{x}_3$	$\underline{x}_4, \overline{x}_4$	$\underline{x}_5, \overline{x}_5$	$\underline{x}_6, \overline{x}_6$	$\underline{x}_7, \overline{x}_7$
A_1	60 95	70 80	80 90	50 70	50 80	60 80	90 95
A_2	80 90	50 70	50 70	70 90	90 95	60 90	60 70
A_3	40 60	70 95	70 80	60 80	60 70	80 90	70 80

Source: Author calculation

Table 8. Normalized weighted decision making matrix

	$\otimes x_1$	$\otimes x_2$	$\otimes x_3$	$\otimes x_4$	$\otimes x_5$	$\otimes x_6$	$\otimes x_7$
Opt	max	max	max	max	max	min	max
Person	$\underline{x}_1;\overline{x}_1$	$\underline{x}_2;\overline{x}_2$	$\underline{x}_3;\overline{x}_3$	$\underline{x}_4;\overline{x}_4$	$\underline{x}_5;\overline{x}_5$	$\underline{x}_6;\overline{x}_6$	$\underline{x}_7;\overline{x}_7$
A_1	0.059 0.093	0.034 0.039	0.316 0.356	0.035 0.049	0.024 0.038	0.013 0.017	0.039 0.041
A_2	0.078 0.088	0.024 0.034	0.198 0.277	0.049 0.063	0.042 0.045	0.013 0.019	0.026 0.030
A_3	0.039 0.059	0.034 0.046	0.277 0.316	0.042 0.056	0.028 0.033	0.017 0.019	0.030 0.034

Source: Author calculation

Table 9. Evaluation of utility degree

Person	P_j	R_j	Q_j	N_j
A_1	0.561	0.015	0.578	100%
A_2	0.477	0.016	0.493	85.335%
A_3	0.497	0.018	0.512	86.506%

Source: Author calculation

Based on the results of Table 9, the ranking of the three persons is $A_1 \succ A_3 \succ A_2$. Hybrid approach results indicate that A_1 is the best candidate with the highest degree and is the best persons for quality manager.

5. CONCLUSION

In this age of increased competitive markets, the notion of the personnel selection problem has an enormous interest and future survival of most companies, depends mostly on the appropriate dedication of their personnel to companies. Select a quality control manager is a very important problem for the companies and distribution chain and is a MCDM problem. In our case of Iran, Kalleh Company is one of the oldest and the most famous companies that are working internationally and quality problem is very important for it. Therefore the selection of quality manager is thus especially critical for Kalleh Company to acquire competitive advantages. The aim of this study is to utilize a hybrid model of MCDM method in personnel selection using Kalleh Company as a case. We used AHP to weight the seven evaluation criteria and COPRAS-G method for evaluating the performance of three persons of Kalleh Company with adopting weighted evaluation criteria. Based on the result of COPRAS-G method, the best person for Kalleh Company is thus verified. Besides, owing to our case is focusing on an international company, the personnel selection model that we proposed can also be a guide for other foreign companies for their personnel selection with efficiency in decision-making process of top managers.

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ODABIR MANAGERA KONTROLE KVALITETE NA OSNOVI AHP-COPRAS-G METODA: SLUČAJ U IRANU

Sažetak

S obzirom na rastuću konkurentnost u globalizaciji te brzim tehnološkim napredovanjem na svjetskom tržištu, zahtjevi kompanija za profesionalnim kadrom se također povećavaju. Vrlo je važno za organizaciju biti u mogućnosti odabrati najbolji i najprimjereniji kadar među ponuđenim kandidatima. Manager kontrole kvalitete je važan kadar u bilo kojoj organizaciji tako da je iznimno važno za taj posao odabrati najbolje kandidate. U ovom radu predlažemo sustav odabira kadra zasnovan na analitičkom hijerarhijskom procesu (AHP) i kompleksnoj proporcionalnoj evaluaciji alternativa sa sivim odnosima (COPRAS-G). Isprva je identificirano sedam kriterija uključujući: znanje o proizvodu i svojstvima sirovine, iskustvo i obrazovanje, snalaženje s administracijom, fleksibilnost u ponašanju, sposobnost procjene rizika, plaćanja i timski rad te je zatim primijenjen AHP za izračunavanje težine svakog kriterija te je naposljetku korištena COPRAS-G metoda za odabir najboljih kandidata. Ova studija se može koristiti kao predložak za odabir kandidata i buduća istraživanja.

Ključne riječi*: Manager kontrole kvalitete, odabir kadra, analitički hijerarhijski proces (AHP), COPRAS-G metoda*

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AN EMPIRICAL STUDY OF EFFICIENCY IN CROATIA AND SLOVENIA INSURANCE MARKETS

Abstract

In this paper we analyze insurance efficiency in Slovenia and Croatia between 2006 and 2010 using a Data Envelopment Analysis. We perform both intra- and inter- country efficiency surveys. The intra country survey indicates that on average companies in Croatia operate more efficiently than companies in Slovenia. A positive trend of scale efficiency improvement due to mergers and acquisitions which took place in recent years in Croatia is also detected. Nevertheless, the inter-industry analysis indicates that the Slovenian insurance industry dominates Croatian cost and technical efficiency, which shows a low efficiency position of the insurance market in Croatia. Analysis also shows that inefficiency in Croatia is more affected by inefficient internal company operation than in Slovenia.

Keywords: *Data Envelopment Analysis, Cost Efficiency, Technical Efficiency, Scale Efficiency, Croatia, Slovenia*

JEL: *C14; G22; C67; D61*

1. INTRODUCTION

When we try to analyse the insurance sector within one region or country it is often done by measuring their performance relative to other companies within the sector or region. Benchmarking is a commonly used approach to measure relative performance. The insurance industry traditionally uses measures like ROE, combined ratio, loss ratio, cost ratio, and others to measure relative performance of the company. With the rapid development of frontier efficiency methodologies, conventional methods are being upgraded with new approaches which clearer explain sources of inefficiency.

One of the benefits of a frontier efficiency analysis is that it can provide a benchmark beyond county borders, since it allows comparisons of efficiency in the insurance industry with the region or internationally. Such results could provide valuable insight into the competitiveness of insurance industries in different countries, and could be of particular interest of regulators, investors, and managers.

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Analysing efficiency at the international level has for a long time attracted significant attention among researchers., This kind of study is of particularly interest for the European market (see Diacon et al., 2002) because of the implementation of the single insurance licence, which was the basis for deregulation of the EU insurance industry. As a consequence many studies have been done to investigate this topic. Hussels and Ward (2007), for example, found out that increased competition in the UK is reflected in the higher intra-industry cost efficiency, but international comparison shows that German industry dominates UK efficiency, both before and after deregulation. Fenn et al., (2008) concluded that most European insurers operate under increasing returns to scale. The results indicate that mergers and acquisitions, facilitated by the liberalized EU market, have led to efficiency gains. They also find similarly as Rai (1996) that larger firms and firms with high market shares operate at higher levels of cost inefficiency. Recently, Eling and Luhnen (2010) analysed efficiency with a comparison of 6462 insurers from 36 countries, and found that developed countries in Europe and Asia achieve higher efficiency scores than emerging markets.

Despite many efficiency studies on the insurance industry there was not much done to analyse the insurance sector of new EU members or future accession countries. Only a few efficiency studies of the financial sector have been published so far for Slovenia and Croatia, mainly covering banks; among them Kraft et al., (2002), Jemrić and Vujčić (2002), Kavčič and Medved (2004), and Medved (2004).

Slovenia joined the EU in 2004, and Croatia is in the closing process to do the same. In this respect it is interesting to investigate the efficiency of the Croatian insurance market in more detail, since single insurance licence will also be valid for Croatia after entering the EU. We believe that Slovenia, as a young member of the EU, could be the best candidate for first international comparisons and benchmarking. The purpose of this paper is to analyse the efficiency of the insurance market in Croatia in comparison to the insurance industry in Slovenia. To do this we utilize the Data Envelopment Analysis (DEA) method, which is a non-parametric method to estimate frontier efficiency. We analyse the technical, cost, and scale efficiency of the insurance sector in both countries separately and together. This study adds to the literature by investigating insurance efficiency of two emerging markets.

The structure of this paper is as follows. In section 2 we give a short analysis of the Croatian and Slovenian insurance markets. Section 3 presents the main theoretical background for an efficient frontier analysis. In Section 4 the choice of variables is discussed. Section 5 presents the results. Section 6 outlines the final conclusions.

2. THE CROATIAN AND SLOVENIAN INSURANCE SECTOR

According to the Croatian Supervisory Agency monthly report gross insurance premiums written in 2010 amounted to EUR 1.27 billion, of which non-life premiums totalled EUR 0.93 billion and life premiums EUR 0.34 billion. The Slovenian market total written premium amounted to EUR 1.94 billion, which is around 50% more than in Croatia. The gross written premiums for non life operations in Slovenia is EUR 1.44 billion, and the gross written premiums for life insurance operation is EUR 0.50 billion.

The aggregate market share in 2010 of the four major insurance companies is above 55% in Croatia and 76% in Slovenia. The insurance sector in both countries has more similarities than not. They are both dominated by single, state owned composite company with a market share of more than 31% in Croatia and 37% in Slovenia. The majority of participants perform both non-life and life insurance operations, since they were established before the new insurance act, which strictly divides life and non-life business. At present time there is no strong presence of foreign companies in Slovenia, since their market share represents only 10% of the total market share. This market share in Croatia is much higher, amounting to 44% in accounting year 2010. A much lower market share of foreign participants in Slovenia may be explained by the relatively small market, which in combination with the relatively high penetration rate is not so interesting for investors.

In terms of regulation both Slovenia and Croatia have similar regulations, both arising from EU insurance directives. One of the main differences in regulation is the fact that Slovenia is an EU member, which allows direct cross border insurance operation from other companies in the EU. That is why some EU insurance companies operate in Slovenia directly or by branch office, which is currently not the case in Croatia.

The development of markets could be measured by penetration rate, i.e. the gross written premium divided by the gross domestic product. From Table 1 we can see that penetration rates for both life and non-life insurance operation is, for Slovenia, almost doubled as it is for Croatia. If we compare life insurance penetration to the EU average we can conclude that both countries, Slovenia and Croatia still have a long way to go to reach the EU average.

Table 1. Penetration rate in Slovenia and Croatia

	Croatia	Slovenia	EU average
Life penetration rate	0.8	1.8	4.5
Non Life penetration rate	2.1	4.2	3.1
Total	2.9	6.0	7.6

Note: data from CEA 2009 statistics

During the period 2002 – 2010 the number of players in Slovenia didn't change much, which indicates a relatively passive market. In other words, not much happened in recent years on the market, except one merger and a relatively low level of cross border operations. In contrast to recent years we have been witness to many mergers and acquisitions in the Croatian market.

We could categorize Slovenia and Croatia as a medium-sized market for life and non-life insurance, and one where premiums are growing modestly. Given the very slow growth of population in both countries, much of the growth is being driven by an increase in life density.

3. DATA ENVELOPMENT ANALYSIS

The idea behind efficiency measurement is to measure a company's performance relative to "best practice" frontiers in the sense that companies lying on best practice frontiers represent the most efficient companies in the industry. The pioneer of this concept was Farrell (1957),

who originally developed the underlying theory.

The Authors identify two principal types of efficiency methodologies – the econometric (parametric) approach and the mathematical programming (non-parametric) approach (see Eling and Luhnen, 2010). The econometric approach requires the specification of a production function, such as the translog or composite cost, and therefore expects a certain underlying economic behaviour, which may not be valid. In this respect the parametric approach is vulnerable to errors in the specification of the functional form and error term. On the other side, the mathematical programming approach avoids an a priori assumption about the analytical form of the production function, and an assumption about the error term is required. Both approaches have their supporters, and there is no consensus as to which method should be treated as superior (see Hussels and Ward, 2006).

Data Envelopment Analysis (DEA), as a member of the nonparametric approach, employs linear programming techniques where the set of best practice or efficient frontier are those which no other observed entities or decision-making unit (DMU) has as much or more of every output with the given input. The DEA frontier is given as the linear combination which connects the set of best practice observations or benchmarks. Efficient firms are situated on the frontier, while inefficient firms are below the frontier (see Mahlberg and Url, 2003).

An important advantage of DEA is that it can be used even for the small number of companies under investigation, which is not possible for parametric approaches (see Cooper, Seiford, Tone, 2006). This is especially important for Slovenia and Croatia with a relatively small number of insurance companies in relation to other western EU countries. However, a key drawback to the DEA approach is the general assumption that there is no random error. In this respect the frontier is sensitive to extreme observations and measurement errors (see Berger and Humphrey, 2000).

In our study, efficiency values are calculated assuming input orientation and constant returns to scale technology. The R programming package Benchmarking (Bogetoft and Otto, 2011) was used together with author's calculations. Technical efficiency, scale efficiency, and cost efficiency in each country are addressed.

Initially introduced by Charnes, Cooper in Rhodes (1978), the basic DEA model (also called 'CCR model') is built on the assumption of constant returns of scale (CRS) of activities. In the case of the constant returns to scale assumption, all firms are assumed to operate at an optimal scale. Let's assume that we observe n DMU's, and each DMU_j has an input vector $\mathbf{x}_j = \left(x_{1j}, x_{2j}, ..., x_{mj}\right)^T$ and an output vector $\mathbf{y}_j = \left(y_{1j}, y_{2j}, ..., y_{sj}\right)^T$. Our task is to determine the weights $\mathbf{v} = \left(v_i\right)_{i=1}^m$ and $\mathbf{u} = \left(u_i\right)_{i=1}^s$ using linear programming to maximize ratio (Cooper, Seiford, Tone, 2007):

$$\max \quad \theta \quad = \quad \frac{\sum_{i=1}^{s} u_i y_{ij}}{\sum_{i=1}^{m} v_i x_{ij}} \tag{1}$$

subject to

$$\frac{\sum_{i=1}^{s} u_i y_{ir}}{\sum_{i=1}^{m} v_i x_{ir}} \leq 1, \quad (r = 1,2,...,n)$$
$$u_1,...,u_s \geq 0$$
$$v_1,...,v_m \geq 0. \tag{2}$$

The weights are chosen in such a way that assigns the best set of weights to each DMU. The term 'best' is used to mean that resulting output to input ratio for each DMU is maximized relative to all other DMU when those weights are assigned to these inputs and outputs for every DMU. We say that DMU_j is CRS-efficient (technical efficient) if $\mathrm{q}^* = 1$ and there exists at least one optimal solution $\left(\mathbf{v}^*, \mathbf{u}^*\right)$ with $\mathbf{v}^* > 0$ and $\mathbf{u}^* > 0$.

We can rewrite model (1) into a matrix form. Let's define the matrix of inputs and outputs

$$\mathbf{Y} = \begin{pmatrix} y_{11} & \cdots & y_{1n} \\ \vdots & \ddots & \vdots \\ y_{s1} & \cdots & y_{sn} \end{pmatrix} \quad \text{and} \quad \mathbf{X} = \begin{pmatrix} x_{11} & \cdots & x_{1n} \\ \vdots & \ddots & \vdots \\ x_{m1} & \cdots & x_{mn} \end{pmatrix}. \tag{3}$$

Now we can write a linear program in matrix form as:

$$\begin{aligned} \max \quad & \theta = \mathbf{u}^T \mathbf{y}_j, \\ & \mathbf{v}^T \mathbf{x}_j = 1 \\ & \mathbf{u}^T \mathbf{Y} \leq \mathbf{v}^T \mathbf{X} \\ & \mathbf{u} \geq \mathbf{0} \\ & \mathbf{v} \geq \mathbf{0}. \end{aligned} \tag{4}$$

The dual problem of linear program (4) is expressed with a real variable q and non-negative vector $\lambda = \left(\lambda_1,\ldots,\lambda_n\right)^T$ of variables as follows:

$$\begin{aligned} \min \quad & \theta \\ & \theta \mathbf{x}_j - \mathbf{X}\lambda \geq \mathbf{0} \\ & \mathbf{Y}\lambda \geq \mathbf{y}_j \\ & \lambda \geq \mathbf{0}. \end{aligned} \tag{5}$$

For inefficient DMU we can reduce the use of inputs by q that $(\theta \mathbf{x}_j, \mathbf{y}_j)$ lies on the efficiency frontier. The CRS model assumes the constant return-to-scale production possibility set, which postulates that radial expansion and reduction of all observed DMUs. Since CRS efficiency does not distinguish whether DMU is "big "or "small," we can use this model to measure the theoretical inefficiency gap of each DMU in respect to the efficiency frontier. In this respect the SCR score is also called 'global technical efficiency' (Cooper, Seiford, Tone, 2007).

In (5) we have constraint $\boldsymbol{\lambda} \geq \mathbf{0}$, which defines, as mentioned above, a constant return to scale. In the case when using $\|\boldsymbol{\lambda}\| = 1$ in equation (5) we have a variable return to scale model (VRS) (Mahlberg, Url, 2003). Scale efficiency measures the distance between the frontier under VRC and CRS technology. It can be interpreted as a potential cost saving of a firm from adjusting to the optimal size. It is calculated as a ratio between CRS efficiency and VRS efficiency.

Cost efficiency can also be measured by the estimation of efficient frontiers. In this case the efficient frontier represents the optimal cost level for a given use of inputs and output. Cost efficiency was first introduced by Fare, Grosskopf, and Lovell (1985). They define cost efficiency of DMU_j as follows. First we solve linear program

$$\begin{aligned} \min \quad & \mathbf{c}_j^T \bar{\mathbf{x}} \\ \bar{\mathbf{x}} \ & \geq \mathbf{X}\boldsymbol{\lambda} \\ \mathbf{y}_j & \leq \mathbf{Y}\boldsymbol{\lambda} \\ \boldsymbol{\lambda} \ & \geq \mathbf{0}. \end{aligned} \tag{6}$$

where $\mathbf{c}_j$ is the unit cost vector of input vector $\mathbf{x}_j$ and may vary from one DMU to another. Based on the optimal solution $\left(\mathbf{x}^*, \boldsymbol{\lambda}^*\right)$, the cost efficiency of DMU_j is defined as

$$E_C = \frac{\mathbf{c}_j^T \mathbf{x}^*}{\mathbf{c}_j^T \mathbf{x}_j}. \tag{7}$$

For additional, in-depth explanations of the DEA methodology and different models, the reader is referred for example to Cooper et al., (2007).

4. CHOOSE OF INPUTS AND OUTPUTS

For our analysis we choose the period from 2006 to 2010. The Croatian data was collected from FINA (Croatian Financial Agency) for years 2007 to 2010 which are publicly available. For year 2006 the data was inputted manually from the respective annual company accounts. After eliminating companies where data was only available for a short part of the sample period, 24 life and non life insurance companies, representing for 98 percent of total premiums, were included in the final analysis. Data for Slovenian insurance firms was provided by the Slovenian insurance association and includes data of their members. After eliminating firms with incomplete data, the sample comprised 15 companies, which again representing 98 percent of the industry premiums.

Defining appropriate inputs, outputs, and their prices is critical in every efficiency analysis. Results obtained from DEA could be misinterpreted if the quantities are poorly defined. In this respect it is important to understand the services offered by the underlying financial sector to identify proper set of inputs and outputs, which will be analyzed. This is especially important in the insurance industry where many outputs are intangibles (see Ivanjko, 1996).

It is commonly agreed among researchers that insurer inputs can be classified into three principal groups: labor, business services and materials, and capital (Cummins, Weiss, 2000). If

data is available it makes sense to split labor into agent labor and back office labor since agency labor costs represents variable cost, while back office personnel usually represents a fix cost and those two could have different price. However, since companies include internal agents costs as a part of labor salaries and external commission as a part of acquisition cost, using separate data could be misleading.

In some studies (see Ennsfellner et al., 2004, Hussells et al., 2007) authors argue that the operating expenses should be treated as a single input in order to reduce the number of parameters. In this analysis we follow this approach. When analyzing the operating expenses of the insurance market, it can be clearly seen that these are mostly labor and commission related, in respect to both, life and non-life insurance operations, with the two largest items are acquisition costs and employee salaries (see Medved 2004). We therefore concentrate on insurance labor costs to determine the price of the operating expenses input factor. The price of labor is taken as an average gross monthly salary for the insurance industry taken from AJPES (The Agency for Public Legal Records and Related Services), classification 66.0 for Slovenia, and taken from the Croatian bureau of statistics, classification 65.0.

Because the number of employees and agents at the company level are not publicly available in Slovenia and Croatia, we follow the approach taken in the majority of insurance efficiency studies to estimate the quantity of labor by dividing expenditure for operating expenses with average monthly gross wage rate for the insurance industry (see Cummins, Weiss, 2000). With such an approach companies are ranked on the same level, regardless of sales strategy they perform (internal or external sales force). This simplification is also common in many other international surveys (Fenn et al., 2008, Eling et al., 2010) using the same arguments as we do in our survey.

One way of deriving cost of capital is the three-tier approach to measuring cost of equity capital based on AM Best ratings as proposed by Cummins et al., (2000). Since company ratings are not available for the Croatia and Slovenia market (at least not for all participants), we use as a proxy for cost of capital a nine and a half year average of the yearly rates of return of the country-specific stock market indices. The respective average was calculated from year 1991 up to first half of 2011. This gives a cost of capital for the Croatian market in the amount of 15.95% and 15.44% for Slovenia. The same approach to determine price of capital was proposed by Hussels et al., (2007).

In order to directly compare monetary values, all monetary values are deflated by the harmonized indices of consumer prices using base year 2006 (see Cummins et al., 2000). Country-specific Harmonised Indices of Consumer Prices (HICP) for services was obtained from EUROSTAT statistics. This index, which is similar to CPI, allows international comparisons and has also been published for the Croatian market since 2005.

In contrast to insurance input there is no common consensus among researchers regarding which insurance outputs are most appropriate for an optimization measurement in the insurance industry. Different outputs have been tested in surveys, among them: gross premiums, net written premium, policyholders reserve, addition on reserves, number of policies, incurred claims, investment income, and others (see Cummins, et al., 2000, Eling et al., 2010). The most

appropriate output measure for the insurance industry would be the embedded value of company, but usually this company information is not publicly available.

We will follow the value-added approach to define appropriate measure output (see Cummins and Rubio-Misas 2006). According to Eling et al., (2010a) the value-added approach to define output is clearly dominant in the insurance industry: So far, 78 out of 93 studies have applied this approach. However, there is no consensus whether benefits (claims for non life operation and mathematical reserve for life operation) or premiums are more appropriate proxy for the value-added approach. Taking insurance claims as output is questionable since under such an assumption management should seek to maximize the value of insurance claims which is clearly not the case (see Diacon et al., 2002). Claims reserves can be regarded as a stochastic process which in addition adds stochastic variability to data.

In this survey we define output as gross written premium, separate for life and non-life business. Some authors (Yuengert, 1993) have criticized such an approach, because premiums represent price time quantity of output and could not be output as such. But if we look at gross written premiums as a market measure, we can perform an optimization survey on that basis. Since Slovenian, as well as Croatian, insurance management in general optimize market share as a strategic goal, we believe this is the right choice. In their survey, Hussels et al., (2007) found a similar efficiency score for the German insurance industry using either claims or premiums output. Since Germany is a typical representative of the highly regulated insurance market before adoption of the single passport, and on the other hand, Slovenia and Croatia belong to the same group, indicates that use of premiums will generate representative results.

The descriptive statistics for each county are presented in Table 2. While operating expenses (salaries, commission, and business services cost) are comparable in both countries, average gross written premiums for life and non life insurance business is more than twice as high in Slovenia than in Croatia. The capital position in both countries goes in line with premiums, since it is according to solvency regulation in each country correlated with premiums. Average gross monthly salary in the period from 2006 to 2010 for the insurance industry sector is 37% higher in Slovenia, but the difference has been closing up since 2008. All financial data is presented in EUR, using the average exchange rate for the year of observation.

Table 2. Descriptive statistics

	Croatia				Slovenia			
Variable	Mean	Stdev	Min	Max	Mean	Stdev	Min	Max
Monthly gross salary	1,531.8	77.4	1,450.0	1,635.0	2,104.4	111.8	1,922.0	2,212.0
Salaries, commission and business services costs (Mio EUR)	20.42	28.63	0.75	145.40	29.16	36.74	1.02	145.60
Capital (Mio EUR)	29.94	47.54	2.98	250.73	56.75	115.96	0.99	482.67
GWP Life (Mio EUR)	16.04	16.43	0.00	58.69	35.36	56.10	0.00	232.10
GWP Non Life (Mio EUR)	44.75	82.82	0.00	398.75	100.18	142.81	0.00	531.34

Source: Author calculation

5. EMPIRICAL RESULTS

Table 3 provides the various DEA measures of efficiency for the Croatian insurance market using gross written premiums as the output measure. Technical efficiency (under CRS technology), scale efficiency, and cost efficiency are presented. Estimates are calculated from separate frontiers for Croatia, measuring efficiency taking into account interrelationship benchmark within the market. The efficiency of the total market is calculated as a geometrical mean of scores of individual firms.

By applying benchmark technology under technical efficiency, the market can improve efficiency by reducing inputs by 26%, meaning that the market could produce the same output (premiums) with 26% less resources. The results by weighing of geometric mean indicate that technical inefficiency is more affected by small companies.

Taking into account mergers and acquisitions which have taken place in recent years in the Croatia insurance market it is interesting to see, whether companies can actually improve their efficiency by increasing the size of their company. Table 2 also presents average scale efficiency for all years. The average value of 0.79 in the last five years indicates that insurance companies would be able to improve their efficiency on average by 21% by adjusting to the right size. But there is a clear trend of improving scale efficiency starting from 2008, which may reflect mergers activities in recent years. Since the Croatian insurance market is still in the developing stage these results are within expectations. Having scale efficiency on an average higher than global technical (CRS) efficiency meaning that technical inefficiency of the insurance industry

is more attributed to the inefficiency of company operations rather than scale (see Cooper et al., 2007).

Turning to cost efficiency results shows decline in cost efficiency from the 2006 to 2008 period. After that period cost efficiency in the Croatian insurance market started to increase quite rapidly. This might indicate that due to the financial crisis, which started in 2008, management was forced to allocate available resources more efficiently. The average result of cost efficiency of 66% indicates that the average firm could reduce their cost by 34%. In depth analysis shows that above average cost efficient have specialized companies performing only non- life insurance operations and the least cost efficient are firms performing only life insurance operations. This might be explained by the fact that the Croatian life insurance market is still in the developing phase, and the current size of income from those operation does not allow management to operate more cost efficiently, since fixed costs for every insurance operations are significant.

Table 3. Efficiency score for Croatia

	2010	2009	2008	2007	2006	Average
CRS						
Geom. mean	0.76	0.73	0.60	0.73	0.89	0.74
Weighted geom. mean	0.83	0.82	0.85	0.88	0.96	0.87
Standard deviation	0.22	0.23	0.30	0.22	0.15	0.22
Max	1.00	1.00	1.00	1.00	1.00	1.00
Min	0.15	0.10	0.02	0.04	0.55	0.17
Scale Efficency						
Geom. mean	0.83	0.78	0.64	0.79	0.93	0.79
Weighted geom. mean	0.86	0.85	0.88	0.92	0.98	0.90
Standard deviation	0.20	0.22	0.30	0.22	0.12	0.21
Max	1.00	1.00	1.00	1.00	1.00	1.00
Min	0.15	0.10	0.02	0.04	0.62	0.19
Cost Efficiency						
Geom. mean	0.72	0.67	0.50	0.60	0.81	0.66
Weighted geom. mean	0.79	0.79	0.76	0.80	0.91	0.81
Standard deviation	0.20	0.22	0.27	0.22	0.18	0.22
Max	1.00	1.00	1.00	1.00	1.00	1.00
Min	0.14	0.09	0.02	0.03	0.49	0.15
Number of DMU	20	23	23	21	14	20

Source: Author calculation

Results for the Slovenia insurance market are presented in Table 4. Comparing the results for inter efficiency measures for Slovenia and Croatia, which are measured separately, we can observe that on average companies in Croatia operate more efficiently than companies in Slovenia.

The results for technical, scale, and cost efficiency in Slovenia stay close to their mean values throughout the observed period. A slow decrease could be observed in technical efficiency in the period from 2008 to 2010, indicating that management of insurance companies did not succeed in reducing resources after the crash of the financial market – which in the insurance industry has the consequence of dropping written premiums. Relatively low scale efficiency over the last two years could be interpreted that in recent years there were no mergers and acquisitions in the market, and also indicates potential in the market for investors. Average cost efficiency of 49% indicates, that companies in Slovenia could reduce their cost by almost 51%. Large companies are more cost efficient than small meaning that the size of small companies is not optimal.

In addition, we compared companies that are active in only one line of business (either life or non-life) with companies that are active in more than one line of business (composite insurance company). The average technical efficiency for specialized companies is 15% larger than those for composite companies. This finding is in line with Cummins et al., (2008), who conclude that diversifying in different lines of business is not always better than a strategic focus on one line.

Table 4 Efficiency score for Slovenia

	2010	2009	2008	2007	2006	Average
CRS						
Geom. mean	0.60	0.62	0.65	0.60	0.54	0.60
Weighted geom. mean	0.65	0.74	0.73	0.65	0.60	0.67
Standard deviation	0.26	0.27	0.26	0.28	0.27	0.27
Max	1.00	1.00	1.00	1.00	1.00	1.00
Min	0.15	0.14	0.14	0.10	0.11	0.13
Scale Efficency						
Geom. mean	0.69	0.69	0.74	0.74	0.69	0.71
Weighted geom. mean	0.69	0.77	0.76	0.74	0.68	0.73
Standard deviation	0.27	0.28	0.26	0.26	0.27	0.27
Max	1.00	1.00	1.00	1.00	1.00	1.00
Min	0.15	0.14	0.14	0.10	0.11	0.13
Cost Efficiency						
Geom. mean	0.55	0.55	0.48	0.44	0.40	0.49
Weighted geom. mean	0.61	0.66	0.56	0.51	0.51	0.57
Standard deviation	0.26	0.25	0.24	0.25	0.26	0.25
Max	1.00	1.00	1.00	1.00	1.00	1.00
Min	0.14	0.14	0.12	0.10	0.09	0.12
Number of DMU	14	14	13	13	13	13.4

Source: Author calculation

Results we present here for Slovenia are in line with results from the survey made by Hussels and Ward (2007) when they measured various efficiency scores for Germany. The average cost efficiency of the German insurance industry in their study was calculated at 0.560, and the average scale efficiency at 0.713. Since both countries belong to a continental approach to the insurance industry those results are not surprising.

Table 4 presents the selected DEA measures of efficiency where the estimates are calculated from the combined frontiers of Croatia and Slovenia to analyze each country's firms as if it would be operating under a single market. This allows us to compare internationally the performance of the insurance industry in each market. Croatian average cost efficiency on the joint frontier is 28% and the Slovenian is 49%. Similar is the technical efficiency for Slovenia whose result is 0.6, which is higher than in Croatia (0.37). In this respect it is more likely that Slovenian insurance companies define the joint frontier, and are therefore the more efficient industry. For example, in 2010 there was no Croatian insurance company which would lie on the cost efficient frontier, since the maximum score for that year was 0.748 for companies operating on the Croatian market. On other hand, if we compare results from a single frontier (see Table 2 and Table 3), we can conclude that the Croatian insurance industry locally on average operates closer to an efficient frontier than the Slovenian insurance market. Taking into account the results from Table 4, we could make the conclusion that the Croatian insurance market is less competitive. But in 2010 more than 65% of insurance companies in our sample were foreign owned companies, which make it unlikely that the Croatian market will be in a low competitive environment.

Two points have to be mentioned here. First, in our survey we could not include the influence transaction costs could have on our results, since that data is not available. Especially for the companies that are members of international financial groups transaction costs could be an important driver for efficiency. Evidence from a banking sector survey in Slovenia (see Kavčič et al., 2004) also shows that foreign banks adjust the pricing structure to local circumstances in order to retain part of the extra profit which is offered by the market. This might also happening in the Croatia insurance sector. Secondly, the insurance market is a highly regulated industry with high fixed costs connected to the labor force and capital. Since the Croatian insurance market is still underdeveloped (this is especially true for life insurance operation) management of companies has a much harder task to improve cost efficiency. Our conclusion then could be, that the efficiency of the Croatian insurance sector could be improved with the development of the insurance sector as such.

Table 5. Efficiency measures with joint frontier for Croatia and Slovenia

		2010	2009	2008	2007	2006	average
Technical (CRS)	CRO	0.366	0.404	0.321	0.366	0.373	0.366
	SI	0.598	0.617	0.649	0.597	0.543	0.601
Scale	CRO	0.654	0.607	0.480	0.570	0.759	0.614
	SI	0.692	0.768	0.761	0.741	0.688	0.730
Cost	CRO	0.331	0.334	0.219	0.223	0.267	0.275
	SI	0.555	0.550	0.482	0.438	0.403	0.485

Source: Author calculation

On other hand, results from Table 4 show a similar pattern of scale efficiency for companies from both countries in last few years. Taking into account the lower technical efficiency of Croatia compared to Slovenia, this indicates that inefficiency in Croatia is more affected by inefficient internal operation than in Slovenia. This means that the insurance sector in Croatia will have to invest more in technology, and probably also into research and development in order to improve current trends.

5. CONCLUSION

The purpose of this paper is to analyse the development of the efficiency of the insurance industry in Croatia and Slovenia. In this respect we performed both intra and international efficiency surveys. Comparing the results for intra efficiency measures for Slovenia and Croatia we can observe that on average companies in Croatia operate locally more efficiently than companies in Slovenia. Mergers and acquisitions in recent years in Croatia had a positive effect to scale efficiency improvement. It was detected that technical inefficiency of the insurance industry in Croatia is more attributable to inefficient internal operations rather than scale. This result is important for both managers and investors when defining company strategy and targets. The average result of cost efficiency of 66% in Croatia indicates that the average firm could reduce their cost by 34%. In depth analysis shows that above average cost efficiency have specialized companies performing only non- life insurance operations, and the least cost efficient are firms performing only life insurance operations. The results for Slovenia are not so favorable as for Croatia, but they goes in line with the efficiency scores which were detected in Germany.

We get a reverse picture of efficiency scores when combing the frontiers for Croatia and Slovenia into a single frontier. This allows us to compare the performance of the insurance industry in both markets. The Croatian average cost efficiency of the joint frontier is now much lower and equal to 28%, indicating that insurance industry in Croatia is highly cost inefficient. This might be explained due to fact, that the Croat insurance market is still in the developing phase, and the current size of income from those operation does not allow management to operate more cost efficiently, since fixed costs for every insurance operation is significant.

We can get another explanation of cost inefficiency by observing descriptive statistics where operating expenses (salaries, commission, and business services costs) are comparable in both countries, while the average gross written premium for life and non life insurance business is more than twice as high in Slovenia as in Croatia.

Taking into account lower technical efficiency of Croatia compared to Slovenia, and comparable scale efficiency, this indicates that inefficiency in Croatia is more affected by inefficient internal operation than in Slovenia. The similar findings we have in intra efficiency analysis. This could mean that the insurance sector in Croatia will have to invest more in technology, and probably also into research and development in order to improve internal company efficiency.

A number of open questions regarding efficiency in both markets still need to be addressed. First of all, one needs to analyse the efficiency position of emerging markets within European insurance market as whole and answer to the question how policy makers could help to improve efficiency position of companies in those markets. This could be especially interesting for regulators and politicians to see how EU deregulation effects efficiency position of emerging markets.

At the country level in depth research of technical progress over the financial sector is needed. Suggested by many researchers this could be measured by the Malmquist productivity index.

Last but not least we need to analyse how the efficiency of different lines of insurance operations (such as liability, homeowner, auto, or life insurance) contributes to overall efficiency of the company in both countries. Evidence from the Croatian insurance market shows that companies specialised only in one line of business (life insurance) are the least efficient on the market. This finding is not supported by surveys in other countries– also in Slovenia – and needs to further investigated.

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EMPIRIJSKO ISTRAŽIVANJE UČINKOVITOSTI TRŽIŠTA OSIGURANJA U HRVATSKOJ I SLOVENIJI

Sažetak

U ovom radu analiziramo učinkovitost tržišta osiguranja u Sloveniji i Hrvatskoj između 2006. i 2010. godine korištenjem DEA metode. Vršimo i intra-i inter-državnu analizu učinkovitosti. Unutar pojedinačne zemlje rezultati pokazuju, da u prosjeku društva za osiguranje u Hrvatskoj posluju učinkovitije od društva za osiguranje u Sloveniji. Otkriven je pozitivan trend rasti učinkovitosti opsega, kao posljedica akvizicija i spajanja u posljednjih nekoliko godina u Hrvatskoj. Ipak, međunarodna analiza pokazuje, da je slovenska industrija osiguranja troškovno i tehnički učinkovitija, što pokazuje nisku poziciju učinkovitosti na tržištu osiguranja u Hrvatskoj. Analiza također pokazuje da je neučinkovitosti u Hrvatskim društvima za osiguranje više pod utjecajem neučinkoviti unutarnjih procesa nego u Sloveniji.

Ključne riječi*: DEA, troškovna učinkovitost, tehnička učinkovitost, učinkovitost opsega, Hrvatska, Slovenija*

JEL*: C14; G22; C67; D61*

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PREDICTING BANKRUPTCY WITH SEMI-PARAMETRIC SINGLE-INDEX MODEL

Abstract

Semi-parametric methods are virtually neglected in the bankruptcy prediction literature. This paper compares the logit model, as the standard parametric model for bankruptcy prediction, to the semi-parametric model developed by Klein and Spady (1993). Special care is devoted to the effect of choice-based sampling prediction accuracy. The choice of the sampling and estimation method lead to a similar trade offs. Using choice-based sampling and logit model leads to minimization of risk exposure. Samples unbalanced across groups and the semi-parametric method allow for better overall prediction accuracy and thus profit maximization.

JEL codes*: G32, G33, C14, C25*

Keywords*: bankruptcy prediction, semi-parametric methods*

1 INTRODUCTION

The problem of predicting corporate failure is at the hart of risk management procedures in banks worldwide. An important stimulus towards development of more complex bankruptcy prediction systems came through the implementation of Basel II Accord since it put these systems in the function of managing bank's capital requirements and internal assessment of risk appetite. The interest of academic community has long been present (see Fitzpatrick, 1932) and intensified in recent years with an array of novel methodological approaches.

Methodological approaches used in bankruptcy prediction can be broadly classified into statistical methods and artificial intelligence methods (Min and Jeong, 2009). The first group includes discriminant analysis (used in pioneering studies of Beaver (1996) and Altman (1968)) and binary-choice models like logit or probit. A common statistical property of these methods is that they are fully parametric. The artificial intelligence group comprises of methods that range from artificial neural networks (ANN) and genetic algorithms (GE) to classification and regression trees (CART) (see Paliwal and Kumar, 2009; and Li at al., 2010). A common statistical feature of this second class of models is a fully non-parametric specification of both the distributional form of variables and functional relations among them.

This paper bridges the two model classes in bankruptcy prediction with the application of the semi-parametric binary-choice model. Semi-parametric estimators of single-index binary choice model as proposed by Ichimura (1993) or Klein and Spady (1993) have been successfully applied in other fields of economic analysis, like labor economics, but there exists no published

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application to prediction of corporate failure. The advantage of these models is that they retain all the benefits of parametric binary-choice models in terms of linear functional form among predictors, i.e. the single index assumption, and straightforward interpretability of estimated coefficients. At the same time, they do not impose strict distributional assumptions of the single index, which is the case with logit or probit model. In the case of predicting corporate failure, which is a rare event, such a feature of the model may be very important. In addition, potential heterogeneity of firms may be better captured by models that do not rely on too restrictive distributional assumptions. After all, the application of fully non-parametric data mining methods in bankruptcy prediction is importantly motivated with such a property.

Our comparisons of prediction accuracy are performed out of sample, even though we provide results also for classification accuracy. Besides evaluating the performance of competing models according to overall prediction accuracy only, we put special emphasis to prediction accuracy of bankrupt and healthy firms separately. Finally, special attention is devoted to the construction of the estimation sample. Namely, choice based sampling of the observations into estimation sample that equates the number of bankrupt and healthy firms in the estimation sample is a quite common approach in the literature and practice. While such an approach may be motivated by computational considerations, it is definitely at odds with composition of real data and, consequently, bankruptcy prediction in practice. Choice-based sampling may for this reason lead to significant biases in model's prediction accuracy (Zmijewski, 1983). This paper evaluates prediction accuracy also conditional on the construction of the estimation sample.

On a population of Slovenian listed and non-listed companies our results show that while logit appears to be more precise in detecting bad risks it is also true that the semi-parametric model of Klein and Spady (1993) captures better the characteristics of healthy firms. Considerably larger share of the latter group in the population implies also better overall prediction accuracy. Both the choice of sampling method and the choice of estimation method should be thus made conditional on an explicit objective function of the financial institution in assessing credit risk.

The remainder of the paper is organized as follows. Section 2 introduces competing bankruptcy prediction models. Section 3 presents our data and discusses the formation of the estimation samples. Section 4 presents the results, while Section 5 concludes.

2 PREDICTION MODELS

The focus of our analysis is the use of semi-parametric binary-choice models in bankruptcy prediction, which is, to the best of our knowledge, the first such application in the literature. In particular, we use the estimator proposed by Klein and Spady (1993). The semi-parametric approach to bankruptcy prediction is a methodological bridge between parametric and non-parametric methods. For this reason it is natural to compare its forecasting precision to both parametric and non-parametric methods. In the choice of the first we follow the approach of many applications in the literature and use the logit model (see for example, Li et al., 2010; Chen, 2011 and Min and Jeong, 2009, among others). There are several reasons for such a choice. First,

logit model has been widely used and taught.[3] Second, it is relatively easy to understand and readily available in virtually all software packages. Third, it has resulted to be a fairly robust and reliable tool for forecasting financial distress. Last but not least, both two methods take on the binary choice probability model with a single-index restriction as a basic structure, but differ in terms of distributional assumptions of the single index. The first method assumes a fully parametric specification (logistic distribution). The second uses no parametric assumptions.

Because of their relatively common basic structure we treat the exposition of the logit model and the semi-parametric model of Klein and Spady in a similar way. As a starting point consider a single-index binary choice model

$$y = \begin{cases} 1 & \text{if } \theta' x \geq \varepsilon \\ 0 & \text{otherwise} \end{cases} \quad (1)$$

where

$$P(y = 1|x) = h(\theta' x). \quad (2)$$

that links the probability that the binary dependent variable equals one given the covariates is equal to a probability transformation of the single index $\theta' x$. In principle, both the parameters of the single index θ and the probability transformation function h need to be estimated. Parametric methods assume a known form of h , while semi-parametric methods make no parametric assumptions about h .

2.1 LOGIT MODEL

In the logit model h is a logistic cumulative distribution function

$$h(\theta' x) = \frac{e^{\theta' x}}{1 + e^{\theta' x}}$$

With this assumption the parameter vector θ can be estimated consistently and efficiently by maximizing

$$L = \sum_{i=1}^{N} [y_i \ln(P_i) + (1 - y_i) \ln(1 - P_i)] \quad (3)$$

Common characteristic of all bankruptcy prediction cases is a very small population share of bankrupt firms. This implies that only a limited share of the overall probability mass is accounted for by bankruptcy cases, which may cause the estimated prediction models to describe well the characteristics of healthy firms, but have only limited prediction power for bankruptcy cases. For this reason many empirical applications balance the estimation sample by including equal shares of healthy and bankrupt firms. In such a case, estimation samples a

3 Among the first to apply logit to the problem of bankruptcy were Santomero and Vinso (1977) and Martin (1977) who employed it to examine failures in the US banking sector. Ohlson (1980) applied it more generally to 105 bankrupt and 2,058 non-bankrupt firms. Notable applications that followed include Zmijewski (1984), and Wilson (1992). Accuracy of classification ranged from 76% in the work of Zmijewski (1984), where he employed probit and weighted exogenous sample likelihood models to investigate firms listed on the American and New York stock exchanges from 1972 to 1978, to 96% in the study by Pantalone and Platt (1987), where the authors use logit analysis to determine the causes of banks bankruptcy in the US after the deregulation.

choice based, i.e. the probability of an observation entering the sample depends on the value of dependent variable, which violates the random sampling assumption. Choice-based sampling in general causes both parameter and probability estimates to be asymptotically biased (Zmijewski,1984).

2.2 KLEIN AND SPADY (1993) SEMI-PARAMETRIC ESTIMATOR

One important and potentially empirically relevant deficiency of the logit model is that it requires the validity of the assumption that the cumulative distribution of the error term is logistic. Consequently, it makes sense to investigate alternative specifications, which require less severe distributional assumptions. A good alternative offered by the literature in this respect are semi-parametric models.[4] These models allow for simultaneous estimation of h and θ and as such provide a specification that is more flexible than a parametric model but retains many of the desirable features of parametric models (Horowitz, 2001). The single-index property is crucial for good properties of semi-parametric estimators because it allows to avoid the curse of dimensionality. This is because the index $\theta' x$ aggregates the dimensions of x. Consequently, the difference between the estimator of h and the true function can be made to converge to zero at the same rate that would be achieved if $\theta' x$ were observable. Moreover, θ can be estimated with the same rate of convergence that is achieved in a parametric model. Thus, in terms of the rates of convergence of estimators, a semi-parametric single index model is as accurate as a parametric model for estimating θ and as accurate as a one-dimensional nonparametric model for estimating h. This dimension reduction feature of single index models gives them a considerable advantage over nonparametric methods in applications where X is multidimensional and the single index structure is plausible.

The main estimation challenge in single index models is estimating θ. Several estimators of θ are available in the literature. Ichimura (1993) developed a nonlinear least squares estimator. Theoretically superior is the semi-parametric maximum likelihood estimator of Klein and Spady (1993), which in addition to exhibiting $\sqrt{N}$-consistency and asymptotic normality achieves also the semi-parametric efficiency bound, assuming that the regressors and the errors are independent.

The estimate of θ is obtained by maximizing the quasi-loglikelihood function:

$$\log L(\theta \perp \Lambda) = n^{\intercal}(-1)\ \Sigma_{\downarrow}(i=1)^{\intercal} n \cong\ (\tau_{\downarrow} i/2)[y_{\downarrow} i\ \log(P^{\frown}_{\downarrow} i\ (\theta))^{\intercal} 2 + (1 - y_{\downarrow} i)\log(1 - P^{\frown}_{\downarrow} i\ (\theta)\ ] \qquad (4)$$

τ_i represents the trimming function as specified by Klein and Spady (1993) and is needed to weight down the influence of observations with a very low probability and to ensure the usual convergence rate of the asymptotic distribution of the parameters. Probability $\widehat{P}_i(\theta)$ is estimated using the fourth-order kernel with probability trimming. Klein and Spady (1993)

4 Manski (1985) proposed a semi-parametric estimator that does not rely on a single-index restriction. Subsequently, Horowitz (1992) developed it into the smoothed maximum score estimator. Although smoothed maximum score requires very weak distributional assumptions it has some drawbacks. Its rate of convergence is lower than ordinary parametric estimators. Moreover, it only allows one to estimate the index, but not the probability transformation.

show that with this modifications the proposed estimator of θ is consistent, asymptotically normal and efficient. In addition, their Monte Carlo experiment indicates that there may be only modest efficiency losses relative to maximum likelihood estimation when the distribution of the disturbances is known, and the small sample behavior of the semi-parametric estimator in other cases is good.

As discussed above choice-based sampling may lead to significantly biased results. This observation applies also to semi-parametric methods. For this reason we considered a modification of the quasi-likelihood function in the spirit of Zmijewski (1994). In particular, we optimize

$$\log L(\theta \perp \Lambda) = n^{\dagger}(-1)\ \Sigma_{\downarrow}(i=1)^{\dagger} n \overline{\boxplus}\ (\tau_{\downarrow} i/2)[P_{\downarrow}1/P_{\downarrow}2\ y_{\downarrow} i \log(P^{*}{}_{\downarrow} i\ (\theta))^{\dagger}2 + ((1-P_{\downarrow}1)/(1-P_{\downarrow}2))(1-y_{\downarrow} i)\log(1-P^{\wedge}{}_{\downarrow} i\ (\theta)] \quad (5)$$

where P_1 and P_2 are proportions of bankrupt firms in population and estimation sample respectively. Prediction accuracy of the coefficients obtained with the sampling correction are compared to prediction accuracy of the model without such correction to asses the influence of choice-based sampling on bankruptcy prediction accuracy.

3 VARIABLE SELECTION

Selection of predictor variables is an important step in all bankruptcy prediction studies. To date no unified theory has been generally accepted. We propose a three-stage strategy, which combines expert knowledge and evidence on most successful predictors found in the literature with statistical testing. We start by constructing 64 different financial ratios as potential predictors. In the first step, bivariate logistic regressions were run for each of the 64 ratios on ten randomly created matched subsamples of our dataset. The ratios that on average classify correctly at least 60 percent of bankrupt firms and 60 percent of non-bankrupt firms, were kept for further stages. This left us with a group of 27 financial ratios, 14 measuring profitability, 9 solvency and 4 liquidity of firms. Ratios that classify neither bankrupt nor non-bankrupt firms at 60 per cent accuracy are nine in number. Seven describe firm activity and two are profitability measures. The remaining 28 ratios classified at required precision either bankrupt or non-bankrupt firms, but not both. As such they were not considered in subsequent steps of variable selection.

The ratios that passed the first step were in the second step grouped into seven groups of highly correlated indicators, using 0.5 as the correlation threshold. From each of the groups we extracted one principal component. As a representative of each group we then took the variable with the largest loading to the principal component. We prefer to proceed in this way to using the principal component in prediction models in order to avoid the efficiency loss problem associated with generated regressors, and because principal components can be hardly given any direct economic interpretation.[5]

5 Chen (2011) reports prediction accuracy loss from using PCA.

In the last step logistic step-wise procedure was used to select the final variables. It starts by estimating parameters for variables forced into the model. Next, the procedure computes the adjusted chi-squared statistic for all the variables not in the model and examines the largest of these statistics. If it is significant at conventional levels, the variable enters into the model. One or more elimination steps follow each selection step, i.e. the variables already selected into the model do not necessarily stay. The step-wise selection process terminates if no further variable can be added to the model, or if the variable just entered into the model is the only variable removed in the subsequent elimination.

The three-step selection approach resulted in four financial ratios as the most suitable variables for bankruptcy prediction. Two of the ratios measure liquidity, one solvency and one profitability.

4 DATA AND SAMPLE DESIGN

The data come from two databases of Slovenian companies. The first is the database of 592 bankruptcy cases firms for the same time period collected by I d.o.o. (Slovenian franchise of Dun&Bradstreet), from which we are able to obtain 592 bankruptcy cases in the period under analysis. These are data on all bankruptcy cases filed with Slovenian legal authorities. The second are data of annual financial statements for all Slovenian firms for the period 1995-2001 provided by Agency for public legal records and related services (AJPES).[6] From the initial database we eliminated all observations for which due to missing data we could not calculate all the potential predictive variables (various financial ratios). Industries in the sample mainly cover the manufacturing sector with their size ranging from very small to large.

From the databases we construct two estimation samples. The first uses choice-based sampling, which means balancing the shares of bankrupt and healthy firms in the sample. From the initial sample we created a sub-sample with 592 bankrupt firms and corresponding 592 non-bankrupt mates. Matching is based on the following characteristics: size (measured by total asset), industry and year of bankruptcy. The last matching criterion ensures that financial statements of matched pairs are always of the same vintage. Because matching is primarily used to obtain a balanced sample of bankrupt and healthy firms the samples mainly consist of small and medium-sized companies, since the incidence of bankruptcy in the large-asset-size firm was quite rare.

The second estimation sample is larger. It contains 3900 healthy firms and 592 bankruptcy cases. This implies that the sample contains 13.2 percent of bankrupt firms. Larger estimation samples were not considered because the estimation of the Klein and Spady (1993) semi-parametric model resulted computationally impossible.

Our goal is to test prediction accuracy of competing models in a pseudo out-of-sample context and not model comparison based on in-sample classification accuracy. In both approaches 75 percent of observations were allocated to a subsample on which the models were estimated, and 25 percent to a subsample on which out-of-sample prediction accuracy

6 Post-2001 data was not considered because of a change in accounting standards.

was tested.

From the balance-sheet and income statement data we calculated 64 financial ratios as candidate predictors.[7] Financial ratios can be broadly classified into four categories: liquidity, profitability, solvency and activity. The ratios are chosen on the basis of their popularity in the financial literature and their potential relevance to the study of financial distress. Dependent variable is a binary variable that takes on value one if the firm operates in time t , and zero if the firm filed for bankruptcy in time t . All independent variables are dated $t-1$.

5 BANKRUPTCY PREDICTION

Table 1 presents the estimates of the logit model. Explanatory variables in the model are four financial ratios obtained in the three-stage selection procedure. The model is estimated on two different samples. The first it the matched sample with equal number of bankrupt and healthy firms in the sample. We label this sample "Matched". The second sample is the larger sample with considerably higher share of healthy firms. We label the sample "Large".

As seen from Table (1), all coefficients are significant and correctly signed. We can observe some variation of estimated coefficients across estimation samples. With the exception of the constant all coefficients are within one standard error. In line with findings of Zmijewski (1994) for the constant this is not so, which clearly implies that selection of the estimation sample is important in prediction practice, where loan applicants come from a population with a small share of bankrupt firms.

Table 1: Estimates of the logit model

	Sample	
Coefficient	Matched	Large
constant	-6.98	-5.14
	(0.69)	(0.47)
tfs	-3.86	-3.12
	(0.51)	(0.35)
pppo	0.11	0.10
	(0.01)	(0.005)
kol	0.60	0.85
	(0.19)	(0.15)
cf2d	2.54	3.01
	(0.74)	(0.70)

Standard errors in parentheses.

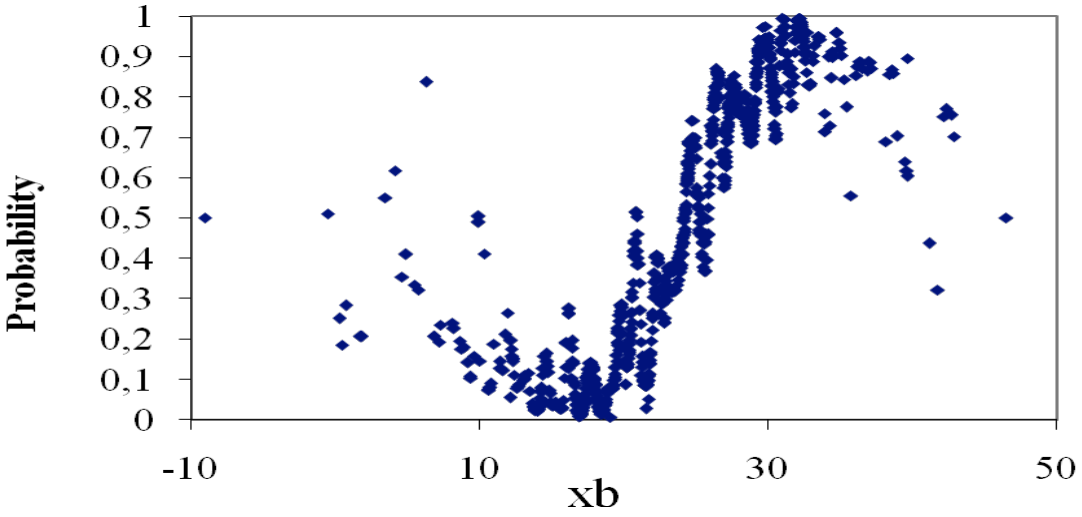
Source: Author calculation

The motivation for considering semi-parametric models in bankruptcy prediction is clearly seen from Figure 1. It plots the distribution function (fitted values) of the estimated Klein and Spady model. It is significantly different from the logistic distribution, which has been confirmed by the Horowitz and Härdle (1994) test (avaiable from the authors upon request). At tails of the distribution it indicates a non-monotonic relation between the estimated single

7 Financial ratios, by their nature, have the effect of deflating statistics by size, implying that a their potential predictive power is not contaminated by firm size (Altman, 2000).

index and probability of default.

Figure 1: Estimated distribution function with the semi-parametric Klein and Spady model 1 (matched sample, without Zmijewski correction, e=6)



Source: Author calculation

Table 2 contains the estimation results for the Klein&Spady semi-parametric model. The model was estimated with two different choices of trimming intensity in optimization of the quasi-likelihood. The constant is not reported because it cannot be identified within the semi-parametric model. For the same reason one of the coefficients needs to be normalized to unity. Virtually all coefficients result to be statistically significant and with signs similar to the logit model (note that the first coefficient is normalized to unity). What clearly emerge from the table are significant differences in estimated parameters when compared to the logit model even after taking into account the normalization of the first coefficient. A second finding is that the trimming intensity importantly affects coefficient estimates. As there is no theoretical guidance for the most appropriate choice we consider both degrees of trimming intensity in the evaluation of prediction accuracy of the model.

Comparison of in-sample classification accuracy of the models is given in Table 3. In this respect three comments are in order. First, it must be noted that the semi-parametric Klein&Spady model does not offer a better overall fit to the data than the logit model even though logit relies on distributional assumptions that are not fully supported by the data. This finding clearly points to certain robustness and reliability of the logit model. Second, choice of sampling clearly demonstrates the trade-off faced by researchers. Choice-based sampling improves classification accuracy of bankrupt firms, but a smaller precision for healthy firms results in an inferior overall fit of the model. Finally, it can be noted that a higher degree of both likelihood and probably trimming in the estimation of the Klein&Spady model that more intensively down-weights the influence of outlying observations in the sample improves model's classification accuracy. The same holds also for out-of sample prediction accuracy, which we turn to next.

Table 2: Estimates of the Klein and Spady semi-parametric model

	Sample			
	Matched		Large	
	trimming intensity (e)			
Coefficient	6	4.3	6	4.3
tfs	1.00	1.00	1.00	1.00
$pppo$	-5.57	-2.33	-2.38	-3.24
	(0.13)	0.13)	(0.01)	(0.09)
kol	-4.34	-2.94	-6.42	-1.32
	(0.10)	(0.16)	(0.03)	(0.04)
$cf2d$	-2.26	-2.81	-6.58	-1.34
	(0.10)	(0.24)	(0.02)	(0.05)

Notes: Standard errors in parentheses. A higher value of parameter e e implies less trimming and vice versa

Source: Author calculation

Table 3: In-sample cassification accuracy

		Sample	
Model		Matched	Larger
Logit	Healthy	89.0	98.1
	Bankrupt	82.4	54.9
	Overall	85.7	92.4
Klein& Spady $e = 6$	Healthy	81.7	96.6
	Bankrupt	79.7	59.9
	Overall	80.7	91.8
Klein & Spady $e = 4.3$	Healthy	83.6	97.1
	Bankrupt	83.8	55.4
	Overall	83.7	91.6

Source: Author calculation

The results of out-of-sample prediction accuracy are presented In Table 4. Models are tested on two different samples and, as explained in Section 4, both samples were divided so that 75 per cent of observations were used for estimation and 25 per cent for testing out-of-sample prediction accuracy.

Fourth, the most important observation concerns the comparison of logit and Klein&Spady semi-parametric model. It clearly emerges from Table 4 that logit is better in prediction accuracy of both bankrupt and healthy firms only when prediction is done on a matched sample. Such a situation does not correspond to real-life assessment of firms creditworthiness. Credit applicants are not drawn from a distribution with balanced group shares. Share of bankrupt firms is considerably smaller in the true population of credit applicants. In this respect the most interesting comparison of models follows from prediction accuracy on the sample with population group shares (label P). Logit turns out to be better in predicting bankruptcy cases while the semi-parametric model more successfully captures the characteristics of healthy firms. Since the share of the latter group is considerably larger this results also in

better overall prediction accuracy. The difference is not large, but consistent across different model specifications. Relative merits of the two methods therefore depend on the objectives of financial institution in credit risk assessment. If the objective is minimization of exposure to risk then logit model would deliver better results as it would deliver less bankrupt firm to the portfolio. However, this also implies that the rejection of a very large number of potentially good risks. With the objective of profit maximization the semi-parametric model seems to be preferable, because it offers a better overall prediction accuracy. The difference is particularly pronounced if financial institutions estimate their models on relatively small and choice-based samples.

Table 4: Prediction accuracy

Model		Sample	
		Matched	Large
Logit	Healthy	84.8	98.1
	Bankrupt	79.7	54.7
	Overall	82.8	97.5
Klein& Spady $e = 6$	Healthy	77.2	99.7
	Bankrupt	72.3	6.1
	Overall	74.7	98.3
Klein& Spady $e = 4.3$	Healthy	80.0	99.8
	Bankrupt	77.7	8.1
	Overall	78.8	98.4

Source: Author calculation

Finally, it must be noted that choice-based sampling induces the same type of trade-off as between parametric or semi-parametric methods. Balancing the sample in favor of bankrupt firm obviously increases the prediction accuracy of potential bankruptcy cases. However, extended credit lines in real life have highly unequal shares. Minimization of risk exposure in this respect comes at the expense of overall prediction accuracy and hence profit opportunities. In this respect, both the choice of sampling method and the choice of estimation method should be made conditional on an explicit objective function of the financial institution in assessing credit risk.

6 CONCLUSION

In this paper we give the first evaluation of semi-parametric estimators of binary-choice models in bankruptcy prediction. The method is very appealing, on one hand because its single index restriction facilitates easy interpretation of estimated coefficient, on the other because it does not rely on any parametric assumptions of the distribution of the single index. As such it is a bridging method between standard and fully parametric statistical methods and non-parametric artificial intelligence methods.

On an exhaustive sample of Slovenian firms we show that logit appears to be more precise in detecting bad risks. The semi-parametric model of Klein and Spady (1993) better captures the characteristics of healthy firms. Considerably larger share of the latter group in the population

implies also better overall prediction accuracy.

Present application of the semi-parametric model to bankruptcy prediction is the first such evaluation of the method in the literature and thus represents a starting point for further research. One obvious extension is predictor selection within the semi-parametric context. Namely, in the present application we selected the set of predictors by using the step-wise procedure that builds the testing procedure on the likelihood function of the logit model and then estimated the semi-parametric model using the same variables. In this respect we put the semi-parametric model to an important disadvantage in the comparison of predictive accuracy. Given this constraint we find the presented results even more encouraging. An obvious extension would thus be casting the step-wise variable selection procedure to a semi-parametric likelihood framework.

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PREDVIĐANJE BANKROTA POMOĆU POLU-PARAMETARSKOG MODELA JEDINSTVENOG INDEKSA

Sažetak

Polu-parametarski modeli su doslovno zanemareni u literaturi o predviđanju bankrota. Ovaj rad uspoređuje logit model, kao standardni parametarski model za predviđanje bankrota, sa polu-parametarskim modelom kojeg su razvili Klein i Spady (1993). Posebna je pažnja posvećena efektu choice-based uzorkovanja na točnost predviđanja. Odabir metode uzorkovanja i procjene dovele su do sličnih balansiranja (trade offs). Korištenje choice-based uzorkovanja i logit modela dovodi do minimaliziranja rizika. Nebalansirani uzorci i polu-parametarska metoda omogućuju generalno bolju kvalitetu predviđanja te tako i maksimizaciju profita.

Ključne riječi*: predviđanje bankrota, polu-parametarske metode, CART*

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IMMIGRATION AND TRADE

Abstract

This paper investigates the relationship between intra-industry trade (IIT), horizontal IIT, vertical IIT (VIIT) and immigration flows using a gravity model for the period 1995-2008 amongst Portugal and European Union's Member States (EU-27). Using a panel data approach, the results show a positive correlation between immigration and IIT. These outcomes indicate that the immigration can reduce transaction costs between home and host country. We also consider the economic dimension which appears to exercise a positive effect on trade. Our research confirms the hypothesis that there is a negative effect of transportation costs on trade.

Keywords*: Intra-industry trade, Horizontal intra-industry trade, Vertical intra-industry trade, Immigration and Panel Data.*

JEL Classification*: C20, C30, F12, L10.*

1. INTRODUCTION

The intra-industry trade (IIT) literature began in the 1960's, when Balassa (1966) pointed out that most of the growth in manufacturing followed the formation of customs' union in Europe. The initial theoretical models of IIT were synthesized in Helpman and Krugman's model - representing a Chamberlin-Heckscher-Ohlin model – which combines monopolistic competition with the Heckscher-Ohlin (HO) theory, incorporating factor endowments' differences, horizontal product differentiation and increasing returns to scale.

The intra-industry trade (IIT) or two-way trade is defined as simultaneous exports and imports of a product within a country or a particular industry.

The link between immigration and intra-industry trade was explained in the 1990s by Krugman (1993). The author considered two regions (North and South) and introduced the mobility amid these regions. This practice involves the phenomena of migration. Some authors as Blanes (2005), Leitão (2011) and White (2009) demonstrate that, the immigrants can induce the intra-industry trade. The idea consents to the explanation that transactions costs and geographical distances contributes to a decrease in IIT, whereas immigration usually leads to an increase in IIT.

Girma and Yu (2002) argue that immigration is typically positively correlated to bilateral trade. Immigrants bring with them a preference for home-country products. In other words, immigration can reduce transaction costs between home and host country.

Based on this stream of literature, the present article analyses the impact of immigration on Portuguese intra-industry trade. Our study uses a panel data between Portugal and European

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Union for the period 1995-2008.

Following Hummels and Levinshon (1995) the manuscript applies a logistic transformation to IIT, horizontal (HIIT) and vertical intra-industry trade (VIIT).

The paper is organized as follows: the next section presents the theoretical background; Section 3 presents the indexes of intra-industry trade. In the Section 4 we develop the methodology and the econometric model. Section 5 analyses the econometric results. Section 6 concludes.

2. LITERATURE REVIEW

In this section we present a survey of the theoretical models of intra-industry trade and their relationship with immigration. The empirical models of mid 80s and beginning of 90s introduced two types of products differentiation (horizontal and vertical intra-industry trade).

Horizontal intra-industry trade (HIIT) occurs within similar quality products. The products are differentiated by attributes as in Krugman (1979), Lancaster (1980), Eaton and Kierzkowski (1984) and Helpman and Krugman (1985). The neo-Chamberlinian models, such as the Krugman model, assume that all varieties enter the utility function symmetrically. By contrast, the neo-Hotelling model, such as the Lancaster model, assumes asymmetry. In these models, each variety is produced under decreasing costs and when the countries engage in trading, the similarity of demands explains IIT.

Vertical intra-industry trade (VIIT) is explained by different varieties of quality product; see Falvey (1981), Falvey and Kierzkowski (1987) and Shaked and Sutton (1984). On the demand side, we have consumers with different preferences, i.e, there is a correlation between quality and price. On supply side, it is assumed that varieties could be higher or low quality. The lower quality products are labour intensive and the higher quality are capital intensive.

The link between intra-industry trade and immigration

The cultural, historical and geographical identities permit the decrease of transaction costs. Some authors as Gould (1994), Head and Ries (1998), Dunlevy and Hutchninson (2001) found a positive impact between immigration and bilateral trade. In medium or long run, when the immigrants become citizens of the host country, the transaction costs also decrease and we have a phenomenon of so-call acculturation.

Following the empirical models of Blanes (2005), Leitão (2011), Faustino and Leitão (2008) and White (2009 the immigration stock includes immigrants and immigrant entrepreneurs. According to the literature, the immigration can reduce transaction costs between foreign and host country, though ethnic networks or information mechanisms (transaction cost reduction channel). This explains the positive effect of immigration on intra-industry trade.

The study of Blanes (2005) provides evidence of immigrants in Spain having a positive effect on the share of its intra-industry trade. According to Blanes' findings, immigration contributes to trade transaction costs' reduction and this benefit the trade in differentiated products (IIT).

The article of Leitão (2011) examines the relationship between IIT and immigration using

a gravity model for the period 1995-2008 between United States and NAFTA, and ASEAN. The author applies a static and a dynamic panel data analysis. The results of Leitão (2011) show that economic dimension, and stocks of immigration are positively correlated with IIT. The trade imbalance is negatively correlated with IIT.

The studies of Faustino and Leitão (2008), White (2009) consider not only IIT, but also horizontal intra-industry trade (HIIT) and vertical intra-industry trade (VIIT).

Faustino and Leitão (2008) test the relationship between immigration and Portuguese bilateral trade. The results show that the stock of immigrants has a positive effect on Portuguese exports, imports and bilateral intra-industry trade. According to Faustino and Leitão (2008) the findings suggest that when immigrants to Portugal originate from a Latin partner-country, the effects on trade are stronger than in the case of immigrants from non-Latin countries.

The study of White (2009) demonstrates the importance of immigrants' connections to business and social networks. The author concludes that the effects of state, regional and national levels affect the immigration from developing countries.

3. MEASUREMENT OF INTRA-INDUSTRY TRADE

In this section we develop the argument of the indexes of intra-industry trade (IIT), horizontal (HIIT) and vertical intra-industry trade (VIIT) as previously defined.

In addition, Grubel and Lloyd (1975) define IIT as the difference between the trades balances of industry i and the total trades of the same industry. In order to simplify the comparisons between industries or countries, the index is presented as a ratio, where the denominator is total trade.

$$IIT_{it} = 1 - \frac{\left|X_i - M_i\right|}{\left(X_i + M_i\right)} \tag{1}$$

The index is equal to 1 if all trade is intra-industry. If IIT_{it} is equal to 0, all trade is inter-industry trade. Grubel and Lloyd (1975:22) propose an adjustment measure to country's IIT index (IIT calculated for all individual industries), introducing the aggregate trade imbalance.

Furthermore, Aquino (1978:280) considered that an adjustment measure is required, at a more disaggregated level. However, the Grubel and Lloyd method is inadequate for this purpose. Thus, following Aquino (1978), it is require an appropriate imbalance effect. The unbalancing effect must be equi-proportional in all industries in order to highlight "what the values of exports and imports of each commodity would have been if total exports had been equal to total imports" (Aquino, 1978:280).

3.1 THE HIIT AND VIIT INDEXES

To determine the horizontal ($HIIT_{it}$) and vertical intra-industry trade ($VIIT_{it}$), Grubel and Lloyd indexes and the methodology of Abd-el-Rahaman (1991) and Greenaway et al. (1994) are used, i.e the relative unit values of exports (UV_{it}^{X}), and imports (UV_{it}^{m}).

Where $HIIT_{it}$:

$$1-\alpha \leq \frac{UV_{it}^{X}}{UV_{it}^{m}} \leq 1+\alpha \tag{2}$$

and $VIIT_{it}$ is :

$$\frac{UV_{it}^{X}}{UV_{it}^{m}} \leq 1-\alpha \quad \text{or} \quad \frac{UV_{it}^{X}}{UV_{it}^{m}} \succ 1+\alpha \tag{3}$$

Where α = 0.15. When the relative unit values of exports and imports are less than 15% the trade flows are horizontally differentiated (HIIT).

The HIIT and VIIT indexes are also calculated with desegregation at 5-digit Portuguese Economic Activity Classification from INE-Trade Statisitcs.

4. ECONOMETRICAL MODEL

The sources of the data regarding the explanatory variables are the World Bank Development Indicators (2011) and Serviços de Fronteiras, Ministério da Administração Interna (Border Services Administration, Portugal). The source used for dependent variables was INE - the Portuguese National Institute of Statistics (Trade Statistics). There are no cases of missing data.

4.1 DEPENDENT VARIABLES

The dependent variables used are IIT, HIIT and VIIT computed according to the methodology of Grubel and Lloyd (1974). Because the IIT is an index varying between zero and one, we apply a logistic transformation to IIT, HIIT and VIIT (see Hummels and Levinshon (1995) Logistic IIT=LN[IIT/(1-IIT)]. The same is carried out for HIIT and VIIT.

Explanatory Variables

The paper uses the following explanatory variables in logs:

- Electric Power Consumption: (EP): It is the absolute difference in electric power consumption (Kwh per capita) between Portugal and European partners. Helpman (1987) and Hummels and Levisnhon (1995) considered a negative correlation between IIT and differences in factor endowments. According to Helpman and Krugman (1985), we expect a positive sign for the VIIT model and negative sign for the HIIT model.
- DIM: This is the average of GDP per capita between Portugal and the partner country. According to Gross and Helpmam (2005), White (2009), Leitão (2011) a positive sign should be expected. The economic size is important to differentiated products.
- IMI: This is the stock of immigration in Portugal by partner-country. The expected effect on IIT, HIIT and VIIT is positive. Blanes (2005), White (2009), and Leitão (2011) found a positive sign.
- DIST (Geographical Distance): This is the geographical distance between Portugal and partner country. According to the gravity model, a negative sign is expected for all models.
-

4.2 MODEL SPECIFICATION

In order to test for the links between the intra-industry trade and its considered determinants, we adopt a formal model specification such as:

$$y_{it} = \beta_0 + \beta_1 X_{it} + \delta t + \eta_i + \varepsilon_{it} \quad (4)$$

y_{it} is the intra-industry trade (IIT_{it}) horizontal IIT ($HIIT_{it}$) and vertical IIT ($VIIT_{it}$), X is a set of explanatory variables. All variables are in the logarithm form; η_i is the unobserved time-invariant specific effects; δt captures a common deterministic trend; ε_{it} is a random disturbance assumed to be normal, and identically distributed (IID) with E (ε_{it})=0; Var (ε_{it}) = $\sigma^2 \succ 0$.

5. EMPIRICAL STUDY

Before estimating the panel regression model, we have conducted a test for unit root of the variable. The table 1 presents the results of panel unit root test (ADF-Fisher Chi square).

Table 1. Panel unit root test results

Intercept and trend		
LogIIT	**Statistic**	**Probability**
ADF- Fischer Chi-square	220,0561	0,0000
LogHIIT		
ADF- Fischer Chi-square	508,6382	0,0000
LogVIIT		
ADF- Fischer Chi-square	171,4537	0,0000
LogEP		
ADF- Fischer Chi-square	135,2113	0,0000
LogDIM		
ADF- Fischer Chi-square	65,6294	0,0682
LogImi		
ADF- Fischer Chi-square	41,0752	0,8117

Source: Author calculation

The most important variables such as the intra-industry trade (LogIIT), horizontal intra-industry trade (LogHIIT), vertical intra-industry trade (LogVIIT), electric power consumption (LogEP), economic dimension (LogDIM) do not have unit roots, i.e, are stationary with individual effects and individual specifications.

The model of intra-industry (IIT) is reported in Table 2. Our analysis evaluates the signs of the coefficients and their significances.

Table 2. Intra-industry trade and immigration

Variables	*OLS*	*Random Effects*	Tobit Model
LogEP	1,372	0,709	0,441
	(4,13)***	(2,420)**	(2,074)**
LogDIM	1,201	2,250	0,540
	(1,94)*	(3,37)***	(1,20)
LogImi	0,326	0,528	0,216
	(4,43)***	(5,87)***	(3,64)***
LogDIST	-3.112	-2,906	-1,732
	(-6,40)***	(-3,14)***	(-3,69)***
C	-1,364	-4,927	0,937
	(-0,64)	(-1,31)	(0,43)
N	325	325	325
$\overline{R^2}$	0,17	0,13	
SIGMA			1,338***
Likelihood			-317,71

T- Statistics (heteroskedasticity corrected) are in brackets.

***/**/-statistically significant, at 1%, and 5% levels.

Source: Author calculation

The results are similar with OLS and Random effects. All explanatory variables are statistically significant. Thus, it can be argued that this outcome is robust in respect to the changes in estimation methodology.

We incorporate the difference in electric consumption per capita to analyze the difference in endowment between Portugal and its trade partners.The results are somehow different from other findings in literature. For instance, Hummels and Levinshon (1995), Zhan et al. (2005) found a negative sign. In our estimation, the coefficient LogEP presents a positive sign for the three estimators (OLS, RE, and tobit model). As Portuguese IIT is mainly vertical intra-industry trade (VIIT), this is consistent with the neo-Heckscher-Ohlin trade theory, i.e, the differences in physical endowments promote the IIT.

As expected, the variable economic dimension (LogDIM) has a significant and a positive effect on IIT, with the exception of the tobit model. This result confirms the importance of scale economy and product differentiation. We can conclude that economic dimension influences the volume of intra-industry trade. The results are consistent with the hypothesis of the positive correlation between immigration and intra-industry trade. The Studies of Blanes (2005), White (2009), Faustino and Leitão (2008) and Leitão (2011) found a positive sign.

Considering that the variable, DIST (distance in logs) can be used as proxy for trade transaction costs for this effect. The results demonstrate that this variable has the "correct" sign in all equations and it is statistically significant in three of these, i.e intra-industry trade increases when partners are geographically close.

In Table 3 we observe that the determinants of HIIT using OLS, Random effects and Tobit model. For the estimates of the HIIT model only the geographical distance are according to the hypothesis formulated.

Table 3. Horizontal intra-industry trade and immigration

Variables	*OLS*	*Random Effects*	Tobit Model
LogEP	2,068	2,283	0,055
	(4,381)***	(3,781)***	(0,09)
LogDIM	-5,924	-12,684	-0,077
	(-5,99)***	(-8,95)***	(-0,058)
LogImi	-0,196	-0,222	0,293
	(-1,592)	(-1,29)	(1,55)
LogDIST	-2,64	-0,481	-2,071
	(-2,03)**	(-,269)	(-1,83)*
C	23,02	44,075	3,802
	(4,89)***	(5,81)***	(0,78)
N	139	139	139
$\overline{R^2}$	0,15	0,11	
SIGMA			1,647***
Likelihood			-69,195

T- Statistics (heteroskedasticity corrected) are in brackets.

***/**/-statistically significant, at 1%, and 5% levels.

Source: Author calculation

The results in table 4 are consistent with the hypothesis of the positive correlation between and VIIT. The variable, electric power (LogEP) presents a positive sign, confirming the dominant paradigm. VIIT occurs more frequently among countries that are dissimilar in terms of factor endowments. With Random effect estimator we can conclude that the economic dimension (LogDIM) has a positive influence on the total VIIT is confirmed. The geographical distance represents a negative correlation confirming the results of Badinger and Breuss (2008), Clark (2006), Faustino and Leitão (2008).

Table 4.Vertical intra-industry trade and immigration

Variables	*OLS*	*Random Effects*	Tobit Model
LogEP	0,547	0,289	0,187
	(3,95)***	(2,16)**	(1,59)
LogDIM	0,209	0,627	-0,251
	(0,778)	(2,06)**	(-0,98)
LogImi	0,138	0,172	0,058
	(4,49)***	(4,27)***	(1,72)*
LogDIST	-0,590	-0,744	0,033
	(-2,38)**	(-1.76)*	(0,12)
C	-1,94	-2,460	-0,364
	(-2,05)**	(-1,41)	(-0,27)
N	312	312	312
$\overline{R^2}$	0,11	0,10	
SIGMA			0,656***
Likelihood			-364,97

T- Statistics (heteroskedasticity corrected) are in brackets.

***/**/*/-statistically significant, at 1%, 5% and 10% levels.

Source: Author calculation

6. CONCLUSIONS

This paper investigates the relationship between intra-industry trade, horizontal and vertical intra-industry trade and immigration flows using a gravity model for the period 1995-2008 between Portugal and European Union countries. There appears to be a positive and statistically significant impact of immigration on intra-industry trade. The general performance of the considered models is satisfactory. The regressors are strongly statistically significant.

This study tests the impact of immigration in Portuguese intra-industry trade. Immigrants express knowledge spillovers that can reduce information costs to economic agents. Our findings suggest that immigration permits the reduction of trade transaction cost and intra-industry trade increases.

This manuscript contributes in several ways. Firstly, the paper examines the impact of immigration on all intra-industry trade. Secondly, the results allow us to view immigration as a vehicle that contributes to the decrease of trade transaction costs and could stimulate Portuguese economy.

However, there are some clear limitations of the present study. Thus, further research should be carried out into this subject, especially in what it concerns the relation between economic theory and international migration, by taking into account the immigrants' skills, and the "ethnic network". Also, other proxies than the consumption of electricity can be considered for the endowments and a more detailed analysis is necessary in order to describe the structure of capital, natural resources and labor force in the selected countries.

We consider that such empirical studies can serve to the construction of a more robust explanatory framework for coping with the complex issues raised by the analysis of trade and immigration. The main gnoseological stake is in our view the formulation of a sounder model of the various effects of immigration for the host countries including the informational as well as cultural and behavioral spillovers. Such outcome is important for a more realistic theory of the international trade based on a paradigm where not only the economic determinants but also culture, information and behaviors matter in explaining the international trade flows.

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IMIGRACIJA I TRGOVINA

Sažetak

Rad istražuje odnos između intraindustrijske trgovine (IIT), horizontalne IIT, vertikalne IIT (VIIT) i imigracijskih tokova koristeći gravitacijski model za period od 1995. do 2008. u Portugalu i zemljama članicama EU (EU-27). Koristeći pristup panelnih podataka, rezultati pokazuju pozitivnu korelaciju između imigracije i IIT. Takvi rezultati upućuju na to da imigracija može umanjiti transakcijske troškove između zemlje porijekla i zemlje domaćina. Također smo razmotrili ekonomsku dimenziju koja izgleda da ima pozitivan učinak na trgovinu. Naše istraživanje potvrđuje hipotezu da troškovi prijevoza imaju negativan učinak na trgovinu.

Ključne riječi: *intraindustrijska trgovina, horizontalna intraindustrijska trgovina, vertikalna intraindustrijska trgovina, imigracija i panelni podaci*

JEL Classification*: C20, C30, F12, L10.*

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UDK 330.35:<657.471.1:355.1>(549.1)

MILITARY SPENDING AND ECONOMIC GROWTH IN PAKISTAN: NEW EVIDENCE FROM ROLLING WINDOW APPROACH

Abstract

Purpose: This paper re-investigates causality between military spending and economic growth by applying autoregressive distributed lag model or ARDL bounds testing approach to cointegration. Furthermore, rolling window approach (RWA) to cointegration is also applied to confirm the established long run relation between the variables. The VECM Granger causality is used to detect the direction of causality between military spending and economic growth. Our empirical exercise indicated long run relationship between military spending and economic growth as confirmed by rolling window approach. Moreover, negative unidirectional causality is found running from defense spending to economic growth. This paper opens up new sights for policy-making authorities to sustain economic growth by curtailing defense spending.

Keywords*: Defence Spending, Growth, Cointegration, Causality*

1.INTRODUCTION

The aim of paper is to revisit the causal relationship between military spending and economic growth in case of Pakistan. The existing literature reveals two main channels of how defence spending affect economic growth. According to Keynesian view, military spending increases aggregate demand by stimulating output, employment and hence economic growth. Additionally, increase in human capital stock due to military spending through education and technological guidance seems to have spillover effects that increase expenditures on research and development for civilian. On the contrary, neoclassical model argues that increase in military spending means shift of resources from private sector at the cost of private spending. This crowds-out investment both by public and private sector and hence economic growth is declined (Sandler and Hartley, 1995). The public sector is less active and efficient as compared to private sector. For the reason that public or military firms use resources less efficiently while private firms are relatively concerned with low cost of production. It is empirically proved by Gupta et al. (2004) that low military spending are associated with high economic growth by raising capital formation.

The present study seems to be a good contribution in defence literature for three major reasons. Firstly, ARDL bounds testing approach to cointegration is applied to test cointegration between the variables. Secondly, the study uses most advanced Ng-Perron (2001) unit root test which is considered superior over the other traditional unit root test such as augmented Dickey-Fuller (ADF), Phillips and Perron (P-P) and Dickey-Fuller generalised least squared (DF-GLS). Finally, stability of ARDL findings is confirmed by applying Rolling Window Approach (RWA)

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to cointegration. The rest of study is organised as following: section-II describes the review of literature on the relationship between military spending and economic growth. Methodological framework is described in section-III while section-IV is about results interpretation. Finally, conclusion and policy implications are drawn in section-V.

2. REVIEW OF LITERATURE

The defence literature provides plethora of studies on relationship between military spending and economic growth with mixed results. The issue of causal relationship between military spending and economic growth had explored by Benoit's (1973, 1978) using data of 44 less developed countries (LDCs). The results indicated positive correlation between military spending and economic growth. Furthermore, he documented that spill-over effects of military spending are significant and thus affect the overall economy positively. Many studies supported the view by Benoit (1973, 1978) applying different approaches such as Kennedy, (1974); Deger, (1986); Sezgin, (1997); Chletsos and Kollias, (1995) and Yildirim et al. (2005). Apart from that, Halicioglu (2004) considered the relationship between military spending and economic growth including real interest rate and non-military expenditures in case of Turkey. The analysis showed a long run and positive association between military spending and economic growth while non-military spending boosts economic growth more than military spending. Atesoglu (2004) found a strong effect of military spending on economic growth but Cuaresma and Reitschuler (2003) documented an inverse relationship between military spending and economic growth for U. S economy. Similarly, Yildirim et al. (2005) investigated the affect of military spending on economic growth in Middle Eastern countries and Turkey. Their empirical results indicated positive impact of military spending on economic growth.

Dunne et al. (2002), Faini et al. (1984) and others rejected the hypothesis that military spending promote economic growth. For example, Lim (1983) documented the inverse effect of military spending on economic growth in case of African less developed economies. Similarly, Starr et al. (1984) argued that rise in military spending raises inflation which in resulting retards economic growth. This implies that military spending indirectly lowers the pace of economic growth. For the case of OECD countries, Cappelen et al. (1984) examined the association between defense spending and manufacturing output, investment and economic growth. Their results showed positive impact of military spending on manufacturing output. An inverse effect of military spending on investment and economic growth is also found. In case of China, Chen (1993) found that there is no cointegration between military spending and economic growth. Masih et al. (1997) re-examined the direction of causal relationship between military spending and economic growth in case of China since 1950. They concluded that military spending leads economic growth. Latter on, Wolde-Rufael (2001) rejected the previous findings and concluded that both variables are cointegrated while direction of causality is running from military spending to economic growth in case of Mainland China.

In recent wave of literature, Bas (2005) investigated the relationship between military spending and economic growth using nonparametric approach. The empirical evidence indicated that military spending has inverse effect on economic growth by declining investment spending. Mylonidis (2008) used data for European Union and found that economic growth is inversely caused by rise in military spending. For the case of United States, Smith and Tuttle, (2008) reinvestigated the relationship between military spending and economic performance borrowing model from Atesoglu, (2002) and noted inverse impact of military spending on aggregate output while findings are inconsistent with Atesoglu, (2002) for United States. Kalyoncu and Yucel (2006) conducted a study for Turkey and Greece to test relationship between military spending and economic growth. Their empirical exercise indicated unidirectional causal relation running from economic growth to defense spending in Turkey. Similarly, Sawhney et al. (2007) collected the data of globe military spending and economic growth to investigate the relationship between both the variables. The results pointed out that a rise in military spending of globe will decline economic growth. Apart from that Tang (2008) also examined the impact of military spending on economic growth for Malaysia and found inverse relation between military spending and economic growth. Similarly, Pieroni (2009) also found inverse association between military spending and economic growth. Keller et al. (2009) have pointed out very good issue on military draft and economic growth and concluded that military draft is associated with high recruitment of their army personals. The large size of military draft means high resources are required to meet their demand. This indicates the distortions of both human and physical capital resources. This big draft of military will lower aggregate demand and hence lower the output in OECD countries.

The attention has also paid in literature to examine the direction of causality between military spending and economic growth. For instance, Joerding (1986) found bidirectional causal relationship between military spending and economic growth and validating the feed-back effect. In case of Pakistan and India, Tahir (1995) examined causal relation between both variables and found bidirectional causality between both variables for both countries[3]. For the case of Egypt, Israel and Syria, Abu-Bader and Abu-Qarm (2003) used multivariate cointegration approach and variance decomposition method to check the causal relationship between macroeconomic variables. Their analysis revealed that military spending is inversely related with economic growth for Egypt, Israel and Syria. Similarly, Karagol and Palaz, (2004) tested the link between military spending and economic growth for case of Turkey using Johansen cointegration approach. Their empirical evidence found cointegration among the variables and reported that high military spending Granger causes economic growth negatively. Kollias et al. (2004) reported feedback hypothesis between military spending and economic growth in case of Cyprus. Yildirim and Ocal (2006) conducted a study to investigate relationship between arms race and economic growth. They showed the causality between military expenditures of Pakistan and India. Furthermore, aggression is main cause of arms race between India and Pakistan which is detrimental for economic growth of both countries. Using panel data set

3 Choudhury (1991) do seem to explore any causal relationship betwen militray spending and econmic growth but inverse impact of militray spending on economic growth is found. He documents that results vary due socioeconomic struture and size of government for each country.

for European Union, Kollias et al. (2007) also found bidirectional causality between military spending and economic growth.

In the case of, Karagianni and Pempetzoglu (2009) explored the relationship between military spending and economic growth using linear and non-linear causality approaches. Their results showed unidirectional causal relation running from military spending to economic growth while economic growth Granger is caused non-proportionately by shock in military spending in Sri Lanka confirmed by non-linear causality. Hirnissa et al. (2009) also tested the direction of causality between military spending and economic growth in case of ASEAN countries by applying ARDL bounds testing approach to cointegration. Their findings indicated that there is cointegration between military spending and economic growth in Indonesia, Thailand and Singapore. The military sepnding and economic growth Granger cause each other in case of Singapore while military spending Granger causes economic growth in case of Indonesia and Thailand[4]. Dunne and Vougas (1999) investigated the causal relationship between military spending and economic growth in case of South Africa. The findings showed cointegration between both variables and unidirectional causality is found running from military spending to economic growth. Reitschuler and Loening (2005) explored relationship between military spending and economic growth in case of Guatemala. Their findings suggested an inverted-U shaped relationship between military spending and economic growth. But Pieroni (2009) found insignificant U-shaped link between military spending and economic growth using non-parametric approach. Finally, Na (2010) examined the reasons of arms race between India and Pakistan by applying Richardson action-reaction approach. The empirical evidence pointed out that military spending in India is determined by income, political status and external wars. In Pakistan and India, military spending are negatively linked with economic growth.

3. DATA AND METHODOLOGY

The study uses data over the period of 1971-2009. Economic Survey of Pakistan (various issues) is used to attain data for real military spending and real GDP. The data has been converted in log-form[5]. The Table-1 reveals the descriptive statistics and correlation matrix. There is negative and significant correlation between military spending and economic growth in case of Pakistan.

Table 1: Descriptive Statistics and Correlation Matrix

Variables	Mean	Median	Maximum	Minimum	$LRGDP_t$	$LRDEXP_t$
$LRGDP_t$	10.9017	11.0148	11.5805	10.5050	1.0000	-0.7853
$LRDEXP_t$	6.9687	7.2005	7.4830	6.0189	-0.7853	1.0000

Source: Author calculation

4 Military sending and economic growth does not cause each other for Malaysian and Philippines' economies.
5 Bowers et al., (1975) suggest that Ehrlich's (1975) log-linear specification is sensitive to the functional form. Ehrlich (1977) and Layson (1983) argue that the log linear specification produces better empirical outcome.

Ng-Perron (2001) developed a test statistics wherein GLS is applied to de-trend the series D_t^d. The critical values of the tests are based on those of Philip-Perron (1988) Z_a and Z_t statistics, Bhargava (1986) R_1 statistics, and Elliot, Rotherberg and Stock (1996). The following annotations are used:

$$k = \sum_{t=2}^{T} (D_{t-1}^d)^2 / T^2 \tag{1}$$

The de-trended GLS tailored statistics is given by:

$$MZ_a^d = (T^{-1}(D_T^d)^2 - f_\circ)/(2k)$$
$$MZ_t^d = MZ_a \times MSB$$
$$MSB^d = (k / f_\circ)^{1/2}$$
$$MP_T^d = \begin{cases} (\bar{C}^2 k - \bar{C} T^{-1}(D_T^d)^2 / f_\circ, and, (\bar{C}^2 k + (1-\bar{C}) T^{-1}(D_T^d)^2 / f_\circ \cdots \end{cases} \tag{2}$$

The generalized Dickey-Fuller type regression is used to calculate F-statistics or Wald statistics. The significance of variables is checked by using unrestricted conditional equilibrium error correction model (Pesaran et al. 2001). This approach involves estimating the conditional error correction version of the ARDL model for variable under estimation. The Augmented ARDL (p, q_1, q_2, ... q_k) is given by the following equation (Pesaran et al. 2001):

$$\alpha(L,p) y_t = \alpha_\circ + \sum_{i=1}^{k} \beta_i(L,p) x_{it} + \lambda' w_t + \varepsilon_t$$
$$\forall t = 1,.....,n \tag{3}$$

where

$$\alpha(L,p) = 1 - \alpha_1 L - \alpha_2 L^2 - ..... - \alpha_p L^p$$
$$\beta_i(L,q_i) = \beta_{i\circ} + \beta_{i1} L + \beta_{i2} L^2 + ... + \beta_{iq_i} L^{q_i} \forall_i = 1,2...,k$$

y_t is an independent variable, α is the constant term, L is the lag operator such that $Ly_t = y_t - 1$, w_t is s´1 vector of deterministic variables such as intercept term, time trend or exogenous variables with fixed lags.

The long run elasticities are estimated by:

$$\varphi_i = \frac{\hat{\beta}_i(1,\hat{q})}{\hat{\alpha}(1,\hat{p})} = \frac{\hat{\beta}_{i\circ} + \hat{\beta}_{i1} + ... + \hat{\beta}_{i\hat{q}}}{1 - \hat{\alpha}_1 - \hat{\alpha}_2 - ... - \hat{\alpha}_p} \quad \forall i = 1,2,...,k \tag{4}$$

Where $\hat{p}$ and $\hat{q}_i$, i = 1, 2, ..., k are the selected (estimated) values of $\hat{p}$ and $\hat{q}_i$, i = 1, 2, ..., k. The long run coefficients are estimated by:

$$\pi = \frac{\hat{\lambda}(p, q_1, q_2, ..., q_k)}{1 - \hat{\alpha}_1 - \hat{\alpha}_2 - ... - \hat{\alpha}_p} \tag{5}$$

Where, $\hat{\lambda}(\hat{p},\hat{q}_1,\hat{q}_2,....\hat{q}_k)$ denotes the OLS estimates of λ in equation (3) for the selected ARDL model. This study uses a more general formula of ECM with unrestricted intercept and unrestricted time trend (Pesaran et al. 2001):

$$\Delta y_t = c_\circ + \pi_{yy} y_{t-1} + \pi_{yx.x} x_{t-1} + \sum_{i=1}^{p-1} \psi_i' \Delta z_{t-1} + w' \Delta X_t + \mu_t \qquad (6)$$

where $c_0 \neq 0$ and $c_1 \neq 0$. The Wald test (F-statistics) for the null hypothesis $H_\circ^{\pi_{yy}} : \pi_{yy} = 0, H_\circ^{\pi_{yx.x}} : \pi_{yx.x} = 0'$, and alternative hypothesis $H_1^{\pi_{yy}} : \pi_{yy} \neq 0, H^{\pi_{yx.x}} : \pi_{yx.x} \neq 0'$. Hence the joint null hypothesis is given by: $H_\circ = H_\circ^{\pi_{yy}} \bigcap H_\circ^{\pi_{yx.x}}$, and alternative hypothesis is as: $H_\circ = H_1^{\pi_{yy}} \bigcap H_1^{\pi_{yx.x}}$. The UECM equation to calculate F-statistic is modelled as following:

$$\Delta LRDEXP_t = \alpha_\circ + \sum_{i=1}^{m} \alpha_2 \Delta LRDEXP_{t-i} + \sum_{i=0}^{m} \alpha_3 \Delta LRGDP_{t-i} + \alpha_4 LRDEXP_{t-1} + \alpha_5 LRGDP_{t-1} + \eta_i \qquad (7)$$

$$\Delta LRGDP_t = \beta_\circ + \sum_{i=1}^{m} \beta_2 \Delta LRGDP_{t-i} + \sum_{i=0}^{m} \beta_3 \Delta LRDEXP_{t-i} + \beta_4 LRGDP_{t-1} + \beta_5 LRDEXP_{t-1} + \mu_i \qquad (8)$$

Where, $LRDEXP_t$ and $LRGDP_t$ are real military spending and real GDP in natural logs and t is time trend variable. On the other hand, η and μ are error terms in the models. The first part of both equations with a_2, a_3 and β_2, β_3 represents the short-run dynamics of the models whereas the second part with a_4, a_5 and β_4, β_5 represent the long-run phenomenon. The null hypothesis in the equation (7) is $\alpha_4 = \alpha_5 = 0$, which indicates no existence of the long-run relationship and vice versa, while the null hypothesis in the equation (8) is $\beta_4 = \beta_5 = 0$, which means the non-existence of the long run relationship and vice versa.

The next step is to compare our computed F-statistic with critical bounds tabulated by Pesaran et al. (2001). If the F-statistic exceeds upper critical bound, the null hypothesis of no long run relationship may be rejected regardless of whether the underlying orders of integration of the variables are I(0) or I(1). Similarly, if the F-statistic falls below the lower critical value, the null hypothesis is not rejected. However, if the sample F-statistic falls between these two bounds then result is inconclusive. The model can be selected using the lag length criteria like Schwartz-Bayesian Criteria (SBC) and Hannan-Quinn (HQ) information criterion.

The third stage includes conducting standard Granger causality tests augmented with a lagged error-correction term. The Granger representation theorem suggests that there will be Granger causality in at least one direction if there exists cointegration relationship among the variables provided the variables are integrated order of one. Engle-Granger (1987) cautioned that if the Granger causality test is conducted at first difference through vector auto regression (VAR) method than it will be misleading in the presence of co-integration. Therefore, an inclusion of an additional variable to the VAR method such as the error-correction term would help us to capture the long-run relationship. To this end, an augmented form of Granger causality test is involved to the error-correction term and it is formulated in a bi-variate pth order vector error-correction model (VECM) which is as follows:

$$\begin{bmatrix}\Delta LRGDP_t\\ \Delta LRDEXP_t\end{bmatrix}=\begin{bmatrix}C_1\\ C_2\end{bmatrix}+\sum_{j=1}^{p}\begin{bmatrix}d_{11}(L) & d_{12}(L)\\ d_{21}(L) & d_{22}(L)\end{bmatrix}\times\begin{bmatrix}\Delta LRGDP_{t-j}\\ \Delta LDREXP_{t-j}\end{bmatrix}+\begin{bmatrix}\beta_1\\ \beta_2\end{bmatrix}\times\begin{bmatrix}ECT_{t-1}\\ ECT_{t-1}\end{bmatrix}+\begin{bmatrix}\mu_1\\ \mu_2\end{bmatrix} \quad (9)$$

Where D is a difference operator, ECT representing the error correction term derived from long run cointegrating relationship via ARDL model, C (i = 1, 2) is constant and h(i = 1, 2) are serially uncorrelated random disturbance term with zero mean. Through the ECT, the VECM provides new directions for Granger causality to appear. Long-run causality can be revealed through the significance of the lagged ECTs by t test, while F-statistic or Wald test investigate short-run causality through the significance of joint test with an application of sum of lags of explanatory variables.

3. EMPIRICAL RESULTS

The main objective of paper is to re-investigate the causal relationship between military spending and economic growth. There are many techniques such as Engle and Granger (1969), Johansen (1991, 1992) and Johansen and Juselius (1990) and, Stock and Watson (1993) are available to find out long run relationship between the variables[6]. The prerequisite of these tests for cointegration is that all variables in the model must have same order of integration.

The ARDL bounds testing approach for cointegration is more appropriate and flexible as compared to other traditional cointegration approaches. The autoregressive ditributive lag model can be applicable whether variables are integrated at I (0) or I(1) or I(1) / I(0). İt shows that there is no need to find out order of integration of variables to apply ARDL bounds testing. But, İt is pointed out by Ouattara (2004) that there is need to have informtaion about order of integration of variables. The main assumption of ARDL model is that the variables are inetgrated at I(1) or I(0) and no variable sholud be stationary beyond that integrating orders. İf any variable in model is integrated at I(2) then whole computation of F-statistic for cointegartion becomes useless. Therefore to apply ARDL bounds testing approach to cointegration, it is necessary to have information about the order of integration of the variables.

Table 2: Ng-Perron Unit Root Test

Ng-Perron at Level with Intercept and Trend				
Variables	MZa	MZt	MSB	MPT
$LRGDP_t$	-4.20307	-1.3811	0.3285	20.9802
$LRDEXP_t$	-3.2154	-1.2052	0.3748	26.9661
Ng-Perron at 1st Difference with Intercept and Trend				
$\Delta LRGDP_t$	-24.1666*	-3.4679	0.1435	3.8189
$\Delta LRDEXP_t$	-30.8187*	-3.8964	0.1264	3.1208

Source: Author calculation

Note: * shows significnce at 1% significnce level.

6 Engle–Granger's approach seems to produce less satisfactory when one cointegrating vector is present in multivariate case (Seddighi et al. 2006).

In doing so, Ng-Perron uni root test is applied. The empirical evidence shows that military spending and economic growth are integrated at I(1). This implies that variables have unique order of integration. In such circumstances, we can apply ARDL bounds testing approach to cointegration. It is necessary to select lag length of variables by estimating 1st differenced of the conditional error correction version of ARDL. In doing so, minimum value of Akaike Information Criteria (AIC) is used to select appropriate lag length. The VAR results show that lag order 2 is appropriate. The results are shown in Table-3.

Table 3: Lag Length Criteria

VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-6.411524	NA	0.005708	0.509789	0.600487	0.540306
1	119.1799	228.3480*	3.60e-06	-6.859385	-6.587293*	-6.767835*
2	124.1340	8.407018	3.41e-06*	-6.917212*	-6.463725	-6.764627
3	127.5878	5.442397	3.56e-06	-6.884110	-6.249228	-6.670492

Source: Author calculation

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Table 4: ARDL Cointegration for Long Run Relation

Model for Estimation	*F*-Statistics	Lag
$F_{RDEXP}(LRDEXP_t / LRGDP_t)$	0.8974	2
$F_{RGDP}(LRGDP_t / LRDEXP_t)$	4.6890**	2
Critical Values	Pesaran et al. (2001)	
Significance Level	Lower Critical Bound	Upper Critical Bound
1%	5.150	6.360
5%	3.790	4.850
10%	3.170	4.140

Source: Author calculation

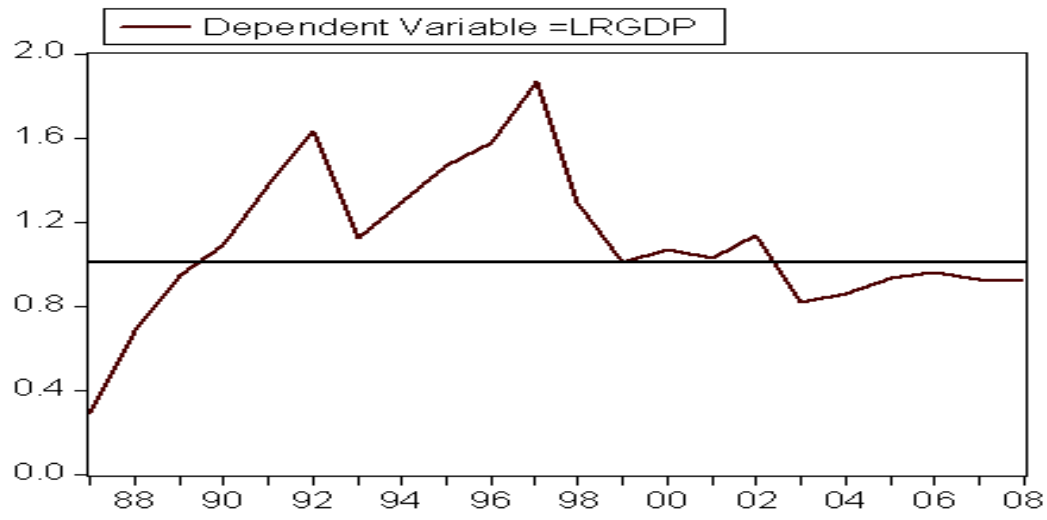
Note: Critical values obtained from Pesaran et al. (2001) following unrestricted intercept and no trend. The lag selection is based on AIC and SBC. ** denotes cointegration exists at 10% level of significance.

The Table-4 reveals the results of PSS (2001) calculated F-statistic to cointegration between the variables. The empirical evidence indicates cointegration between military spending and economic growth when military spending. The reason is that calculated F-statistic is greater than upper bound at 10% significance level when military spending is forcing variable.

Rolling Window Approach (RWA) to Cointegration

This study also applies rolling window bounds testing approach to cointegration is to probe whether a cointegrating relation is stable or not. The theoretical and empirical literature does not seem to provide any confirmation to choose the rolling window size. In order to capture static and dynamic association between military spending and economic growth, we take 15-year observations as a window size. Thus if the normalized F-statistic is greater than one then cointegration exists and stable otherwise not. Our results for rolling window approach to ARDL cointegration show that moving window size is 15 and ARDL model with 2 lags is estimated for $LRGDP_t = f(LRDEXP_t)$ with unrestricted constant and no trend. The upper critical bound from Pesaran et al. (2001) is 4.140 with k-1 (regressor) having constant and no trend. The selection of the window size of 15-years is appropriate to justify that static and vibrant link between military spending and economic growth can be checked. The normalized F-statistic of $LRGDP_t = f(LRDEXP_t)$ for each window can be visualized by the thick and straight line mentioned in figure-1. It is stated above, if the normalized F-statistic is more than 1(more than thick and straight line) then there is stable cointegration between military spending and economic growth. The descriptive view of normalized F-statistic is reported in Table-5. Figure-1 indicates that cointegration relation between military spending and economic growth is instable before 1990 and after 2003.

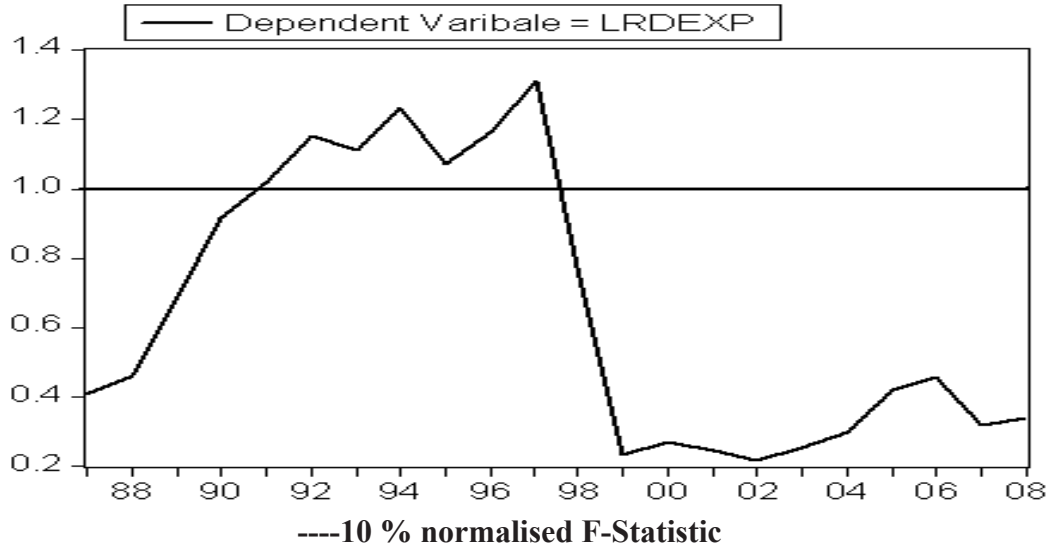
Figure-1



----10 % normalised F-Statistic

Source: Author calculation

Figure-2



Source: Author calculation

Table-5 reveals that more than 1 normalized F-statistic is 68.43% while less than 1 is 32.58% which indicates overall stable long run association between the variables.

Table-5 Descriptive View of Normalized F-statistics for Rolling Approach to ARDL Cointegration Test

	Dependent Variable: LRGDP	
Less than 1	6	32.58%
More than 1	13	68.43%
Total	19	100
	Dependent Variable = LRDEXP	
Less than 1	12	63.17%
More than 1	7	36.84%
Total	19	100
Window Size = 15		

Source: Author calculation

The rolling window ARDL cointegration approach has also been applied to investigate the normalized F-statistic for $LRDEXP = f(LRGDP)$. The empirical evidence is reported in figure-2 and descriptive view in Table-5. It is noted that more than 1 normalised F-statistic 36.84% while less than 1 is 63.17%. Our results indicate that cointegration relation is stable when military spending is forcing variables and not vice versa. These findings are consistent with ARDL cointegration results reported in Table-4. This shows that long run results are robust.

The OLS regression results show negative relationship between military spending and economic growth and it is significant at 1% level shown by t-statistic in parenthesis. The results reveal that a 1 percent increase in military spending will decline economic growth by 0.50 percent. These findings are consistent with line of literature such Choudhury (1991), Abu-Bader and Abu-Qarm (2003), Cuaresma and Reitschuler (2003) and Atesoglu (2004) etc.

OLS Regression Results

$$\hat{LRGDP}_t = 14.3956 - 0.5013 LRDEXP_t$$

(30.4105)* (-7.3968)*

R-squared = 0.6167 F-statistics = 54.7118

The Table-6 presents the results of VECM Granger causality. It is pointed by Groenewold et al. (2007) that causality test for long run and short run causality evidence is applicable if variables are cointegrated. The empirical evidence on direction of causal relation indicates unidirectional causality running from military spending to economic growth and it is significant at 5% level of significance. These results are contradictory with the findings of Tahir (1995) and Yildirim and Öcal (2006). This implies that military spending is detrimental for economic growth as argued in neoclassical model. The neoclassical model reveals that an increase in military spending means shift of resources from private sector at the cost of private spending. This crowds-out investment both by public and private sector. This crowds-out in investment declines the pace of economic growth.

Table 6: Granger Causality Analysis and Sensitivity

Variables	Short Run		Long Run		Sensitivity	
	ΔLRGDP	ΔLRDEXP	ECT_{t-1}	R-Squared	Diagnostic Test	
ΔLRGDP	…..	3.1783**	-0.0666**	0.4784	J. B Test	0.1477
		(0.0427)	(0.0224)			(0.9287)
					LM Test	0.6015
						(0.5560)
					ARCH	0.8064
					Test	(0.3763)
					W. Hetro	0.6860
						(0.7459)
					Ramsey	0.5928
					Test	(0.4485)
ΔLRDEXP	1.7532	…..	-0.0267	0.2452	J. B Test	2.3733
	(0.1851)		(0.5885)			(0.3052)
					LM Test	2.6321
						(0.0741)
					ARCH	0.2472
					Test	(0.6226)
					W. Hetro	0.9179
						(0.5473)
					Ramsey	1.8913
					Test	(0.1812)

Source: Author calculation

Note: ** shows significance at 5% level of significance. In parenthesis, probability values are given.

Table-6 presents the results of long and short runs granger causality, where maximum lag is 2 obtained following AIC. The appropriate lag length avoids the problem of spuriousness. The empirical evidence indicates that military spending granger cause economic growth both

in short run and long run as indicated by significance of lagged error term. The results show that economic growth does not cause military spending in the both periods. The diagnostic tests reveal that error terms of both models are normally distributed, short run models are well specified. There is no evidence of autoregressive conditional heteroscedisticity and white heteroscedisticity. There is a problem of serial correlation when economic growth is forcing variable which does not seem to affect our findings.

4. CONCLUSIONS

In this study, the causal relationship has been reinvestigated between military spending and economic growth in case of Pakistan for the period 1971-2009. In doing so, Ng-Perron unit root test is applied to examine the integrating order and cointegration is found by using ARDL bounds testing approach. The VECM granger causality test has been applied to check the direction of causality between military spending and economic growth. The results revealed negative impact of military spending on economic growth. Furthermore, results reported that military spending is inversely Granger caused by economic growth. These findings are consistent with the line of literature such as Abu-Bader and Abu-Qarm (2003); Karagol and Palaz, (2004); Sawhney et al. (2007); Tang (2008); Smith and Tuttle, (2008) and many others.

The advent of the nuclear age has positioned Pakistan and India among the strategically important nuclear states of the twenty-first century. Both India and Pakistan are compelled to cooperate with each other in regards to the development of international trade and stability in the socio-political sphere of the South East Asia. According to a study conducted by Yildirim and Ocal (2006), there has been a bidirectional causal relation between military spending of Pakistan and India. Both the countries have been spending extensively on defence due to the persistent war threat and mutual mistrust between them, at the cost of the economy boosting programs and education. Furthermore, the large number of population and its increasing growth rate in both countries do not permit their governments to invest such a huge chunk of their annual budgets on their military. According to the International Institute of Strategic Studies (IISS), India has the 4th largest army in the world with 1.3 million army personnel while Pakistan is sustaining a huge number of armed forces comprising 6.13 million army personnel. The governments of Pakistan and India should initiate bilateral talks to develop a sense of mutual confidence and trust, harmonize their relationship, and work collectively on launching vocational training programs to fight against poverty. Poverty, illiteracy, unemployment and a large number of unskilled labour are the biggest economic challenges faced by these countries. In order to combat these evils, Pakistani governments in order to reduce their military expenditure and increase investment in developmental projects, which in turn will stimulate the pace of economic growth.

Moreover, our study has potential to reinvestigate the association between defence spending and economic growth by incorporating capital, interest rate, labour, trade openness, internal and external debt, government size etc. The directional of causal relationship between military spending and economic growth would help policy making authorities to curtail defence spending to sustain economic growth.

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VOJNA POTROŠNJA I EKONOMSKI RAST U PAKISTANU: NOVI DOKAZI DOBIVENI PRISTUPOM KLIZNOG PROZORA

Sažetak

Rad ponovno istražuje kauzalnost između vojne potrošnje i ekonomskog rasta primjenom autoregresijskog modela s distribuiranim vremenskim pomakom ili ARDL graničnog testiranja u pristupu kointegraciji. Nadalje, pristup kliznog prozora (RWA) kointegraciji je također primijenjen kako bi se uspostavila dugoročna veza među varijablama. VECM Grangerova kauzalnost je korištena za otkrivanje smjera kauzalnosti između vojne potrošnje i ekonomskog rasta. Naša empirijska vježba ukazuje na dugoročnu vezu između vojne potrošnje i ekonomskog rasta kao što je potvrđeno pristupom kliznog prozora. Osim toga, nađena je negativna jednosmjerna kauzalnost koja ide od vojne potrošnje prema ekonomskom rastu. Ovaj rad daje nove uvide vlastima pri kreiranju politike koja bi podržala ekonomski rast obuzdavanjem vojne potrošnje.

Ključne riječi*: Vojna potrošnja, rast, kointegracija, kauzalnost*

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UDK 001:330.35>(497.5)

HYPERCOMPLEX KNOWLEDGE IN A KNOWLEDGE-BASED ECONOMY[2]

Abstract

The paper provides a definition of hypercomplexity and hypercomplex knowledge in knowledge-based economies and proves the hypothesis that development, application and expansion of new technological achievements have a direct impact on a country's economic growth. Data collected from relevant databases for 110 world countries were used in the calculations. Data for other countries have not been published, which is a typical limitation in the application of such research methodology. Developmental lags of the Republic of Croatia have been established by the method of transformation of variables in the analysed developmental indicators and their components, and proposals for their improvement have been provided. Taking into consideration the established effect of the increase in the Research Capacity Development Index, Technology and Innovation Efficiency Index, and the Ability to Absorb Knowledge and Technology Index on economic growth, Croatia needs to invest additional resources in the increase in human capital and labour productivity in order to reduce developmental lags.

Keywords*: hypercomplexity, knowledge, knowledge economy, human resources development, economic growth and development*

JEL classification*: O10, O15, O33, D83*

1. Introduction

New economic development is a consequence of scientific-technological revolution and has resulted in changed significance of certain production factors and emergence of the new economic development factors. Knowledge, labour, capital, and later management (organisation) were considered primary resources in the economic science until the occurrence of the third scientific-technological revolution. In the framework of the new science, it is deemed that information, space and time have become new factors of economic development (Pulić, 1998, 25). Besides, production factors management has become more important than their owning. Physical jobs have become fully mechanised, intellectual management increasingly cyberneticised, energy, space and time mastered, new scientific disciplines have emerged, the number of investments in scientific research has been increasing, and the time period from scientific research to application of the discovery has become shorter. (Sundać, 1997, 9-13) Great changes in the field of scientific research have led to shorter duration of acquired knowledge, and this causes the necessity for permanent education. The gap between developed and underdeveloped countries has been increasing. All of these consequences of the third technological revolution have been significantly influenced by globalisation, information as the basic knowledge unit, and networking. Free, transnational flow of ideas, information, knowledge, human resources, goods, and capital has created a new technological and overall development direction. Development of new technologies leads to increasingly higher share

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and significance of knowledge, education, and new skills.

Rapid obsolescence of existing knowledge and application of new knowledge, as a foundation of hypercomplex knowledge, require permanent education of human resources. They should be constantly trained for development, application and use of new technologies. Trained human resources enable technological progress and development; application and expansion of new technological achievements are the necessary preconditions for competitiveness in developed societies, by which they have a direct impact on a country's economic growth.

The objective of the paper is to define hypercomplexity in knowledge-based economies, and establish the position of the Republic of Croatia in the global environment on the basis of analysis of research capacity development, technology and innovation efficiency and the ability to absorb knowledge, as well as to propose the basic developmental guidelines.

2. THEORETICAL AND METHODOLOGICAL ASSUMPTIONS WITH LITERATURE OVERVIEW

2.1. LITERATURE OVERVIEW

Knowledge economy is a predominantly electronic economy based on information, knowledge, and new skills (Godin, 2010, 261). Information have become the basic value in the circulation of goods on the world global market, and their possession or non-possession is always reflected in trade characteristics. Possession or non-possession of information has become the new source of power. Information are disseminated by global communication networks which have determined an economic shift: from industrial to information economy. Attention should be devoted to difference between information industry (production of hardware, software and orgware), and information industry based on information and its installation in each service and goods. Establishment and expansion of communication networks and their horizontal and vertical connections have brought down hierarchical structures of industrial society, classic Tayloristic organisation, and centralised social institutions have become disputable. It may be concluded that, in the past decade, high technology increase in the world trade has been accelerating, and that it resulted in the following: promotion of creativity and innovativeness, stimulation of interdisciplinary and multidisciplinary approach to research; organisational structure changes in order to increase effectiveness; linking of knowledge and economy through faster commercialisation of results; collecting of scientific and financial resources through (transnational) megaprojects, development of research- and educational capacity, increased number of investments in research. The above has occured as a consequence of the following proccesses: organised and permanent collection of knowledge and creation of knowledge databases, rapid and organised creation of new knowledge; increase in the ability to absorb knowledge, improvements of communication infrastructure for more effective access to knowledge and its exchange by creating computer networks, finding of effective organisational models of application of the acquired knowledge («learning enterprise»), by developing new branches of science (biomedicine and genetics, biotechnology, nanotechnology...), by emergence of new materials and new forms of energy...(Strategija razvitka Republike Hrvatske Hrvatska u 21. stoljeću, 2003) The above-mentioned stimulates sociocultural transition from an industrial

society to knowledge society, and economies to knowledge-based economies.

On the existing developmental level of science, technology, also human society, investment in human resources education has become one of the most important investments for modern development. This is proven by the fact that only about 15% of the world countries are highly developed, and their share in the world wealth amounts about 80% (the World Bank, 2005). Economy of scale is no longer significant in the global economy. New obstacles to penetration of new companies to a knowledge economy are not a matter of scale, but rather of high value and quality production. Knowledge economy is based on specialised knowledge, primarily on the skill of linking, identifying and solving problems. Such skilled employees have the following qualities: multi-education, independent initiative, creativity, communication, sense of responsibility, co-operativeness, comprehension of technologies and the environment. Innovativeness and creativity have become the ability of managers to act strategically, to create alliances, and to stimulate development and changes.

One should take into consideration the fact that changes in the structure of modern economics, new possibilities and challenges have been elaborated on in various theories on post-industrial economy and society, while pointing out different contents and using different names. According to this approach, the first theoretician who used the name «knowledge economy» is Peter Drucker, together with Marien («classic industry has been replaced by new forms of post-industrial activity»), Huntington (the «postponed society» theory), Crozier («entropy state»), Boulding (post-civil society theory), and Mumford («the age of equilibrium»). According to Drucker, knowledge economy and national knowledge-based economy differ from traditional economies by the fact that: information becomes a basic shareable resource and its value rises with use; location of the economy becomes irrelevant – the market becomes virtual; laws, regulations and taxes are no longer of national significance; knowledge and information are transferred where demand is the greatest, and obstacles the smallest; prices become a matter of context and the same product and service may be charged differently every time; human resources become the basic value of knowledge economy. (Drucker, 1992) Knowledge management in a knowledge-based society becomes a success strategy focused on the rational, i.e. effective and efficient use of knowledge as an important non-material resource in contemporary manufacturing and service processes. Efficient use of knowledge has become a necessary precondition for realisation of economic strategy – economic development. Interrrelation between educational and economic (entrepreneurial) subsystem implies such a relationship, in which, in systematic terms, educational system produces an information output by which the economic system attempts to fulfill its information needs in the production field.

A new economic view which emerged at the beginning of the 1990s rejected traditional hypotheses which implied that economy was a closed, balance-reaching system. Theoreticians of hypercomplexity deem that national economies and societies are a complex, adaptive, endogenous system. Hypercomplexity implies great complexity of a society, company, organisations, and science (Qvortrup, 2004a: 2). It is considered one of the «four c's» for the new paradigm in the field of economics (Antonelli, 2011) The «four c's»: complexity, chaos, catastrophe, cybernetics»).

Hypercomplexity annulls many aspects of traditional economic theory. Namely, mathematical models used by traditional economy are based on system balance. Advocates of (hyper) complexity of economics claim that traditional economic models have never been adjusted to the latest discoveries and thus remained incomplete models of reality, and emphasise the significance of introduction of information entropy in the economic models. Entropy has been used since 1988 in formulating of important concepts of organisation and simulation of development of complex systems, including economic systems. Traditional economic models have been set up by allowing only a very small degree of freedom, for reasons of model simplification. For example, the relationship between unemployment and inflation has traditionally been considered a simple function with a single freedom degree, which provides very little entropy. "The sciences of the complexity redefine from scratch the relationships between science and society." (Agguerrondo, 2010:3)

It is deemed that hypercomplexity (Rutenbeck, 2006) is based on behavioural, institutional and evolution economy, and complexity includes components from each of these fields of economics. Behavioural economics (BE) is defined as a discipline which uses insights on social, cognitive, and emotional phenomenons in the impact of people's economic behaviour. The BE has linked the disparity of economic theories and real behaviour, which has reflected in insufficient predictability. Psychology, especially cognitive and social, has contributed to improvement of ecological validity – reality – of economic models whose estimates are based on mathematical axioms and formalisations (from which conclusions are derived on reasoning in the decision-making process). The latest field of behavioural economics is neuroeconomics, a discipline which combines neurology, psychology, and economics, and refers to research of brain activities during financial decision-making and behaviour. Neuro-correlations of inclination and avoidance of risk have already been recognised, and there are evidence that persons with damaged regions for the display of emotions (for example, fear) make better financial decisions. Institutional economics is interdisciplinary; found between economics and the law. This is a relationship between the state as regulator, in the wider context of drafting and execution of laws and regulations on one hand, and economic activity of entrepreneurs and economy as a whole on the other hand. Evolution economics has focused on processes which constantly introduce economic changes, thus influencing all economic entities and institutions, such as different companies or employees. These processes are a result of actions and interaction of various individuals who make the system, and are based on available information. In simple terms, this means that no social model, including the economic one, may be constant; it is subject to constant changes caused by constant innovations.

Brian Arthur, Steven N. Durlauf and David A. Lane from the Santa Fe University have defined six characteristics of (hyper)complex systems (Qvortrup, 2004b and Agguerrondo, 2010:7-9): 1. Dispersion – economic events are defined by interaction of many dispersed factors, and any factor's action depends on the expected activities of a limited number of other factors; 2. There are no global entities which control interactions. Control is ensured by mechanisms of market competition instead; 3. Economy has many levels of organisation and interaction;

these units usually serve as «building blocks» for building of a unit on the following, higher level, on any level of activity. Total system organisation is hierarchical, with many kinds of interactions by levels; 4. Permanent adaptation – behaviour, action, strategy and products are constantly revised and the system continuously adapts; 5. New markets, new technologies, new behaviours, and new institutions are created continuously, the result of which is constant need for learning and training; 6. Because of new niches and new possibilities, economy is far from «optimal», or from global balance. This is why improvements are always possible and occur regularly. The table below shows the differences between categories and forms of knowledge complexity, and provides a definition of hypercomplexity.

Table 1: Knowledge Complexity and Forms of Knowledge Complexity

Knowledge Category	Knowledge Form	Definition of Knowledge
1. The first class knowledge – simple knowledge	Knowledge of something	**Knowledge of facts /factual knowledge**
2. The second class knowledge – complex knowledge	Knowledge of learning conditions /knowledge	**Reflexive knowledge**
3. The third class knowledge – hypercomplex knowledge	Knowledge of reflexive knowledge system conditions	**Systematic and creative knowledge**
4. The fourth class knowledge	Complex knowledge	**Synergy of knowledge of all members of the society**

Source: Made by the author, according to Qvortrup L.: The Hypercomplex Society, University of Southern, Denmark, 2004, p. 2, and Qvortrup L.: Society's Educational System, www.seminar.net

The first class knowledge represents simple factual knowledge, and the second class knowledge represents comprehending and using simple factual knowledge. Hypercomplex knowledge (or the third class knowledge) implies systematic and creative management of the existing facts and knowledge in forming of new ones. The third class knowledge has been subject of research by many modern philosophers, among others, by the French philosopher Michel Serres. According to Serres, in order to learn something, the starting point is not only what one knows in relation to what one does not know; the matter is rather in changing the outlook on learning as a creation of something new (Serres, 1995, 1-204). Foundation of the third class knowledge are scientific research, licences, patents, trademarks, and innovations. The fourth class knowledge represents a "knowledge society" as a special form of knowledge, which may not be owned by a single person, but is owned by a total social community in which all individuals are members. It is created by the synergy of knowledge of all members of narrower and wider community and is much more complex type of knowledge.

Thus, a society's hypercomplexity concept is based on the paradigm of complexity. However, «complexity» is not a new concept. On the contrary; complexity and management complexity are concepts rooted in rationalists' ideas of 18th and 19th century philosophies. However, the term of hypercomplexity of society and knowledge has been introduced by

Herbert A. Simona, and the term has been transferred to scientific management theories in the twentieth century. He showed that modern society has been developing into a social system through social evolutions, with an important ability to manage complexity. Summary of his comprehensive analysis of social system as a whole is the following: a society develops according to polycentric and poly contextual social systems in order to manage increasingly more complex environment in the global society.

2.2. METHODOLOGY

Knowledge societies which base their development on the third class knowledge, i.e. hypercomplexity, develop their research capacity and are successful in the absorption of technology and knowledge. In the following section, the subject of analysis is development of research capacity, technology and innovation efficiency, and the ability to absorb knowledge in the Republic of Croatia and the selected countries.

The method of transformation of variables (Habing, 2004:1-6) is used to analyse the development level of research capacity, technology and innovation efficiency and the ability to absorb knowledge and technology. Namely, in order for all of the above-mentioned indicators to be transformed to the index which has values from zero to one, which enables their comparison and aggregation, the following formula of variable transformation and its derivative is used:

$$x - index = \frac{x - \min(x)}{\max(x) - \min(x)} \quad (1)$$

where min(x) and max(x) are the highest and the lowest values of the variable x. The method of transformation of variables is used every time there is a great number of different indicators in the research which need to be reduced to a common measure, the goal of which is the possibility of their unification and facilitation of their comparison. For example, the World Bank uses the quotient of the natural logarithm of GNI per capita, reduced by the natural logarithm of the number 100 and natural logarithm of USD 40,000 as the supposed maximum value of GNI per capita in its methodology for the calculation of the GNI index as a component of the Human Development Index (HDI).

Data used for analyses below are taken from statistical publications of the United Nations for 2009 and 2010, and for reasons of comparibility, 2007 has been taken as the reference year in relation to data availability. The analysis has been conducted for 110 countries, and the most significant results for the Republic of Croatia and the selected countries have been shown in tables in the appendix to the paper.

3. ANALYSIS OF RESEARCH CAPACITY DEVELOPMENT, TECHNOLOGY AND INNOVATION EFFICIENCY AND THE ABILITY TO ABSORB KNOWLEDGE IN THE REPUBLIC OF CROATIA AND THE SELECTED COUNTRIES

As stated in the theoretical and methodological part of the paper, development of innovation and technology, together with proper functioning of the educational system and research capacity development determines economic growth and development. Namely, educated employees, i.e. human capital, become agents of the creation of knowledge which enables an increase in the number of innovations, which lead to technological changes, which significantly accelerate economic growth. This interaction is subject of the analysis below by means of mathematical, statistical and graphic methods.

An increase in the share of highly educated population is a component of a long-term research capacity development strategy. Namely, research capacity has a significant impact on economic growth and development regarding direct relationship between development of human resources and innovativeness, which results in research capacity development. The Research Capacity Index is a combined index of three indicators: 1. investments in research and development, 2. investments in tertiary education, and 3. the number of scientific publications (Table 2 in the appendix to the paper).

According to the Research Capacity Index, in 2007 Israel was ranked first, followed by Sweden, Japan, the USA, Finland, Germany, Switzerland... the Republic of Croatia was ranked 32nd, and Cambodia was the last, 110th. Research and innovations help create new workplaces, achieve prosperity and quality of life. A significant deviation of the Republic of Croatia is evident in 2007 in research capacity development in comparison with highly developed countries. Namely, the Republic of Croatia lagged behind Israel by 91,07%, behind Sweden by 82,37%, and behind Japan by 76,93%. Likewise, Croatia also lagged behind the neighbouring countries in research capacity development, i.e. countries which accessed the European Union in 2004. According to this indicator, Croatia lagged behind Slovenia, Poland and Hungary, which were ranked 27th to 29th (the average lag of 7,5%). The Republic of Croatia achieved a better result in comparison with Slovakia (positive deviation of 10,43%), Romania (21,42%), and Serbia (49,80%). In comparison with Cambodia, ranked last, measured by research capacity development, the Republic of Croatia realised a positive deviation of 99%.

Although the European Union is the world leader in many technologies, it has been faced with ever greater challenges, not only by traditional competitors (Japan, the USA), but also by knowledge economies in the making (Korea, China). The main test for the European Union is to stay competitive and use science and technology with the goal to contribute to economic growth, create workplaces, quality of life and solve social challenges, such as poverty, health care and damage done to the environment. Thus, the Republic of Croatia needs to recognise the importance of investments in research and development. Lower consumption level for research and development by the private sector is the key reason for lagging behind the European Union in research capacity development. The share of R&D business financing amounts only 1,2% of GDP in the EU, in comparison with 1,9% in the USA and 2,4% in Japan. (European Union Delegation in

Croatia, 2011) The European Union also has fewer examples of turning scientific knowledge and discoveries in patented inventions, especially those necessary for high technology industries. (7th Framework program, 2010) The EU strives to eliminate these difficulties by an integrated approach to research and innovation policies, in order to implement research and development and their significance in all EU policies, from state grants to effective protection of intellectual property, from education to co-ordinated use of tax incentives for research and development promotion. However, the most concrete manifestation of the European Union's science and technology policy is forming of the European Research Area (ERA) and investment of EUR 50,5 billion (European Union Delegation in Croatia, 2011) in research capacity development until 2013.

Positive effect of research capacity has a direct impact on higher technology and innovation efficiency. Namely, more educated human resources create a greater number of scientific and professional research, the result of which is a greater number of scientific publications which contribute to the increase in the number of patents, licences and trademarks. Technology and Innovation Efficiency Index is a combined index, i.e. the mean of three indicators: 1. the number of patents by the country's residents applied in the region; 2. receipts from licences, and 3. the number of residents' trademarks applied in the region (Table 3 in the appendix to the paper).

Technology and innovation efficiency is measured as an arithmetical mean of receipts from licences, the number of patents and the number of trademarks. Countries are ranked according to the index level. According to the calculation of this index, the USA are ranked first, followed by Japan, Korea, and Germany. The Republic of Croatia is ranked 31st. Technology and innovation efficiency is crucial for economic growth and development, and competitiveness of countries. Measured by technology and innovation efficiency, the Republic of Croatia lags behind the most developed countries two times (99% behind the USA, 95% behind Japan and 76% behind Korea). Croatia also lags behind Hungary (ranked 18th), Poland (ranked 26th), and Ukraine (ranked 29th), but realises positive deviations in comparison with Slovenia (ranked 33rd), Slovakia (ranked 50th), and Serbia (ranked 52nd). According to the above indicator, Croatia is ranked 31st. The greatest positive deviation is realised by the Republic of Croatia compared to Bolivia, ranked last, on the 110th place. According to data from 2006, leaders in innovations are Sweden, Finland, Switzerland, Denmark, Japan, and Germany. Croatia groups among „trailing countries" in terms of innovations, together with Estonia, Spain, Italy, Malta, Hungary, and Slovakia which are separated from the developed countries by followers and catching-up countries (Pro-Inno-Europe, 2006). Constant evaluation of innovation systems and innovation capacity of companies has a great role in the formulation of strategic developmental guidelines of certain countries, at least in relation to development of the small and medium-sized enterprises sector, technological transfer, inclusion of the scientific sector in economic development, lifelong learning, etc. Constant evaluation through mutual comparisons, including „competitions" of national administrations, results in deeper analyses of development and introduction of improvement measures. In order to increase competitiveness, the European Union has been financing a great number of technology and innovation research through

the 7th Framework R&D Programme and the Community's Competitiveness and Innovation Framework Programme (CIP) (European Union Delegation in Croatia, 2011). Until 2013, the European Union plans to invest EUR 3,6 billion (7th Framework program, 2010) in small and medium-sized enterprises which strive for innovations, especially in the fields of energy efficiency and renewable energy sources, environmental technologies and improved use of information and communication technologies (ICT). The European Technological Institute was founded in 2008, and it unites three sides of the knowledge triangle in one place – research, education, and innovation, which together make a basis for knowledge-based economy. The Institute operates through communities for innovation and knowledge, which are a result of partnership between the private sector, research community and universities. Considering its considerable lagging behind in the technology and innovation efficiency, Croatia should make great efforts in order to reach EU Member States, as well as other developed countries. This should be accomplished by creating a climate which promotes innovation, which enables business entities to be competitive, and the ability to absorb knowledge will play a significant part in this process.

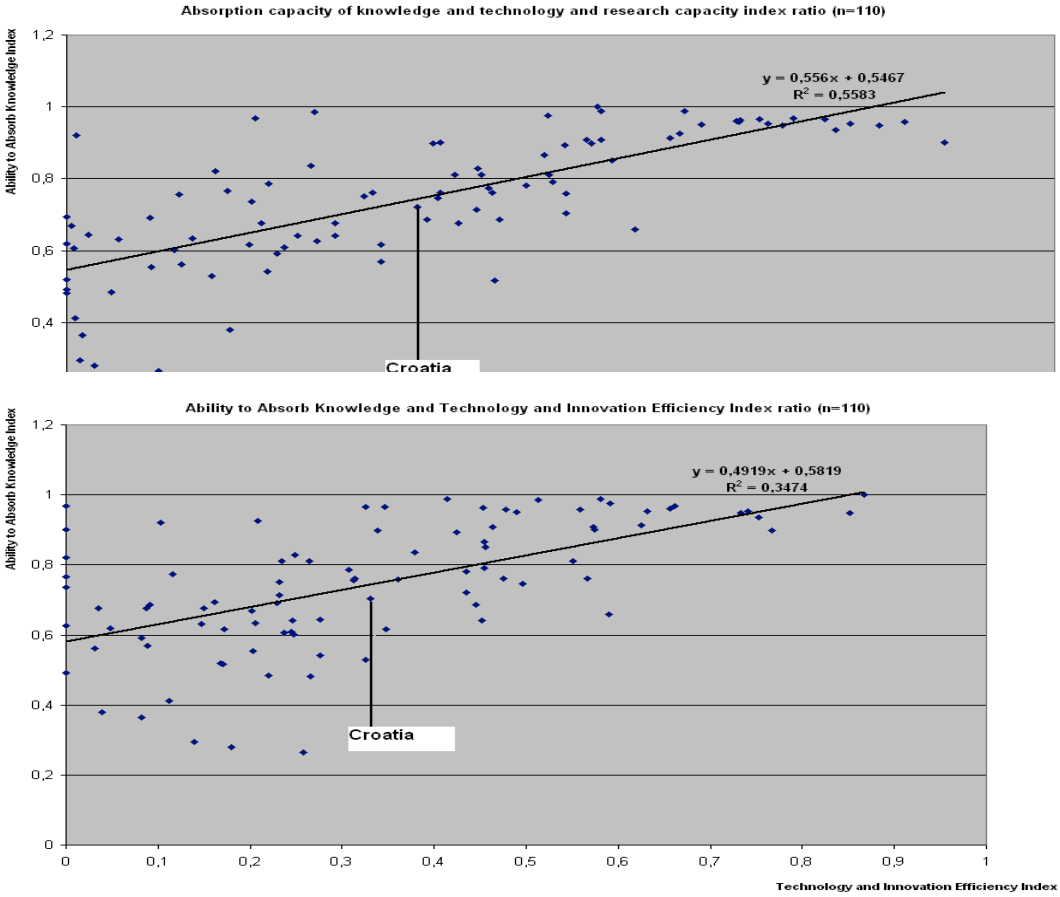
The ability to absorb knowledge and technology reflects in a successful difusion of new economic technologies. The Absorption of Knowledge and Technology Index is the arithmetical mean of two indicators: 1. labour force productivity and 2. GNI per capita.

The basic premise of the ability to absorb knowledge and technology is reflected in higher labour force productivity, which generates greater production, and by this higher income level. According to this indicator, the United States of America are ranked first, with the maximum index (table 4 in the appendix to the paper). The maximum index means that the United States of America have the ideal ratio of labour force productivity and the GNI. Norway, Ireland and Hong Kong have minimum deviations, following the USA. The Republic of Croatia is ranked 40th and records negative lagging behind the USA by 28,19%. Slovenia is also ranked better than the Republic of Croatia (ranked 29th), the Czech Republic (ranked 31st), Slovakia (ranked 33rd), Hungary (ranked 35th), and Poland (ranked 38th). Among the neighbouring countries, Croatia records positive deviation in comparison with Serbia.

Although, according to the World Bank criteria, Croatia groups among highly developed countries (according to the World Bank criterion, Croatia in 2008 realised USD 16,980 per capita) (Human Development Report, 2010), and according to the OUN criterion, is one the high human resources development level (according to the World Bank criterion, Croatia in 2008 had the Human Development Index of 0,767 and groups among countries of highly developed human resources) (Human Development Report, 2010), Croatia records the greatest developmental lags in the key developmental components; the application of research capacity and efficiency and application of technology and innovation. When Croatia is compared with the neighbouring countries, its lagging behind Slovenia is especially visible in terms of research capacity development (the lag of 8,58%). The Technology and Innovation Efficiency Index indicates Croatian lagging behind Austria (28,2%), and Estonia (15,02%) in terms of ability to absorb knowledge and technology. In global terms, Croatia lags behind Israel the most in research capacity development (91,08%) and the United States of America in the ability to absorb

knowledge and technology (28,19%), and technology and innovation efficiency (99,17%). Taking into consideration almost double lag in all components of development indicators in terms of highly developed countries' average, Croatia will have to invest greater efforts in order to reach highly developed countries and the EU Member States. Chart 1 shows relationship between the Research Capacity Index, Technology and Innovation Index, Ability to Absorb Knowledge and Technology Index and economic growth.

Figure 2: The Relationship between the Ability to Absorb Knowledge and Technology, Research Capacity, and Technology and Innovation Efficiency



Source: author's calculation

Charts indicate a strong relationship between the increase in the Research Capacity Index, Technology and Innovation Index, and the Ability to Absorb Knowledge and Technology Index and economic growth (Chart a), but also vice versa (Chart b). In addition, charts indicate that Croatia is below the average of the countries analyzed in the development of hypercomplex knowledge Namely, taking into consideration regression determination coefficient which marks the connection between two or more variables, and which is described in the model (a) 74,71%, and in the model (b) 58,94% of all points of the function, a strong connection may be established between the observed occurrences on the basis of which the following

conclusions may be derived: reduction of the gap between the developmental level of Croatia and the developed EU Member States should also be based on an increase in the quality of the human factor, which is achieved by an increase of general health care and quality of life. At the moment when investment capital has reached enormous mobility and availability, the human quality factor has the key role in its gaining: the higher the quality, the better conditions for the import of capital, and the technology provided by this capital is of greater quality. Quality educational programmes increase the quality of education of the human factor; improvement of the ability to attract researchers and strengthening participation of female researchers support creation of the necessary preconditions for more sustainable and attractive careers in the sector of education, research and development. The necessity for specific practical knowledge and skills, and for general knowledge and skills such as interpersonal relationships and social competence, should be met by stimulating investments in research and development, by financing vocational education in Croatia which has currently been viewed in the traditional manner, by conducting a reform of vocational education. Greater investments should be made in high education. Investments in Croatia have currently been too low in comparison with European means. Life-long learning, for now primarily conducted through adult education policy, should be stimulated; examples of good practice from other European economies should be used; information and communication technology should be applied in education; various innovative approaches to learning should be stimulated.

4. CONCLUSION

Development of innovation and technology through proper functioning of the educational system and research capacity development system determines economic growth and development. Educated employees, i.e. human capital, becomes an agent of knowledge creation which enables an increase in the number of innovation, and they lead to technological changes which significantly accelerate economic growth. Increase in the share of highly educated population is a component of a long-term strategy of research capacity development. Dynamic coordination between science and society is achieved by making investments in their development, and efficiency of the two-sided science - society communication channel is promoted which became the foundation of hypercomplex knowledge in a knowledge-based economy.

A new economic theory, which emerged at the beginning of the 1990's, rejects traditional hypotheses which indicated that economy was a closed system which reached balance. Theoreticians of hypercomplexity deem that national economies and societies are a complex, open, adaptive, endogeonous system, and that hypercomplexity represents exceptional complexity of the society, companies, organisations and science. In such environment, taking into consideration the established correlation between an increase in the Research Capacity Index, Technology and Innovation Efficiency Index, and the Ability to Absorb Knowledge and Technology Index and economic growth, in order to reduce developmental lags, Croatia needs to invest additional resources in the increase in human capital and productivity.

The significance of a specific component of economic growth from the analysed model should be additionally established by statistical and mathematical methods, which could

provide a possibility to precisely determine specific measures for stimulation of technology and innovation efficiency, ability to absorb knowledge and technology, as well as human resources development.

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APPENDIX

Table 2: Research Capacity Index for Republic of Croatia and selected countries in 2007

Country	Investments in Research and Development Index	Investments in Tertiary Education Index	Number of Scientific Publications Index	Research Capacity Index	Rank
Israel	1,00000	0,710308	0,954685	0,888331	1
Sweden	1,00000	0,559778	0,983858	0,847878	2
Japan	0,823834	0,790723	0,8532	0,822586	3
U.S.	0,694301	-	0,916995	0,805648	4
Finland	0,911917	0,504054	0,963749	0,79324	5
Germany	0,650259	0,801417	0,883266	0,778314	6

Switzerland	0,761658	0,540581	1,000000	0,767413	7
Canada	0,520725	0,750566	0,93517	0,735487	8
France	0,551813	0,749984	0,872152	0,72465	9
United Kingdom	0,453368	0,746585	0,928678	0,709543	10
Denmark	0,634715	0,500408	0,970194	0,701772	11
Netherlands	0,463731	0,632456	0,949439	0,681875	12
Austria	0,608808	0,541559	0,891364	0,680577	13
Australia	0,458549	0,645389	0,931028	0,678322	14
Belgium	0,471503	0,55191	0,903262	0,642225	15
Croatia	**0,316062**	**0,308393**	**0,770283**	**0,464913**	**32**
Cambodia	0,012953	0,000001	0,000001	0,004318	110

Source: authors calculations according to Human Development Report 2009, The World bank, Washington, 2009, p. 143.-201.; World Development indicators 2010., The World bank, Washington, 2009., p. 1-101., 197.-263.

Table 3: Technology and Innovation Efficiency Index for Republic of Croatia and selected countries in 2007

Country	Receipts from Licensing Index	Number of Patents Index	Number of Trademarks Index	Technology and Innovation Efficiency Index	Rank
U.S.	0,910938	0,775263	0,915405	0,867202	1
Japan	0,877057	0,820000	0,856587	0,851215	2
Korea	0,719607	0,735507	0,844691	0,766602	3
Germany	0,783820	0,661866	0,810635	0,752107	4
United Kingdom	0,918750	0,583693	0,721695	0,741380	5
France	0,825809	0,567577	0,804084	0,732490	6
Canada	0,821293	0,467229	0,694727	0,661083	7
Australia	0,678086	0,528482	0,762831	0,656466	8
Finland	0,953755	0,407113	0,534935	0,631934	9
Spain	0,637033	0,446582	0,792042	0,625219	10
Singapore	0,894995	0,294928	0,581881	0,590601	11
China	0,053190	0,714471	1,000000	0,589221	12
Ireland	0,935795	0,341474	0,466600	0,581289	13
Israel	0,804126	0,382234	0,534812	0,573724	14
New Zealand	0,682744	0,408344	0,628466	0,573185	15
Croatia	**0,568085**	**0,279041**	**0,459189**	**0,435438**	**31**
Slovenia	0,529494	0,271656	0,473990	0,425047	33
Slovakia	0,000001	0,213754	0,532433	0,248729	50
Serbia	0,000001	0,284566	0,452211	0,245592	52
Bolivia	0,095170	0,000001	0,000001	0,031723	110

Source: authors calculations according to Human Development Report 2009, The World bank, Washington, 2009, p. 143.-201.; World Development indicators 2010., The World bank, Washington, 2009., p. 1-101., 197.-263.

Table 4: Absorption of Knowledge and Technology Index for Republic of Croatia and selected countries in 2007

Country	Labour Force Productivity Index	GDP Index	Absorption of Knowledge and Technology Index	Rank
U.S.	1,00000	1,00000	1,00000	1
Norway	0,97811	1,00000	0,98906	2
Ireland	0,97611	1,00000	0,98805	3
Hong Kong	0,97612	0,99600	0,98606	4
Singapore	0,95230	1,00000	0,97615	5
Canada	0,95185	0,98600	0,96892	6
United Arab Emirates	0,93530	1,00000	0,96765	7
Denmark	0,95335	0,97800	0,96567	8
Switzerland	0,94210	0,98900	0,96555	9
Netherlands	0,94132	0,98300	0,96216	10
Australia	0,95160	0,96800	0,95980	11
Sweden	0,94515	0,97300	0,95907	12
Austria	0,93537	0,98000	0,95768	13
Finland	0,94109	0,96700	0,95404	14
United Kingdom	0,93767	0,96600	0,95183	15
Croatia	0,73218	0,82800	0,78009	40
Serbia	0,52103	0,76000	0,64051	64
Congo	0,00000	0,17200	0,08600	110

Source: authors calculations according to Human Development Report 2009, The World bank, Washington, 2009, p. 143.-201.; World Development indicators 2010., The World bank, Washington, 2009., p. 1-101., 197.-263.

HIPERKOMPLEKSNO ZNANJE U GOSPODARSTVU TEMELJENOM NA ZNANJU

Sažetak

U radu se definira hiperkompleksnost i hiperkompleksno znanje u gospodarstvima temeljenim na znanju te se dokazuje hipoteza da razvitak, primjena i širenje novih tehnoloških dostignuća direktno utječu na ekonomski rast zemlje.

U izračunima su korišteni podaci prikupljeni iz relevantnih baza za 110 zemalja svijeta. Za ostale zemlje podaci nisu objavljeni što predstavlja tipično ograničenje u primjeni ovakve metodologije istraživanja.

Metodom transformacije varijabli utvrđena su razvojna zaostajanja Republike Hrvatske u promatranim razvojnim pokazateljima i njihovim komponentama te su dani prijedlozi za njihovo poboljšanje. S obzirom na utvrđenu vezu između porasta indeksa razvijenosti istraživačkih kapaciteta, učinkovitosti tehnologije i inovacija te sposobnosti apsorpcije znanja i tehnologije na gospodarski rast, Hrvatska mora ulagati dodatna sredstva u povećanje ljudskog kapitala i produktivnosti rada da bi smanjila razvojna zaostajanja.

Ključne riječi*: hiperkompleksnost, društvo znanja, ekonomija znanja, ljudski potencijali, ekonomski razvoj*

JEL klasifikacija*: O10, O15, O33, D83*

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CHILDREN'S ADVERTISING ON TELEVISION AND THEIR CONSUMER SOCIALISATION: PARENTS' ATTITUDES

Abstract

One of the most controversial issues in marketing is marketing towards children. Beginning with the analysis of the process of children's involvement in consumption, child's ability to understand and critically respond to an advertisement, parents' attitudes to children's advertising and possible directions and solutions to the problem of advertising to children the article empirically examines parents' attitudes towards television advertising. Research results include parents of children aged between 10-12 and indicate that parents in general have no positive attitude to advertising to children and show mild interest for the prohibition of television advertisements.

Key words: advertising to children, TV advertising, consumer socialisation, parents' attitudes

1. INTRODUCTION

In spite of the doubtlessly multiple positive contribution to the society deriving from the effects of the aggregate marketing system (Wilkie and Moore, 1999), its functioning is not flawless, and one of the most controversial issues is marketing to children. The growth of marketing activities towards that group of consumers clearly illustrates the character of the market economy, within the framework of which and in the effort to achieve profit the attention is directed towards those market segments which offer good profit opportunities, often not taking into account the ethical dimension.

On the one hand children have considerable financial resources at their disposal today, but on the other hand they are easily influenced by advertising on account of their naivety, lack of criticism and lack of information. In the USA, children under the age of 14 spend 40 billion dollars per year and influence their parents' 500 billion dollars worth purchase (Tolić, 2009). By targeting children advertisers offer various products mainly through the mass media promising happiness and thus distorting basic positive values in the society and by promoting the urge to possess they achieve high profits, which is unethical because of children's vulnerability. In spite of the growing presence of the Internet, television remains the main advertising media easily reaching children of all ages through different contents.

Bearing all this in mind the purpose of this article is to conduct a theoretical research on a sample consisting of Croatian children aged between 10-12 and through their parents' attitudes empirically research multiple dimensions of the issue of advertising to children on

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television. The article begins with a short review on children's consumer socialisation, in which process the parents' role is indispensable. The key aspect of children's consumer socialisation is the achieved level of cognitive development reaching its final stage at teen ages, when children become able to respond critically to ads but continue to be vulnerable to certain product categories as well. This analysis served as the basis for the selection of the age of children's parents involved in this research. The knowledge on the harmful influence of a market activity is of little use if it does not result in a particular protection of a consumer group's interests and therefore the article reviews the methods of regulation of the sensitive issue of advertising towards children on television in the world and in Croatia as well. An important part of the text is dedicated to the analysis of parents' attitudes towards advertising taken from already conducted research worldwide and some of its aspects are included in our research and empirically tested in the Croatian environment. The theoretical research resulted in the formation of research hypotheses about parents' general attitudes to children's advertising on television, its influence on children, parents' intermediation and children's reaction to television advertisements as well as the attitudes towards regulation of the matter under research.

2. CONSUMER SOCIALISATION OF CHILDREN AND THE ROLE OF PARENTS

In order to be able to participate in the market independently and responsibly it is necessary for children to experience during their upbringing "the process through which young people acquire skills, knowledge and attitudes relevant for their functioning as consumers on the market" (Ward, 1974, 2 according to Roedder, 1999, 1983), the so called consumer socialisation. It includes the acquisition of knowledge about products, brands and purchase, the ability to make purchase decisions and the acquisition of particular values such as materialism (Roedder, 1999). During this complex process, children exposed to multiple influences undergo a dramatic development consisting of several phases: perceptive, analytical and reflective (Roedder, 1999). Main factors in children's consumer socialisation are parents, peers, school and companies' sophisticated marketing communications. Although television is still the most dominant media, companies increasingly turn to on-line media (Calvert, 2008).

Parents have a very important role in children's consumer socialisation since marketing messages, primarily via television, reach children at their homes. According to a recent Gfk– the Market Research Center (www.gfk.hr) - survey almost 19 % of the total number of inhabitants of the Republic of Croatia are young people and surprisingly 84% of children watch television advertisements and considerably influence their parents' purchase decisions. The way in which parents mediate in the consumer socialisation depends on the style of parenthood (Rose, 1999), within the framework of which the communication with children concerning watching television may differ. When it comes to active mediation, when parents talk with their children about advertisements and the restrictive mediation, meaning the control of the exposure to advertisements, both may influence the reduction of children's demand for advertised products, while parents' participation in watching television without making comments about advertisements has no significant impact (Calvert, 2008). In any of these three cases the

communication between parents and their children is indispensable for the development of an adequate protection against negative influences of advertising (Carlson, Laczniak, Walsh, 2001). The influence of parents as children grow up becomes weaker as well as the influence of media and advertising (Martens, Southerton, Scott, 2004).

3. CHILD'S ABILITY TO UNDERSTAND ADVERTISEMENTS WITHIN THE FRAMEWORK OF CONSUMER SOCIALISATION

The initial stages of the consumer socialisation research already referred to a child's understanding of advertising (Roedder, 1999). Although, there is no consensus, not even within the EU (Gunter, Oates, Blades, 2005), from the formal point of view, children are all persons up to 18 years of age and up to 15 years of age from the sociopsychological point of view. The ability to understand advertising goes hand in hand with the appropriate level of cognitive and social development of children. Piaget's theory of cognitive development strongly influenced the research on children's advertising communicative process during 1970s and 1980s (Wackman, Wartella, 1977). This theory was followed by information processing theories according to which Roedder (1981) classified children into three age categories based on their cognitive abilities to store and recall information between short-term and long-term memories and later he suggested the corresponding phases undergone by children in the process of consumer socialisation. Within the framework of the field of social development and in order to understand advertising beyond one's own perspective, relevant is the approach to the ability to take other person's perspective, the ability impossible to be experienced by children under the age of 8-10 (Selman, 1980). The relationship between the child and advertising boils down to two basic questions: (1) the ability to understand advertising and (2) the ability to react maturely and construct cognitive protection, in which process the point of reference is adults' ability to understand advertising (Wright, Friestad, Boush, 2005).

Results regarding children's ability to distinguish the programme content from advertising differ from one author to the next, some of them detect such an ability already at the age of 3 or just the opposite some of them claim that children aged between 5-7 have difficulties or that they are unable to make difference (Lawlor, Prothero, 2002). The majority of researches claim that almost all children can tell the difference between advertising messages and the rest of the programme at the age of five (Roedder, 1999).

It is very complex and multilateral to understand the purpose of advertising and within the sale's primary (1) function it includes (2) the persuasive intent aiming to alter somebody's mental state, behaviour or both, (3) informative intent, which because of advertisers' self-interest also includes (4) promotion, which in turn may be followed (5) by the intention to cheat or manipulate. It is considered that children become aware of advertising's persuasive intent at the age of 7 or 8, understanding that advertisers "try to persuade people to buy something", while younger children regard advertising as entertainment or an impartial information (Roedder, 1999). Not all researchers agree with this, for example Pine and Veasey (2003) state that children become aware of advertising's persuasive intent already at the age of 6 or 7,

contrary to Oates, Blades and Gunter (2002) who think that they develop partial awareness even at the age of 10. The theory of mind has recently indicated that children over the age of 3 years old start to comprehend the purpose of advertising concerning its intent to sell and the simple persuasive intent. They grow aware of the informative and cheating intentions between the ages of 3-5, they understand persuasion between the ages of 4 and 6 and they develop the knowledge of partiality and promotional intent between the ages of 6-8 (Oates, Blades and Gunter, 2002). In spite of all these differences, it is possible to conclude that children begin to understand complex advertising intents at the age of 8.

Knowledge on partiality and cheating, which are possible in advertisements, give rise to a certain cognitive defence against advertising in children making them less influenced by advertising, because they believe it to a lesser degree and they like it less and consequently it influences the reduction of their purchase demands (Robertson, Rossiter, 1974). In accordance with Roedder's (1981) classification of information processing Brucks, Armstroing and Goldberg (1988) reveal that children at the age of 9 and 10 need to be provided with instructions in order to be effectively protected against advertising and they think that children at the age of 13 are able to create a spontaneous critical cognitive response to advertising. In the context of knowledge on effective performance, it is considered that besides understanding advertising intents it is crucial to understand special advertising tactics and posses the knowledge on advertising's role in the market, which is acquired in early adolescence. The knowledge on advertising may not be a satisfactory defence against the seductive nature of advertising. Nairn and Fine (2008) analysing the models of dual processing and distinguishing between explicit and implicit mental processes, reveal the fact that modern marketing techniques, which relate products to positive stimuli, manage children's behaviour through the implicit change of attitude in which process the attitudes towards products are mediated through unconscious and irrational means impossible to be resisted by children and adolescents. Although adolescents, depending on their personal variables and knowledge on special advertising tactics, show high levels of scepticism in relation to advertising (Boush, Friestad, Rose, 1994) that group remains vulnerable, especially to advertising tactics of high risk products such as cigarettes and alcohol.

Qualitative research (O'Sullivan, 2005) may serve as a supplement to the research on cognitive development of children and provide a valuable insight into children's experience with advertising and results of these research may be applied to create regulations or children's advertisements, but should not be misused in the latter case.

4. PARENTS' ATTITUDE TOWARDS ADVERTISING TO CHILDREN

Since that parents bear the immediate responsibility towards children as the mediators of media content, their attitudes and their behaviour towards television advertisements are very important. It is believed that parents' attitude towards advertising to children depends on the extent to which such advertising disrupts the relationship between parents and their children regarding parents' emotional need expressed during their interaction with a child in the process of a child's socialisation (Grossbart, Crosby, 1984). Attitudes may vary according to different cultures and communication patterns of mothers. The influence of mothers' communication

patterns regarding the tendency towards children's control, which contributes to the negative attitude, was detected very early by Wiman (1983) in his research in the USA. In his research Mukhery (2005) detected that mothers in India have less negative attitudes towards television advertising (mean value 2,88) and advertising to children (2,19) and supervise their children to a lesser extent (3,08) in comparison to mothers in Japan (mean values 3,55, 3,28 and 3,41) and the USA (mean values 4,05, 3,86 and 4,07), which may be explained by later introduction of television broadcasting and the wish to know about new offers in the market. The USA boasts with the most negative attitudes and this is the country where parents talk with their children about advertisements and supervise their children more than anywhere else.

In general, parents express their anxiety in regard to advertising to children and especially towards food advertising. The research conducted by Young, de Bruin and Eagle (2003) among parents in Great Britain and Sweden on advertising to children on television indicated the following: advertising encourages children to make pressure on their parents to buy advertised products, the desire for products depends on the intensity of watching advertisements, children are more easily influenced than adults by advertisements and they are exposed to too many advertisements which lead people to buy products they don't really need. Research results vary even within same cultures, for example while Dens, De Pelsmacker and Eagle (2007) reveal moderate attitudes, which in tandem with family conflict and annoyance are the most powerful factors in restrictive mediation concerning television advertising, Ipa, Mehte and Coveney (2007) reveal strong negative attitudes towards food advertising to children and the desire for more pronounced regulation.

Baqiocco, D'Alessio and Lagin (2009) indicate that parents' attitudes to television advertising differ from their children's attitudes and that parents underestimate children's cognitive abilities, they believe that children enjoy advertising more than they really do, they consider their children immature and less suspicious towards advertising. In other words, they think that their children are less involved in the market then they really are. With the introduction and more pronounced use of new approaches to children such as placing products in children films parents' anxiety builds up and their negative attitudes are in opposition to actual legislation (Hudson, Hudson, Peloza, 2008).

According to Burra and Burra's (1977) 30 year old research 65% of parents demand stronger legislative control, while Cosmas and Yannopoulos (1981) indicate that the majority (64%) of mothers think that advertising to children on television should be banned, which has not been duly regulated to this very day.

5. DIFFERENT APPROACHES TO THE ISSUE OF CHILDREN'S ADVERTISING

Advertising to children has two important components; social, related to anxiety, primarily parents' regarding the harmful influence on children and political, as the consequence of the former and regarding the criticism and consumers' actions and public interest groups' actions resulting in television networks' self-regulation and legal regulation of advertising to children (Martin 1997).

The controversy over advertising to children reached its peak in 1970s, then it

experienced a slight fall on account of the introduction of regulatory measures, to rise once again with the appearance of new media and marketing and advertising techniques. Alternatives to tackle the issue of advertising to children may include (1) activities in favour of television including public regulation, self-regulation and effort on the part of media and advertisers, and (2) activities for the benefit of children regarding children's media literacy and encouragement of parents' involvement (Armstrong, Brucks, 1988.)

The approaches to the solution of the issue of advertising to children differ from country to country. In the USA the issue of advertising to children is balanced with advertisers' freedom of speech guaranteed by the First Amendment (Jordan, 2008). Among many laws in force (Jordan, 2008), whose enforcement is under the jurisdiction of the Federal Communications Commission (FCC) and the Federal Trade Commission (FTC), only two percent refer to children: the Children's Television Act dating from 1990 (CTA) and the Children's Online Privacy Protection Act dating from 1998 (COPPA) (Curran-Kelly, Richards, 2007). The system of the self-regulation of the advertising industry, the so called Children's Advertising Review Unit (CARU) established in 1974 is also in force. The purpose of CARU is to take care of unethical advertising to children through monitoring and evaluating advertisements and issuing warnings to advertisers in accordance with defined guidelines for advertising to children under the age of 12, to which advertisers only partially adhere (Ji, Laczniak, 2007.)

Within the EU, member countries may bring their own laws in accordance with already existing directives, the most important within the field of marketing communications are the following (European directives related to advertising, www.easa-alliance.org/Issues/European-Directives/page.aspx/254) the Audiovisual Media Services Directive (AVMS), arising from the Television Without Frontier Directive (TWFD) (Woods, 2008) and the Unfair Commercial Practices Directive (UCP). Such approach resulted in a variety of solutions (the Regulation on Advertising Aimed at Children un EU Member States and some Neighbouring States, www.obs.coe.int/online_publication/reports/childadv.pdf.en), for example it is forbidden to advertise to children under the age of 12 in Sweden, four member countries: France, Ireland, Netherlands and Great Britain do not consider advertising to children harmful and its prohibition is considered undemocratical in Spain (Children and Advertising: the European Dimension, www.ppu.org.uk/children/advertising_toys_eu.html). National self-regulatory organisations for the whole of the EU are integrated into the European Advertising Standards Alliance (EASA).

In Croatia, the issue of children's advertising has not been adequately regulated. In Article 109 of the Consumer Protection Act (Official Gazette 79/2007, www.nn.hr) children are referred to as consumers defined by their age in the context of unfair business practice and there is no reference to children regarding advertising in the Media Act (Official Gazette 59/2004, www.nn.hr). More attention is given to this problem in the Marketing Association of the Croatian Chamber of Economy's Code of Advertising Practice (http://hgk.biznet.hr/hgk/fileovi/6196.doc) referring to children in Articles 7 and 16 in relation to fairness in communication and safety, while Article 17 deals in greater detail with specific tactics of children's advertising.

The ideal solution to the problem of advertising to children consists of joint involvement of all participants. Besides providers' and marketing agencies' individual efforts to use

advertising content that will not abuse children's vulnerability and media's effort to make a clear distinction between advertisements and the rest of broadcasts, it is worth to mention the joint cooperation of the government and organisations in the implementation of self-regulation in certain countries, signifying a new approach within the EU member states. It is necessary to increase parents' involvement as persons most closely associated with children's consumer socialisation and to increase their active role in the process of children's media literacy as this is the case with the Media Smart Programme in Great Britain applied both in school and at home (Jackson, 2003).

6. FORMULATION OF RESEARCH HYPOTHESES

Taking into account the theoretical research on the parents' role in their children's consumer socialisation and the importance of their attitudes towards advertising to children for the creation of the relationship with their children, it is possible to deduce the following subject area hypotheses:

a) General parents' attitude towards children's television advertising. Five items of the questionnaire on parents' attitudes towards the exposure and nature of children's advertising messages are based on previous research such as the criticism of children's advertising (Karpatkin, 1998, Armstrong, Brucks, 1988) as well as research on parents' attitudes (Young, de Bruin and Eagle, 2003) and they constitute H1: Children are exposed to too many advertising messages on television and they are deceitful and do not help children in their development and understanding of the world surrounding them.

b) Parents' judgement of their children's capacity to understand advertisements based on the theoretical research in chapter 3. The research includes children aged between 10-12 who are capable of understanding the commercial intent of advertising and assisted by adults they are able to produce a critical response. However, they are still in their vulnerable phase showing a lack of cognitive abilities to respond to ads independently and maturely. This point is included in H2: Children aged between 10-12 are more vulnerable to the persuasive character of advertising than adults and the advertising to children is unethical.

c) Researching the pattern of parents' intermediation on the basis of 3 items (Mukheri, 2005) the scope is to find out to what extent parents actively participate in the media-child-parent context, and on the basis of previous hypothetic attitudes the H3 hypothesis has been set up: Parents actively participate in the intermediation of media contents.

d) During the consumer socialisation, children influence their parents as well through their reaction to advertisements consisting of children's demand of desired products. This aspect has been reviewed through 3 items (young, de Bruin and Eagle, 2003) and included in H4: Children look for advertised products.

e) Finally, parents' attitudes towards advertising and their experience with their children result in the wish to regulate this field, reviewed in chapter 5, in which 2 items (Walsch, Laczniak, Carlson, 1998, Cosmas, Yannopoulos, 1981) are used to bring under

consideration the H5 hypothesis: Parents think that advertising to children should be banned.

7. RESEARCH ON PARENTS' ATTITUDES TOWARDS ADVERTISING TO CHILDREN

7.1. RESEARCH METHODOLOGY

The research on parents' attitudes towards advertising to children was conducted in two primary schools in Rovinj, namely: the Primary School of Jurja Dobrile and the Primary School of Vladimir Nazor and the Primary School of Vladimir Gortan in Žminj and there was no important difference in results and therefore the results are presented in an integral manner. The research included 5th and 6th graders aged between 10-12 who have reached certain maturity regarding the understanding of advertising but they are still not capable of producing an independent critical response and defend themselves against the seductive nature of advertising. The research included their parents as well amounting to 221 pupils' parents in Rovinj and 41 pupils' parents in Žminj, that is a total of 262 parents who attended PTA meetings. The questionnaire used in the research contained 18 questions, one of them was concerned with the hours spent watching television and 17 questions included a 5 level Likert scale based on the research by Young, De Bruin and Eagle (2003) and partially by Cosmas and Yannopoulos (1981.), Walsh, Laczniak and Carlson (1998.), Mukherji (2005) and Chan and McNeal (2003). Presented research results are based on 183 valid questionnaires or 69,8% of the total number of pupils.

Since the research starting point was the presence of advertising to children on television the subject of research were the following television programmes HRT1, HRT2, RTL, NOVA TV watched from 7 to 8 o'clock in the morning and HRT1 from 8 to 10 in the afternoon, HRT2 from 6 to 8 p.m., RTL from 4 to 6 p.m., NOVA TV from 8 to 10 p.m., and all channels from 8 to 10 in the morning on Sundays and Saturdays as well as in the afternoon and on working days, which amounts to a total of 40 hours of programme in September and October 2010.

7.2. RESEARCH RESULTS ANALYSIS

Presented research results in Table 1 are based on 183 valid questionnaires or 69,8% of the total number of pupils.

Table number 1: Research results on parents' attitudes towards children's advertising

Claims	Mean Values	Standard Deviation
1. My child watches an average of _____ hours of television .	2,65	1,338
Parents' general attitude towards advertising		
Children are exposed to too many advertising messages on television.	4,35	0,934
Television advertising contributes to children's understanding of the world around them.	2,86	1,149
Television advertising messages present products in their real light.	2,04	1,060
Television advertising to children is full of tricks and deceits.	3,92	0,862
Television advertising is deceitful for children.	3,92	1,010
Children's capacity to understand advertisements		
Children are more influenced by advertising than grown up people.	4,20	1,001
Children aged between 10-12 understand advertising's commercial intent.	3,22	1,168
The more children watch television advertisements the better they will understand them.	2,58	1,141
Television advertising to children is unethical.	3,72	1,037
Parents' intermediary role		
Parents are entirely responsible for their children's choice of television advertising.	3,42	1,184

We limit our children's television watching time.	3,72	1,010
We talk with our children about television advertising messages (commercials).	3,93	1,040
	Children's behaviour regarding advertisements	
Television advertising to children encourages children to desire products they don't really need.	4,16	1,031
Children usually look for advertised products.	3,97	1,058
Television advertising to children encourages children to make pressure upon their parents to buy goods.	4,05	0,999
	Regulation of advertising to children	
Television advertising to children should be banned.	3,52	1,101
Television advertising to children under 12 years of age should be banned.	3,52	1,135

Source: Author calculation

According to research results presented in Table 1 children on average spend 2 hours and 39 minutes watching television every day, which is not irrelevant if we have in mind the additional time devoted to other media. Advertising messages broadcast on television in accordance with the schedule are broadcast within the framework of uninterrupted programme nonselectively to all household members who find themselves in the same room. It was determined that on average 26% of television advertisements are aimed at children (163 of 633). Parents think that children are exposed to too many advertisements (mean value 4,35), while the parents in Great Britain and Sweden believe that children are less exposed to advertising messages (values 3,21, 3, 29) (Young, de Bruin and Eagle, 2003).

Regarding the effects of advertising messages on children parents in general have no positive attitude. Although their attitude is not markedly negative, they think that advertising messages do not contribute to children's knowledge of the world surrounding them (mean value 2,86), while in Great Britain and Sweden parents have expressed a higher level of scepticism regarding the same issue (mean value 1,83, that is 1,19). Parents believe that advertising messages are deceptive, that is, that their representation of products is unreal (mean value 2,05), and there is even a more negative attitude of parents in Great Britain and Sweden (mean value 1,18 and 0,94). They also believe that television advertising messages contain tricks and deceits to seduce children (mean value 3,92), that is, they are deceptive for children (mean value

3,92), which confirms the hypothesis number 1.

Concerning the effect that these messages have on children the hypothesis number 2 was met as well. Parents think that children are more influenced by advertising than adults (mean value 4,20) and in comparison to Young, De Bruin and Eagle's (2003) research in Great Britain and Sweden (mean values 3,15 and 3,4) this conviction seems to be more pronounced. In tune with this theoretical finding parents believe that children between the ages 10-12 haven't developed a proper knowledge of the advertising's commercial intent (mean value 3,22). In parents' view the frequency of advertising messages for the purpose of achieving the commercial effect does not contribute to children's better understanding of messages (mean value 2,58). Consequently they think that advertising to children is completely unethical (mean value 3,72).

A relatively high percentage of parents think that they are entirely responsible in regard to watching television advertisements (mean value 3,42) and they mainly express the restrictive behaviour regarding watching television corresponding to the mean value of 3,72. Parents as mediators talk with their children about advertising content (mean value 3,93), which is positive. All hereby mentioned speaks in favour of the hypothesis number 3.

Parents believe that television advertising in general encourages children to buy products they do not really need (mean value 4,14) in comparison to Great Britain and Sweden where this ratio is lower (3,03 and 3,17). Children usually look for advertised products on television (3,97 in comparison to 2,72 and 2,24 in Great Britain and Sweden) and they make pressure on their parents to buy advertised products (mean value 4,05). The consequence of reversible socialisation through hereby mentioned three items fervently speaks in favour of hypothesis number 4.

Parents' prevailing attitude is that both advertising to children (mean value 3,52) as well as advertising to a particular sensitive group of children under the age of 12 should be banned (mean value 3,52), which only moderately speaks in favour of hypothesis number 5.

8. THEORETICAL AND MANAGERIAL IMPLICATIONS

The purpose of the mentioned research was to gain an insight into the issue of advertising to children on television, which has been insufficiently researched in Croatia. The benefit of such a research is related to the acquisition of knowledge on parents' attitudes on the position of a child within the process of consumer socialisation consisting of an intensive cognitive development of a child's relationship towards the world of consumerism, and in this particular case, it is related to television advertising. Although this research includes knowledge on parents' attitudes towards this omnipresent media, further research may be focused upon the Internet advertising due to the increase in children's interest for this media.

The primary intention of this research was to gain a detailed insight into the field of television children's advertising including parents' attitudes towards advertising, children's ability to understand advertisements, children's response and parents' role and parents' attitudes towards the regulation of this issue. Although the article reviews the matter under discussion, the limitation of this research lies in the lack of a more detailed approach to the issue

of children's advertising but may serve as basis for further research regarding for example the styles of parenthood in the consumer socialisation.

Managerial implications of this research have their value consisting in the possibility of a better adaptation of advertisements to the real needs of children in their development. However, on the other hand, whether the managers are willing to follow certain guidelines concerning children's advertising and to what extent remains unanswered. Because of the urge to earn profit, advertisements, even those aimed at small children, will be creatively shaped in order to attract for the consumption of a particular product. The solution lies in the regulation of this issue by the law, which requires the readiness of the society in which the issue of children's advertising has been placed in the centre of attention.

9. CONCLUSION

The issue of advertising to children including advertisements that are more sophisticated and the increase of children's purchase power has been given more prominence. Children learn about market forces and market behaviour through the process of socialisation, which is a time consuming process during which children have financial resources at their disposal, they take part in purchase decisions or influence their parents' regarding the purchase of desired products, but have no cognitive abilities nor a level of social development to take a responsible stand against advertisements. Numerous research projects, conducted in accordance with different methodologies, on children's ability to react in a critical way to ads have offered different findings. Nevertheless, it may be concluded that children at the age of 5 may tell the difference between advertising messages and the rest of the programme and that at the age of 8 they start to understand complex advertising intents, but it is only ate the age of 13 that they can create a spontaneous critical cognitive response to advertising.

There are many factors included in the consumer socialisation of children: parents, peers, school and companies' sophisticated marketing communications but parents play the most important part because of the close relationship with their children. Therefore, their attitudes are very important as well as their conduct towards television advertising messages, which is still the dominant form of advertising. Their role is particularly demanding today because advertising messages are more and more seductive, deceitful and companies find new ways to approach children such as the on-line approach. Parents' attitudes reflect their children's attitudes towards advertising. Parents are an important factor that may exert its influence even on the legislation, if they are organised. The solution to the problem of advertising to children is still out of reach. Although it has been a matter of concern of companies, parents and organised consumer groups for ages, there is no identical solution in different countries and inadequate attention has been given to this issue in the Croatian legislation as well.

From the theoretical point of view it has been determined that parents believe that their children are exposed to too many influential television advertising messages. Aware of their children's vulnerability they consider themselves responsible and mediate in an active and restrictive manner. Generally speaking they have predominantly negative attitudes regarding television advertising and feel their children's pressure to buy advertised products, which

children often don't really need. In comparison to well-elaborated theoretical knowledge in the foreign literature, the detected hypotheses have been confirmed in the Croatian case as well. However, the surveyed parents are not firmly convinced that television advertising to children should be banned, not even to children under 12 years of age. Finally, it may be concluded that parents are fully aware of their children's inability to react in a responsible manner to television advertisements, but in spite of the predominantly negative attitude they do not feel enough coerced by television advertising to feel strictly in favour of its ban.

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DJEČJE REKLAME NA TELEVIZIJI I NJIHOVA POTROŠAČKA SOCIJALIZACIJA: STAVOVI RODITELJA

Sažetak

Jedno od najkontroverznijih pitanja u marketingu je marketing usmjeren prema djeci. Polazeći od analize procesa uključivanja djece u potrošnju, dječje sposobnosti da razumiju i kritički odgovore na reklamu, stavova roditelja prema reklamama za djecu i mogućih smjerova i rješenja problema reklama za djecu, rad empirijski istražuje stavove roditelja prema televizijskim reklamama. Rezultati istraživanja uključuju roditelje djece stare 10-12 godina i ukazuju na to da roditelji uglavnom nemaju pozitivan stav prema reklamama za djecu te iskazuju blagi interes za zabranu televizijskih reklama.

Ključne riječi*: reklame za djecu, TV reklame, potrošačka socijalizacija, stavovi roditelja.*

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FACTORING - INSTRUMENT OF FINANCING IN BUSINESS PRACTICE –SOME IMPORTANT LEGAL ASPECTS

Abstract

Succesful business practice needs constant sources of financial means. One of the biggest problems of business practice is how to provide these financial means. Among many other methods, business practice is using factoring as a method of financing. Factoring, as a special method of financing, is realised in practice by factoring contracts.

Factoring contract is a legal transaction based on the institute of assignment, under which the creditor assigns its receivables to factor (generally specialized companies).

Factoring has some common functions, first and most important of these functions is the function of financing (of the supplier). Other functions of factoring like advance payment, book keeping, regarding claims, collecting of the claims, protection against failures of payment are also very important.

Commercial practice has developed numerous forms of factoring agreements. In spite of their diversity, all kind of factoring agreements have certain common characteristics in terms of their subject mater, conclusion, effect, termination etc.

The factoring contracts are not fully encompassed by existing provisions of the law, but are regulated under the UNIDROIT Convention on International Factoring.

In this article, the autors are analizing characteristics of factoring and the factoring contract.

Keywords*: factoring; factoring contract; assignment of short-term claims.*

1. INTRODUCTION -THE CONCEPT OF FACTORING AND ITS IMPORTANCE

While fulfilling their business activities on the market commercial subjects are encountering a number of problems which make practical realization of their business tasks more difficult. Rapid development of technologies (production, transport, business etc.) leads to evident enlargement in scope and speed of business operations as well as the rapid development of business network; in the conditions of even more developed and larger market problems related to business operations are becoming bigger and bigger.

The largest numbers of difficulties which inevitably follow modern business operations are predominantly of financial nature, firstly problems of liquidity in general, and the questions of creditworthiness (conditions for obtaining credit), risk of claim payment, costs ect.[1]. Enlarging the scope of exchanging the goods and services in international business relations the problems are additionally multiplied due to the presence of different sovereignties and

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accordingly different legal regulations in the field of finances and banking.

Questions of financing, crediting (as a form of financing), as well as performing certain operations for others (with compensation), appear as very significant and actual when fulfilling business transactions, on national as well as international level. Instruments, methods and techniques through which crediting is performed in contemporary conditions of financial business are very different; one of these "techniques" or instrumental forms (which has proven to be very successful) is factoring (business). Factoring is a form (or an nstrument) of financing, which originated, as many other "contemporary" business forms, in practice of USA, from where it spread rapidly and "conquered" other countries with developed market commerce. Since it is very useful as the source of financing, primarily short term (trade financing)[2], factoring has had a very successful affirmation in transition and developing countries.

By its nature factoring is a banking operation which falls into the group of special credit operations[3]. In economic terms, factoring represents a technique of clearing commercial claims, which is significantly improving liquidity of participants in commercial exchange and cutting down business expenses. By using this financial technique the client cedes to the factor, the bank or maybe some other specialized financial institution, (undue) claims it has towards third persons on the basis of (different) contracts, for the collection of (those) claims.

Factoring (business) is performed through the factoring contract, contractual relation (agreement) between the creditor (client, exporter – the supplier) and factor (bank or other specialized financial organization) on the basis of which the claims or payment risk are assigned from the client to the factor (bank).

In legal theory the factoring contract is generally considered as a kind of contract in which one party – the factor binds to take over still undue short term claims of the other party – the client, to collect them, and to pay the client the counter value of claims right away or in precise short period of time and to guarantee the payment under certain conditions, and the client binds to pay the corresponding compensation to the factor[4].

Factoring contract is a two-way binding contract with standing execution of prestations; since the characteristics of contractual parties are very important in factoring, this is a contract intuitu personae. The contract is formal which is understandable having in mind its value and importance; in business practice this contract is most often performed as adhesive contract[5]. Factoring contract is generally innomminated contract since the number of countries which have legally regulated this contract is considerably lower of the number of those which have not done that.

In factoring contracts many elements of classical contracts can bee seen, before all the elemnts of cession contracts, then credit contracts, guarantee contracts, service contracts, commission contracts and escont and lombard (credit) contracts[6]. Regardless to having lots of common elements with abovementioned contractual agreements factoring contract cannot be equaled with them, on the contrary. Factoring contract distinguishes itself from cession in wideness of prestations which are offered to the client (cession is a technique in which undue claims are transferred in factoring business); from escont credit contract, whose subject is purchase of effects, it differs in guarantee of factor for billability of claims and inability of claim

(against the client in case of not being able to collect the debts from the debtor); it differs from service contracts by the character of operations the factor performs for the client. Factoring contract differs significantly from commission contract since the factor does not conclude the contract with the third party as a commission agent but acts towards it in its name and on its behalf; factoring differs from lombard credit since there are no elements of mortgage in it.

Having in mind everything that has been said, we can treat factoring contract as a specific – sui generis contract.

2. HISTORY OF FACTORING

Factoring business was created in international trading in the period connected with the development of new markets[7]. With the growth of needs to ensure the placement of goods and collect the demands in the markets (of far away) overseas countries primarily therefore in foreign trading exchange between the USA and England new ways, instruments and techniques of making business are starting to be used.

Factoring business has developed from the commission business; in XIX century the risk of international trading was very big, therefore the English textile factory owners who, at that time, exported their products to American market (which was not known to them), hired the agent to make the sale of their goods on commission. American agents in time have widened the scope of their activities by testing the solvency of the buyers as well as performing a number of administrative and other operations on behalf of the client. In that way the agents took over the complete taking care of the goods from the moment it is loaded in some port till the collection of claims[8]. With further development of business operations the agents have, upon factory owners' demand and naturally with increased commission, agreed to guarantee also for the solvency of the buyers, so in the moment of delivery the already approved arranged amounts of down payment, which actually represented the payment of selling price with the deduction of agent's commission (compensation). In time these operations took the character of performing collection services, with or without taking over the risk of collection and financing the client (deliverer), with which the primary commission business grew into a new specific business – factoring business. Alongside with the transformation of commission into factoring business, the subjects that were performing this business also transformed; instead of trading companies, which were performing commission and other businesses, factoring business was more and more taken over by the banks from which some were specialized for such business.

Factoring was created in international exchange, but has achieved full affirmation (also) in domestic trading exchange, especially in the USA. In European countries factoring has appeared a bit later (which is, by the way, the case with all other business products of trading practice). In Europe factoring was firstly accepted in Germany, and then afterwards in other developed countries also, its development was especially important in Italy and Sweden.

In contemporary market conditions, countries in transition also use this business method often, which is completely understandable having in mind the great need for financial assets which appears chronically with commercial subjects from these countries; apart from that, the motive for its usage is also its »practicability« and relative simplicity in application,

which represent surely an additional motive for the application of this financial instrument.

3. SOME SIGNIFICANT ADVANTAGES AND DISADVANTAGES OF FACTORING

Factoring, as a special finacial technique, significantly improves liquidity of participants in commercial exchange and reduce business expenses by providing and accelerating the paymant of claims and, in the same time, unburden the legal and financial structures of the trade organisations-participants on market of goods and services, leaving them more time and space for other business tasks [9].

Factors are financialy strong and specialised to make a great number of services vith relativly law costs.

From the financial point of view advantage of factoring is the growth of liquidity of the business subjects, but of the trade in general as well[10].

Factoring is especially importante and convinient for small and medium size enterprises[11], their position on the market improves significantely by using factoring tecqnique.

Financing is more inportante for the clinet, the fact that the financial means are available when they are needed and that business on the market can go on without delay is the biggest advantage of all[12]

For the client of the factor's organisation (seller or performer of services) the fact that factor is taking all risks of collecting the claims is very importante. Naturally the costs of such a type of factoring is higher.

Collecting the claims and other services done by the factor (book keepeng, analyzing the market ect.) are also very importante because they unburden the client of many tasks and obligations and make the posibilities for him to concentrate on trade and business.

Insurance of collecting the payment by way of factoring is cheaper than clasical insurance (which make the wholle expences of factoring smaller).

Financing by way of factoring is onelly short time financing, that fact can be disadvantage Also factoring is generally arising in cases when factor is sure of the capacity for paying of the debtors.

Gegenerally factors are financing the clients with higher business turnover[13]

Interests of the parties in factoring contract are diferent so advantages and disadvantages can change depending of the point of view.

Disadvantage of factoring for the client eventualy can bee the cost of factoring, which (sometames) can bee high.

Disadvantage of factoring from factor's point of view is the risk of insolvency or other obstacles in collecting the (client's) claims.

4. SUBJECTS IN FACTORING BUSINESS

In factoring business regularly appear meny participants in business operations; these are, firstly the factor, then factor's clients (the exporter, the seller), debtor (client's co-contractor on the basis of a contract on trading goods, most frequently the buyer in sales agreement), so called »correspondent factors« appear in complex business of international factoring (factoring

organizations from abroad that participate in realization of factoring business).

Specific forms of factoring businesses (which appear especially in anglo-saxon countries) imply (also) a larger number of subjects, participants in business.

Factoring business is usually practiced by specialized firms – factors. Nowadays there are an extremely large number of companies in the world that were specialized for performing factoring business. On national level, most of independent factoring organizations are founded by banks (domestic and foreign), apart from that, banks can perform this business in departments[14] (specialized for that business tasks).

On international level numerous factoring companies[15] are most often associated in multinational and trans-national factoring companies; the most famous are four such networks[16]. Great financial power of these multinational networks is based on participation of a large number of banks, insurance and reinsurance companies and other financial institutions (as direct members of the network or share holders of member companies).

Apart from financing, important aspect of factoring organizations' dealings for the client is in the fact that factoring organizations are well acquainted with the state of liquidity of participants in the market, therefore the use of their services (for the client) significantly lowers the risks of claim collection; risks are of course taken over and beard by factoring organizations.

Seen from the economic point of view by taking over the collection of demands (even in the cases when creditors and debtors are barely solvent) factors influence the raising of general liquidity level of commercial subjects and the economy in general, where they improve also the security of business, especially when it is a case of international transactions (which are by the way even more complicated[17]).

5. FUNCTIONS AND THE RELATIONS OF PARTICIPANTS IN FACTORING BUSINESS

Factoring business has several functions which accomplish financial and legal security of collecting claims; all functions of factoring are of very big importance[18].

Since the factoring represents (a very important) source of financing of current assets in contemporary economy[19], we could say that the financing (crediting) is the most important function of factoring.

Security of the collection of claims is also an important function of factoring; the factor, in fact, takes care of the liquidity (credit worthiness) of the debtor, so in case that the debtor does not fulfill its commitments, he renounces the right to debt redemption for the amount which has already been paid to the client.

Apart from these two (essential) functions factoring also has a service function[20], the factor organization keeps prompt evidence of the collection of claims from the buyer, about the date when claims are due for collection towards the buyers, tests the credit worthiness (liquidity) of the debtors, keeps books for the client, calculates taxes and commissions, expenses etc. Among these important services the factor can also perform other services, which are not directly connected to factoring contracts, but have indirect importance on their realization (testing and analysis of market, turnover statistics etc.).

In factoring business regularly appear three subject participants that enter into mutual relations, these are the factor, the seller (deliverer) of the goods, that is the performer of service (client) and the buyer that is the user of service (which appears in this relation in the role of the debtor).

Subject participants of three – side business relationship enter into mutual relations; the factor and the client conclude a factoring contract, on the basis of which the client transfers one or more claims (towards to its debtor) to the factor, and in return receives the compensation in a specified percentage from transferred claims. Regularly this percentage is around 80 – 90% of assigned claims. Upon the conclusion of factoring contract the debtor has to be informed that in the future their contract commitments with the seller that is the performer of the service will be regulated with the factor[21]. In the business of export (international) factoring, even more subject participants in the business appear; these are the domestic factor, domestic exporter, foreign correspondent factor and the importer. Domestic factor in this complex business assigns claims to correspondent factor for collection. Another variant of export (international) factoring is possible where the domestic factor enters into direct contact with the importer through its foreign subsidiary. As it has already been said, financing the seller of goods that is the performer of services, which is done through factoring, is the most important function of factoring business.

Assigned claims are paid up just after the transfer that is at latest till the due date; in that way the clients ensure the necessary liquidity by getting money assets that allow them to purchase the goods from the supplier, at reduced prices. Factor companies perform the services of claim collection; it is possible that the client company transfers onto the factor (assign to it) all its claims against (all) its debtors (global claims cession), relieving in that way from the duties related to the collection of all those claims and directing all its attention to its basic and regular activity; (possible) negative consequence of this "global cession" can be an increased level of "connectedness" to the factor and "dependence" on the factor in business activities. In factoring business the factor can renounce the right of recovery in relations towards the client, by which he takes over the role of guarantor of collection of its claims (del credere factoring).In order to maximally reduce the risk of inability to collect the claims the factor takes over upon him to test the credit worthiness of client's debtors. In factoring contracts the factor reserves the right to, in case of low credit worthiness of a debtor, refuse to guarantee for the collection of its debt. In this case, (unlike in "del credere" factoring) the risk of collection is on the client. It is understandable that factoring with guarantee implies larger compensations for the factoring organization. The factors are regularly contracting allowed limit of the amount of claims per single debtor, which is not time limited and is renewable (revolving).

Apart from the services of claim collection, the services of the factor regularly include also the book keeping on behalf of the client. In import-export businesses, the role of factors is especially important, since them by taking over certain commitments (collection of claims, testing credit worthiness etc.), ensures continuous and unobstructed functioning of business.

6. TYPES OF FACTORING

Depending on different criteria there are few divisions of factoring business (and contracts related to them)[22]. Having in mind the fact that factors can perform several different functions that are very important for factoring business, one of the most important divisions of factoring business has in its base the scope of functions which are within a certain factoring business. Depending on which of (possible) functions are realized in a particular factoring business (crediting, payment ensuring, rendering professional services) there are "real" factoring, in which all these functions are present and » quasi « factoring where some functions are missing; primarily the function of taking over the risk of insolvency of the debtor[23] .

In "real" factoring the factor takes over the client's short term claims from the contract (on sales of goods or service rendering) with the third party, undertakes advance payment (crediting) of the client, keeping business evidence that is bookkeeping, as well as taking over the risk of insolvency of the buyer (debtor from the contract on the sales of goods or rendering of services).

Apart from this (the most important) there is also the division into "open" factoring and "undisclosed" factoring[24]. This division is particularly specific for anglo-saxon law. In "open" factoring the exporter (client) cedes onto the factor its claims against the foreign buyer, having at the same time the duty to inform the foreign buyer about the claim cession and invite him to pay up the owed price to the factor.

There are two "variants" of "open" factoring, in the first one the exporter definitively transfers its claims against the foreign buyer to the factor and stops being the party in basic business, in his place comes the factor as claimant (claim cession). For assigned claim the factor pays to the client (exporter) a specific value of that claim, with the deduction of interest, expenses and commission. This value goes up to 95% of book value of the claim depending on the level of turnover, balance sheet of the buyer, the risk which the factor undertakes. Having in mind the high value which is paid by the factor, before the assignment of claims, the factor inquires about the credit worthiness of the foreign buyer.

The factor is not obligated to, within the so called "global cession"; take over every claim that is offered to him, especially if the claim seems to be dubious.

In the other variant of "open" factoring the exporter (client) assign the claim to the factor only for the purpose of collection; the cession is not performed in order to definitely transfer the claims to the factor, but only so the factor could collect the claims from foreign buyer in his name, but on behalf of domestic exporter (the client)[25].

"Undisclosed" factoring is a rather complex legal business where the presence of factor in business is hidden from the third party (therefore undisclosed – hidden factoring); in undisclosed factoring the exporter sells the goods ready for export, for cash. The factor (as hidden principal) resells these goods, on credit, through the exporter, to the foreign buyer. Before the foreign buyer there appears only the client, who is not the owner of goods since it has been sold to the factor. The client appears in his own name and on behalf of the factor (as his commission agent). This rather complicated transaction allows the increase in price (since the

factor's profit and short term credit given to exporter are included in it). With the use of such a complicated transaction the exporter gets cash no matter the goods are being sold on credit. The factor, on the other hand, receives considerably larger commission[26].

One of the most important divisions of factoring businesses is the one where we can distinguish factoring with the right or without the (factor's) right of recovery. In factoring with the right of recovery, in case of the inability of the factor to collect the claim, he has the right of recovery towards the client, where as in factoring without the right of recovery, in case of the absence of payment, the factor takes over the whole risk of claim collection, naturally it comes with a higher commission[27].

Factoring can be divided also accordingly to the territorial principle, therefore, naturally we have domestic and international factoring, depending whether the contract between the client and the factor is concluded in the same country or not.

Having in mind the number of subject participants in factoring business it is possible to make a division to direct and indirect factoring, in the latter, having in mind its international character, two factors appear the export and import one; some of divisions mentioned can mutually overlap (for example indirect and international).

7. INSTRUMENTS OF CLAIM TRANSFER IN FACTORING

Cession[28] is the usual instrument for assignment of claim in factoring; however it should be emphasized that, when these businesses are in question, in some countries cession of claims is not permitted, therefore instead of it is used personal subrogation [29].

Cession, that is assignment of claims, is performed on the basis of agreement (contract) between assignor (cedent) and assignee (cessionary) where the consent of the debtor (cessus) is not required[30].

The condition which inevitably has to be fulfilled in order for cession to be valid is the existence of (some form) of informing the debtor (notification) of the assignment of claim.

In civil law countries the system of notary notification of debtor is a usual practice; unlike continental, the law and practice of anglo-saxon countries, are applying the system of registration of the claims. The application of registration system has dual function, apart from notifying the debtor about the assignment of claim, registration serves also as the mean of security of the factor (since it establishes the priority of collection in his favour[31]).

Besides the differences in systems of informing debtors of performed cession (that is the change of creditor), the differences between the civil law and some common law countries are present as far as the permissibility of contracting the ban on assignment of claims generally is in

question.

In countries of continental law, and in England as well contracting the ban on assignment of claims is permissible[32]; impiety of this restriction as a consequence produces invalidity of assigned claims (in that case the cessionary can not collect claims from the debtor). The view of American Uniform Commercial Code (UCC) is completely opposite, in fact, it is absolutely forbidden to contract the ban on assignment of claims. This absolute ban on assignment of

claims

suits strong commercial subjects which appear as buyers in a large number of buying businesses (to take account possible change of creditor would greatly complicate their position).

According to the provisions of the factoring contract (between the client and the factor) the client (seller, performer of services) assigns his future claims (from the contract of sales or performing services, concluded with the buyer of goods or services) to the factor[33].

Towards the buyer of the goods or services the factor has the position of the creditor from contract from which assigned claim originated. In conformity with the provisions of contract law debtor can post all objections he had related to the factor also to his predecessor.

Significant for factoring business can be the relation of factor towards the third parties that can claim the right to collect from the assignment of claim (especially in case of "global cession"). In connection with possible claims of the third parties, in practice disputable situations can occur, in conformity with legal regulations of contract law in the countries of continental legal tradition the priority in collecting has the creditor which was the first to obtain that right or the one about whom the debtor was first informed. Anglo-saxon countries, that practice the system of registration as the system of informing the debtor, establish the priority in collecting according to the order of (their) register entries.

8. NORMATIVE ORGANIZATION OF FACTORING

As a »new« institute estableshed in business practice, factoring was not directly regulated in comparative law practice for a rather long time.

Common law countries and countries of roman legal tradition have somewhat different approach to factoring business. These diferences creates certain difficulties in practical application of factoring, but they made also difficulties in normative regulation of some basic questions concerning factoring; naturally the difficulties primarily appear in civil law countries.

Because it is the »product« of anglo-saxon business practice[34] factoring is structured in conformity with the demands of common law system; the specific business concepts are regulated with more pragmatism which is the characteristic of common law legal tradition.

Civil law countries, which based their legal institutes on roman legal tradition, had to adjust the specificities of factoring business with existing rules (of their) civil law. Generally, as the biggest problem of civil law countries in the matter of factoring business and its organization appeared the inability of assignment of future and total claims (so called "global cession").

In view of comparative law the question of cession was not treated equally in all countries with civil law tradition.

In France[35], in 1981 the law was passed (loi Dailly) which provided simpler assignment of future claims. Provisions of this lex specialis had no real effect in practice.

Unlike France (which did nit »permit« cession), Belgium made certain changes within its positive law, so in that way it allowed the application of cession.

Italian law had certain problems in the application of factoring, despite that in Italian business practice , factoring operation has been very successfully used; the aforementioned problems were very efficiently overcame by the court practice [36].

Regarding the system of informing the debtors (without the very same there is no validity of the cession i.e. the transfer of the claim) the system of notary notification was accepted in Italy, however its strictness weakened as the time passed, so the courts were satisfied by ''simple'' notification of the debtors in written form. The problem of the impossibility of ceding of future claims was resolved by rendering a special law 1991.[37] The transfer of the future claims by means of this Law is limited to those claims which occur within a 24-month period from the day of contract conclusion on factoring.

As well as in other European countries, German business practice was familiar with the institute of factoring; regarding the legal realization of the factoring operation, fairly complicated system was used which was realized through the framework agreement and more agreements on transfer of the claims from the creditors on factors. Owing to the complex contractual structure, there were no big requests (registration, acceptance of the debtors) in the view of the ceding effects towards the third entities.

In the USA, factoring operations was governed by the provisions of UCC (Chapter 9-106) but only after a long time factual application and notable number of the court cases. Factoring is conceived and understood as a means of financing and provision (of payment). The company seller receives from the factor financial assets (financing) and as a security for the received assets it transfers on the factor his (current and future) claims. Here, the sale of (rights) claims is taking place, in order for the sale to make an impact towards the debtor and towards the third entities as well, an American system predicted registration.

The legal system of Great Britain is not too demanding regarding the issue of factoring operation, as for the validity of the contract on factoring a written notification of the debtors is required, although these requests, as well as in some continental countries , are less and less formal, so very often an invoice is presupposed as a valid notification.

Beside mostly sporadic organization of the factoring operation via special laws (France, Italy) or within the existing trading or civil regulations (USA, Belgium) and few countries in transition, rendered the regulations on factoring, and these are Russian Federation (Civil codex, ch.43, articles 824-832) and Moldova (Civil code, art. 1290-1300).

On international plan, up to the rendering of UNIDROIT convention factoring operation was organized only according to the rules of the common law and autonomous trading law. After the conducted procedure of international unification which was carried out under UNIDROIT, 1988 in Ottawa a Convention on international factoring was rendered.[38] Convention came into force in 1995.

Starting from a great number of existing modalities, Convention defined the contract on factoring as the contract on the basis of which the deliverer is obliged to transfer on the factor the existing or the future claims from the contract on the sale of goods i.e. service rendering between the deliverer and his buyer i.e. the user of the services (debtor). There is an assumption that it is the issue on permanent business relations between the contracting parties.

Convention envisaged four basic factors of factoring, these are financing of the deliverer, book keeping, collection of claims, and protection from failure in payment of debtors.

In conformity with the provisions of the Convention, the factor must perform at least two out of four aforementioned functions.

Convention is, as an important condition for existing of the contract on factoring, pointed out the notification of the debtors on the transfer of claims. In conformity with the provisions of the Convention, deliverer will be obliged to submit the notification on the transfer of claims on the factor, but this notification may be delivered by the factor, upon the authorization of the deliverer.[39]

The most important provisions of the Convention deal, of course, with the rights and obligations of the contracting parties. In conformity with the provisions of the Convention the transfer of the existing and future claims is possible, and it is also possible to contract a global cession. Convention has, therefore, accepted the notion of cession as the manner of claims transfer.

One of the significant solutions from the Convention relates to the agreements on the prohibition of the claims transfer from the basic affair (deliverer-buyer); these agreements will be without an impact on the factoring operations. By insight into the provisions of the Convention it is obvious that there is legal autonomy between factoring and the contract on sale, an issue of responsibility from the side of the deliverer towards the debtor regarding the breach of the basic affair, in case of the claims ceding, would not influence the very factoring operation.

Regarding the legal relation between the factor and the debtor in the Convention, the latter has rights to point out all objections (towards the factor) that he might have pointed out and towards the first creditor (deliverer).

When the issue of the legal organizations of the factoring operations in countries under transition is being discussed, it was mentioned that only Russian Federation and Moldova have legal provisions which directly and indirectly refer to factoring, other countries do not have such direct legal regulations since regarding these operations, alongside the provisions of the autonomous right, direct regulations are being applied (mostly these by which banking affairs are being organized).

In the Republic of Serbia there are frequent requests in relation to the normative regulation of the factoring operations, these requests coincided with an initiative for rendering a comprehensive text of the Civil Code.

Factoring has been drafted in the first draft of the Civil Code (CC).[40]. Alongside the suggested text, a reserve was stated in the view of the suitability of the legal regulating, this reserve was added since this is the issued of the ''new'' contract established in the business practice, which was, up to the present moment, regulated by the general conditions on operating of factoring organizations, i.e. by the provisions of » lex mercatoria «, and on international plan it is regulated by the provisions of the Convention on international factoring (rendered in 1988 in Ottawa).

The text of the draft of the CC conceptualized the definition of the factoring operation, and establishes the content of the factoring contract and the its form (obligatory written).

The text of the draft determined the contracting party, claims that are being transferred, stipulation of the moment of claims maturity, manner, time and payment venue, compensation that the factor gets for his services.

The text of the first draft of the CC envisaged that the existing or future claims may be ceded and has precisely determined which moment is considered to be the moment of the cession of the existing[41], and which moment relates to the future claims[42].

The offered text of the first draft envisaged the rights of the factor for collection and for bearing of the risk in relation to the collection depending on the type of the factoring operation.

The first draft of the CC envisaged responsibility of the client for the existence of the ceded claim as well as for his collection

Regarding the notification of the clients, the first draft established that the client or a factor are obliged to inform the debtor on the performed cession, if there happens to be an omission in notification of the clients, he will not be obliged to perform the payment to the factor, however his obligation towards the deliverer would remain effective.

Provisions suggested in text of the first draft of CC that relates to the contract on factoring mostly follow the usual business practice and solutions from UNIDROIT Convention on international factoring. Until the definite draft and adoption of the text of the Civil Code, regulations on banking affairs as well as rules on autonomous trading law will be used (general conditions in business, usual contracts, etc.)

9. CONCLUSION

Financial means, their lack and the ways haw to provide them are biggest problems of business practice. Among many other existing methods of financing, business practice introduced factoring as a special method of financing. The essence of factoring is the assignement of recevables and transfer of risks. Like the other methods factoring also have advantages and divadvantages.

Factoring, as a special technique has some common functions, first and most important of these functions is the function of financing (of the client - the supplier). Other functions of factoring are advance payment, book keeping, regarding claims, collecting of the claims, protection against failures of payment, and all of them are also very important.

Factoring, this special technique of financing is realised in practice by factoring contracts. Factoring contract is a legal transaction (based on the institute of assignment), under which the creditor assigns its receivables to factor-organisations.

Commercial practice has developed numerous forms of factoring agreements. In spite of their diversity, all kind of factoring agreements have certain common characteristics in terms of their subject mater, conclusion, effect, termination, rights and obligations of the contracting parties. etc.

In this article the autors are analyzing the most importante characteristics of factoring especially its legal aspect (comparative and internationale normative regulation, rights and obligations of the parties, types of contracts ect.).

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www.yellowpages.rs/advokati-finansije/factoring/Srbija

ENDNOTES

(Endnotes)

1 See N. Joubert, The Legal Nature of Factoring Contract, The South African Law Journal, 1987, vol. 104 (part I), p. 88; Klapper, L. 2000. "The Determinants of Global Factoring." In World Factoring Handbook 2000. BCR Publishing, Kent, United Kingdom.;Klapper, L., and D. Vittas. 2003. "The Use of Reverse Factoring." World Bank, Washington, D.C.

2 The sources of financing can be, depending on the purpose, divided into long term (capital investments) and short term (financing of commerce among other things). Factoring business represents one of the forms which are often used in short term commerce financing. See more in R. Kovačević, Important role of factoring as an instrument of financing export-experiences of new members of EU, Economic annals, (April - June) 2005, no. 165, p. 81; Muschella, D. 2003. "The Italian Factoring Industry." Paper presented at the World Bank Conference on the Factoring Industry as a Key Tool for SME Development in EU Accession Countries, 23–24October, Warsaw, Poland; World Bank (2003), Czech Republic, Policy Note:Insolvency and Creditor Rights System,Fourth Draft,October 15, 2003;Worthy, R. G. 2003. "Factoring: Modern AmericanStyle." Paper presented at the World Bank Conference on the Factoring Industryas a Key Tool for SME Development in EU Accession Countries, 23–24 October,Warsaw, Poland;Papadimitriou, D. B., R. J. Phillips, and L.R. Wray. 1994. "Community-Based Factoring Companies and Small Business Lending." Working Paper 108. Jerome Levy Economics Institute, Annandale-on-Hudson, NY.

3 See M.Vasiljević, Trgovinsko pravo, Beograd, 2006, p 290.

4 See I. Spasić, M. Todorović , International financial leasing and International Factoring, Belgrade, 1989, p. 19. We can find similar definitions of factoring in V. Gorenc, Factoring cession, Economy and law, 1982, no. 3, p. 3; S.Carić, New trends in legal regulations of the trading of goods, Novi Sad, 1976, p. 3; B. Pavićević, Contracts on leasing, franchising, factoring and forfeiting, Belgrade, 1992, pg. 45; M. Todorović, Factoring contract, master thesis, Law school Belgrade, 1979, p. 14; M. Vasiljević, op.cit. p. 290; R. Đurović, International commercial law, Belgrade 1977, p. 418; J.Vilus-S.Carić-S.Šogorov, International commercial law; Belgrade, 1989, p. 430;

5 See Internet page http://contracts.onecle.com.bam/cbcc.factor

6 About differences and similarities of factoring and other contracts see more in N: Joubert, op. cit. p. 90 – 100, Berger A. and I. Hassan, 2004, „Further Evidence on the Link between Finance and Growth: An International Analysis of Community Banking and Economic Performance",Journal of Financial Services Reserch, forthcoming.

7 There are concepts of its much older origin (the period of Hammurabi; Roman empire; England 14. century); all these forms can be origins of this business, but they are in fact related to representation or of performance of certain actions on behalf of others, and not to factoring.

See more in R. Kovačević, op. cit. p. 82.

8 In that way the agents took over the business of forwarding, storing, but also the book keeping business, the business of invoice issuance, conducting procedures in connection to debt enforcement (before the court or arbitration).

9 See Ivanka Spasić, The Role of Assignment in Factoring Contracts; Foreign Legal Life, 2009, n. 3, p. 132 and further; about the advantages of the factoring see also T. Rajčević; Faktoring, Law and economy, 2005, n.5-8, p. 425 ad further;

10 See R. Kovačević, op. cit. p. 83;

11 See R. Kovačević, op. cit. p. 91

12 See more about advantages of factoring on Internet pages: http//www.businesslink.gov.uk/bdotg/action/detail

13 About more disadvantages see also Internet pages: http//www.businesslink. gov.uk/bdotg/action/detail

14 For example in Croatia and Serbia (countries which up to recently did not have remarkable volume of factoring business, nor numerous factoring organizations) nowadays a large number of banking organizations perform also factoring operations (among others for example Croatia bank, Zagrebačka bank, Reiffaisenbank , Erste factoring, Commercial bank Zagreb in Croatia and Societe General Bank, OTP- although bank, AOF agency in Serbia); apart from these banking departments there are also independent factoring organizations, there are fewer (for example D factor in Croatia and Prvi faktor (The First factor), Focus factor, Finebra and Oekb in Serbia) more information on Internet pages www.wlw.hr.CompaniesByProducts and www.yellowpages.rs/advokati-finansije/factoring/Srbija

15 These international factoring companies are mainly founded by large world banks or the very banks are performing these operations within specialized departments (for example Lloyd 's; Midland Bank, Barclay's etc. have such departments)

16 Factors Chain International; International Factors Group; Credit Factoring International; Walter E.Heller Overseas Corporation. Of these few multinational networks only FCI network (Factor Chain International) is opened and consists of independent national factoring companies, this network has the largest number of members and the largest volume of factoring operations, see more M.Todorovic, op. cit. p. 20 and further.

17 Apart from increased risk of collecting claims, in international transactions also appear the questions of meritory law, unification of standards of material law, possible state measures (mainly of restraining character) etc.

18 See N. Joubert, op. cit, p. 89; Charpentier, D. 2003. "Factoring and Credit Insurance: Competitors or Complements?" Paper presented at theWorld Bank Conference on the Factoring Industry as a Key Tool for SME Development in EU Accession Countries, 23–24 October,Warsaw, Poland; Frank, M. Z., and V. Maksimovic. 2003. "Trade Credit, Collateral, and Adverse Selection." Working paper. University of Maryland Finance Department, College Park, Md.; Jappelli, T., and M. Pagano. 2001. "Information Sharing, Lending and Defaults: Cross-Country
Evidence." Journal of Banking and Finance 26: 2023–2054.

19 About contemporary trends in the development of factoring see more. R. Kovačević, op.

cit. p. 83; Jimenez, G., and J. Saurina. 2003. "Loan Characteristics and Credit Risk." Paper presented at the Federal Reserve Bank of Chicago Conference on Bank Structure, May; Kallberg, J., and G. F. Udell. 2003a. "Private Information Exchange in the United States." In Credit Reporting Systems and the International Economy. M. Miller, ed. Cambridge,Mass.: MIT Press.;Kallberg, J., and G. F. Udell. 2003b. "The Value of Private Sector Business Credit Information Sharing: The US Case." Journal of Banking and Finance 27: 449–469.

20 About different functions of factoring and their specifics see more I. Spasić, Factoring and forfeiting contracts , Legal Life, no. 11/2010, p. 359-360

21 The duty of informing the debtor about the transfer of claims to the factor is present in all national legal systems, although the forms of informing and the party (in factoring relation) which is obligated to do that may vary.

22 See I. Spasić, op. cit. p. 360

23 See Becker, Bank Betriebslehre, Kill, 1977, p. 132; the same B. Pavićević, op. cit, p. 52; Bakker, M., and A. Gross. 2004. "Development of Non-Bank Financial Institutions and Capital Markets in European Union Accession Countries,." Working Paper No. 28. World Bank, Washington D.C; Berger, A. N., N. Miller,M. Petersen, R. Rajan, and J. Stein. 2002. "Does Function Follow Organizational Form? Evidence from the Lending Practices of Large and Small Banks." Harvard Institute Research Working Paper, Boston; Kaufmann, D., A. Kraay, and M. Mastruzzi. 2003. "Governance Matters III: Governance Indicators for 1996–2002." World Bank Policy Research Working Paper.

24 See B. Pavićević, op. cit. p. 50-51.

25 The role of the factor here is similar to the role of commission agent (factoring business originated from commission business); see B. Pavićević, op. cit. p. 51.

26 See B. Pavićević, op. cit. p. 51-52

27 See N. Joubert, op. cit. p. 91.

28 Factoring contract should not be identified with the cession.

29 In France the cession of claims is not permitted in accordance with general rules of contract law

30 In previously mentioned France, in order to perform valid assignment of claims, it is necessary not only to notary inform the debtor, but for him to agree to it; in large number of cases this makes it harder, even impossible to assign claims so for the purpose of factoring another institute is used and that is personal subrogation.

31 About the specifics of American system of registration and its important differences in regard to the notification system see more in T. Milenković-Kerković, The change of subject in contract and the needs of regulating factoring contracts by law, Law and economy, no, 5-8, 2006,. p. 466.

32 English Law on Property Act from 1925, Italian Codice civile, par. 126o, Swiss law on contracts Art. 164 pg.1 etc.

33 If the due claims are in question there is no credit function in factoring, but only the service of collecting on other's behalf (in their name and on behalf of others).

34 Factoring originated in common law countries, on the basis of the institute of assignment

35 One of the key problems of French law was the inability to use cession, and naturally for that matter the global cession as well.

36 See T. Milenković-Kerković, op. cit. p. 469

37 Legge del 21 febbrai 1991, n. 52 sulla disciplina della cessione dei crediti d'' impressa.

38 Even from the title it can be seen that Convention relates only to the international operations of factoring.

39 Provisions of the Convention will not relate to the non-factoring, which is actually a banking credit (discount claim) where the claim is used as a mean of security, see Spasic, I., Todorovic, M., op.cit. p.30

40 The text of the first draft of CC has been published in the publication Civil Code of the Republic of Serbia (first draft), second book, Contractual relations, Belgrade, 2009.

41 Moment of conclusion of the contract on factoring.

42 Moment of cession of the future claims is considered the moment of their origination, if it is not stipulated otherwise by the contract.

FAKTORING – INSTRUMENT FINANCIRANJA U POSLOVNOJ PRAKSI – NEKOLIKO VAŽNIH PRAVNIH ASPEKATA

Sažetak

Uspješna poslovna praksa treba stalne izvore financijskih sredstava. Jedan od najvećih problema poslovne prakse je kako osigurati ta sredstva. Osim mnogih drugih metoda, u poslovnoj se praksi često koristi faktoring kao metoda financiranja. Faktoring se, kao posebna metoda financiranja, u praksi realizira putem ugovora o faktoringu.

Ugovor o faktoringu je pravna transakcija zasnovana na instituciji doznake putem koje kreditor faktoru (uglavnom specijaliziranim tvrtkama) doznačuje tražbinu.

Faktoring ima nekoliko uobičajenih funkcija od kojih je prva i najvažnija financiranje (dobavljača). Ostale funkcije faktoringa poput plaćanja unaprijed, knjigovodstva, ustanovljavanja potraživanja, naplate potraživanja, zaštite od neizvršene naplate, su također vrlo važne.

Trgovinska praksa je razvila brojne oblike ugovora o fakoringu. Usprkos njihovoj raznolikosti, sve vrste ugovora o faktoringu umaju neke zajedničke karakteristike u smislu predmeta, zaključka, učinka, raskida itd.

Ugovori o faktoringu nisu u potpunosti obuhvaćeni postojećim zakonskim propisima ali su regulirani UNIDROIT Konvencijom o međunarodnom faktoringu. U ovom članku autori analiziraju karakteristike faktoringa i ugovora o faktoringu.

Ključne riječi: *faktoring, ugovor o faktoringu, dodjela kratkoročnih potraživanja.*

Adela Delalić[1]

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MULTIDIMENSIONAL ASPECTS OF POVERTY IN BOSNIA AND HERZEGOVINA

Abstract

This article explores possibilities for extending the existing standard analyses of poverty in Bosnia and Herzegovina, based on monetary measures of poverty / welfare. Through the investigation of previous and available studies and related databases it is concluded that it is possible to create a new, non-monetary measures of poverty that can be used to determine multidimensional indicators of poverty. The paper proposes two new non-monetary measures of poverty: education and deprivation, which contribute to more accurate assessment and analysis of poverty in the country. On the basis of determined indicators of poverty, based on consumption, education and deprivation, conclusions about the state of poverty in the country and recommendations for the future researches are given.

Keywords*: multidimensional poverty indices, poverty, Foster-Greer-Thorbecke's indices, deprivation, educational poverty*

1. INTRODUCTION

The knowledge about multidimensional nature of poverty is not a new or modern issue. Numerous studies show that the category of poverty is not a purely economic, but a complex social problem with many dimensions and manifestations.

The most common approach to measuring poverty is using monetary measures of poverty/welfare such as income or consumption. Increasingly, poverty is measured through a variety of non-monetary characteristics of the population, such as education, health, food quality, characteristics of housing units, participation in the labor market, political, cultural and other activities, subjective assessments of the status in society, etc.

None of these measures individually provides a complete picture of the situation of poverty in a society. Combining these measures in the common indicators allows obtaining a more complete and accurate picture of the size, nature and causes of poverty in the observed population.

The three most important studies that have dealt with the problem of poverty in Bosnia and Herzegovina are LSMS (Living Standard Measurement Study 2001), HBS 2004 and HBS 2007 (Household Budget Survey 2004 and 2007). As a result of these studies indicators of poverty and inequality were obtained, such as the poverty rate (head count index), poverty gap index, poverty severity index, Gini coefficient, Theil index, Atkinson's measures of inequality and many others. Consumption is conventionally considered a better measure (than income) in transition countries, since it is difficult to estimate the size of income in terms of Bosnian society. Therefore all these measures were calculated using consumption as a measure of

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poverty/welfare. All these indices of poverty and inequality were calculated based on only one measure of poverty - consumption per capita[2] or adjusted per adult equivalent consumption.[3]

Databases obtained from the HBS 2007 were used as the main source of data for this study. In order to investigate the multidimensional nature of poverty, the main objective was to explore possibilities for determining the poverty indicators that are based on monetary and non-monetary measures of poverty. Also, in anticipation of the next wave of HBS, this paper presents the beginning of the study of poverty in Bosnia and Herzegovina in terms of its multidimensionality.

2. METHODOLOGY AND DATA OVERVIEW

The HBS 2007[4] considered was conducted by three statistical institutions in Bosnia and Herzegovina: Agency for Statistics of Bosnia and Herzegovina, Federation of Bosnia and Herzegovina: Federal Office of Statistics and Republika Srpska Institute of Statistics. The sample consisted of 7468 households with 24 334 household members. The questionnaire was divided into three parts: Log on procurement, Log on consumption from own production and Final interview. In order to achieve unbiased sample, there were calculated the specific weights for households and individuals and determined sample size considering rate of non-response, based on previous wave of survey (HBS 2004). Household budget survey in B&H (waves 2004 and 2007) is the most extensive survey conducted in Bosnia and Herzegovina after the war and represents the major source of data for poverty and living standard in B&H measurement and analysis. The main results were published in two publications: "Household budget survey in B&H 2007 – Poverty and living conditions" and "Household budget survey in B&H 2007 – Final results".

Households record expenses for food and beverages and a variety of other goods and services in the Log on procurement for a period of 14 days. Log on consumption from own production is intended to record the estimated value and quantity of goods consumed from own production, in a period of 14 days. The Final interview consists of 11 separate modules, such as demographic characteristics of households and household members, data on housing (the characteristics of housing units, the legal status, housing expenses, etc.), expenditure on furniture, home appliances and services, clothing and footwear and others. Databases collected in the HBS 2007 survey are complex and extensive, and each of them contains over a thousand variables.

Consumption can be treated at the individual and household level. In most cases, consumption at the household level is not a good enough indicator because it does not take into account the differences in size and structure of analyzed households. For the purposes of this

2 In these terms, consumption per capita is considered as household consumption divided by number of household members – household size.

3 Adjusted consumption per capita equals household consumption divided by adjusted household size. Adjustment of household size was performed using modified OECD equivalence scale. This scale, first proposed by Haagenars (1994), assigns a value of 1 to the household head, of 0.5 to each additional adult member and of 0.3 to each child.

4 The next wave of HBS survey is conducted in 2011. and the first results and databases are expected in 2012.

study, the monetary measure of poverty/welfare included the adjusted per adult equivalent monthly household consumption[5] and relative poverty line that amounts to 60% of national consumption median. Previous analyses[6] of poverty in Bosnia and Herzegovina did not use non-monetary measures of poverty, nor were combined with monetary measures in order to obtain more precise estimates.

After a thorough search of the questionnaire and databases, in order to analyze the multidimensional nature of poverty in this study, the following non-monetary characteristics of household members were selected and included: education level, characteristics of associated dwelling, possession of household appliances and electronic devices at home and owning a car in the household.

The level of education achieved was used as a separate non-monetary measure. The analysis included only adults (in this case, people aged 15 or more). The following indicator is usually takes as the educational poverty threshold illiteracy or highest achieved level of education, according to ISCED scale, is less than level 2. There were no data on illiteracy in the used databases and the educational level 2 (based on ISCED scale) in the case of the education system in Bosnia and Herzegovina corresponds to primary education. Therefore, for the purposes of this study, the poor in terms of education are those residents who are aged 15 or over and have not completed primary school.

The second non-monetary measure, deprivation, included characteristics of household dwelling (a separate kitchen, bathroom with toilet, running water and electricity), possession of household appliances and electronic devices (electric or gas stove, fridge or freezer or fridge/freezer, washing machine, cleaning equipment /vacuum cleaner, washing carpets,.../, phone and TV) and owning a car in the household. Variable deprivation was created as follows: based on the above mentioned items, each individual was assigned with the number of items that are missing in the associated household.

The following table contains percentage of deprivation (considering the described items) for household members in Bosnia and Herzegovina.

5 Adjusted by use of modified OECD equivalence scale.

6 Household Budget Survey in B&H 2004, Household Budget Survey in B&H 2007 and Living Standard Measurement Study in B&H 2001, performed by Agency for Statistics of Bosnia and Herzegovina, Federation of Bosnia and Herzegovina: Federal Office of Statistics and Republika Srpska Institute of Statistics.

Table 1. Rates (percentages) of lacks of household members in terms of characteristics of housing unit, ownership of household and electronic appliances and automobiles in the household[7]

Item	Percentage
Characteristics of household dwelling	
Separate kitchen	24.7%
Bathroom with toilet	5.7%
Running water	5.1%
Electricity	0.1%
Possession of household appliances in household	
Electric or gas stove	8.1%
Fridge, freezer or fridge/freezer	1.7%
Washing machine	10.1%
Cleaning equipment (vacuum cleaner, washing carpets,...)	8.6%
Ownership of cars in household	37.6%
Possession of electronic devices in household	
Phone	20.4%
TV	1.7%

Source: Author's calculations based on HBS 2007 databases

Table 1 shows that, for example, there are 5.1% of residents who live in households without running water, 10.1% in households without a washing machine or 37.6% in households without a car, in Bosnia and Herzegovina.

Technically, a new variable – deprivation, was designed to assign the number of lacks in associated household to each resident. Table 2 contains the percentages of population with 0, 1, 2, or more lacks in the associated household.

Table 2. Percentage of population with the certain number of lacks in the associated household[8]

No. of lacks	Percentage	Cumulative percentage	„A certain number" or more lacks
0	39.0%	39.0%	100%
1	32.9%	71.9%	61%
2	14.1%	86.0%	28.1%
3	5.7%	91.7%	14%
4	3.0%	94.7%	8.3%
5	1.9%	96.6%	5.3%
6	1.4%	98.0%	3.4%
7	1.0%	99.0%	2%
8	0.6%	99.6%	1%
9	0.3%	99.9%	0.4%
10	0.1%	100.0%	0.1%
11	0.0%	100.0%	0%
Total	100.0%		

Source: Author's calculations based on HBS 2007 databases

It is estimated that the number of 3 lacks could be considered as the acceptable minimum for the state of serious deprivation in terms of housing quality and standard of living. Specifically, people that live in households with no liquid water are probably in a state of serious deprivation. Such persons probably do not have a bathroom with toilet and washing machine in the associated household (at least 3 lacks) and will be eligible for a state of serious deprivation. Similarly, persons that are living in households without electricity probably live in a household

7 The results are generated by SPSS 17.0, ©SPSS Inc., 2010.

8 The results are generated by SPSS 17.0, ©SPSS Inc., 2010.

without a TV, electric stoves, vacuum cleaners, etc. (at least 4 lacks), and will also be eligible for a state of serious deprivation. Based on the results presented in Table 2 we conclude that 14% of the population live in households with 3 or more than 3 lacks. If we take the threshold of 2 lacks, then there are 28.1% and in case of 4 lacks there are 8.4% of people in a state of deprivation. Also, based on adjusted per adult equivalent monthly consumption, the percentage of poor people was 18.1%, and we conclude that the threshold of 3 and more than 3 lacks achieves poverty rate closest to the poverty rate based on consumption.

To estimate the one-dimensional and multidimensional poverty measures indices from the Foster-Greer-Thorbecke's family of indices were used.

Foster-Greer-Thorbecke's family of one-dimensional poverty indices is given by the following expression:

(3.1) $$P_{\mathsf{a}} = \frac{1}{N}\sum_{i=1}^{n}\left(\frac{z - Y_i}{z}\right)^{\mathsf{a}}, \mathsf{a} \geq 0,$$

where:

N – the total number of residents in the population,

n – the total number of the poor,

z – poverty line,

Y_i – chosen measure of poverty and

a - measure of poverty index sensitivity.

For different values of the parameter a we get different values of Foster-Greer-Thorbecke's indices. For $\mathsf{a} = 0$ we get a headcount index, for $\mathsf{a} = 1$ poverty gap index and for $\mathsf{a} = 2$ poverty severity index.

Multidimensional indices from Foster-Greer-Thorbecke's family are given by the expression (3.2):

(3.2) $$P_{\mathsf{q}}(X, z) = \frac{1}{N}\sum_{j=1}^{m}\sum_{i \in S_j} w_j \left(1 - \frac{x_{ij}}{z_j}\right)^{\mathsf{q}_j},$$

where:

m – number of poverty measures included

z_j - poverty line for j measure (dimension)

x_{ij} - value that person i achieved in terms of j measure (dimension)

w_j - ponder assigned to j measure (dimension)

q_j - measure of index sensitivity in terms of j measure (dimension)

S_j - set of persons that are poor in terms of j measure (dimension)

The most used Foster-Greer-Thorbecke's multidimensional poverty indices are: multidimensional headcount index ($q_j = 0,\ \forall j = \overline{1,m}$), multidimensional poverty gap index ($q_j = 1,\ \forall j = \overline{1,m}$) and multidimensional poverty severity index ($q_j = 2,\ \forall j = \overline{1,m}$).

For the purpose of this study Foster-Greer-Thorbecke's one-dimensional indices were calculated based on adjusted per adult equivalent monthly consumption, education level and deprivation variable. Two-dimensional Foster-Greer-Thorbecke's were calculated by combining consumption and education level and consumption and deprivation.

In the case of two-dimensional indices based on consumption and deprivation, it was necessary to make certain adjustments to the calculation formula. Specifically, variables consumption and deprivation move in the opposite directions in terms of poverty. When consumption increases then the poverty risk decreases while when deprivation (number of lacks) increases then the poverty risk increases also. Considering that, adjusted expression for calculating the mentioned indices is:

$$P_q = \frac{1}{N}\left[\sum_{i\in S_1} w_1\left(\frac{z_1 - x_{i1}}{z_1}\right)^{q_1} + \sum_{i\in S_2} w_2\left(\frac{x_{i2} - z_2}{z_2}\right)^{q_2}\right], \tag{3.3}$$

where the index $j = 1$ refers to the consumption and the index $j = 2$ to the deprivation.

Generally, headcount index is the simplest, but with some serious drawbacks. It is based just on number of poor and total population size and doesn't consider the intensity and depth of poverty. For example, in two societies of which one have poverty line set at the lower level, headcount index can be equal even though living standard in one of them is significantly lower. The problem of headcount index comparisons can be partly avoided by using relative poverty lines that considers living standard of a certain society. The poverty gap index is more accurate than the headcount index because its sensitivity to the distance from the poverty line. For example, if a poor person becomes poorer, poverty gap index will increase while headcount index stays the same. Due to squaring of the poverty gaps, poverty severity index takes into account individuals that are more distant from poverty line with the greater significance. In this way, this index becomes more sensitive to the changes in the bottom of distribution of income or consumption.

3. RESULTS

Calculated one-dimensional and two-dimensional Foster-Greer-Thorbecke's poverty indices, based on adjusted per adult equivalent monthly consumption and deprivation, are shown in Table 3. Indices were calculated at the country level (B&H[9]) and at the level of its constituent parts (FB&H[10], RS[11] and BD[12]). In case of the two-dimensional indices, two combinations were calculated: in the first combination, consumption and deprivations were

9 Bosnia and Herzegovina
10 Federation of Bosnia and Herzegovina
11 Republika Srpska
12 Brcko District

weighted by the same weight (both weights are equal to 0.5), and in the second combination, consumption was weighted by the weight of 0.8 and deprivation was weighted by the weight of 0.2.

Table 3 .One-dimensional and two-dimensional Foster-Greer-Thorbecke's poverty indices in terms of adjusted per adult equivalent monthly consumption and deprivation[13]

Area	Index	One-dim. Consumption	One-dim. Deprivation	Two-dim. $w_1 = w_2 = 0.5$	Two-dim. $w_1 = 0.8$ i $w_2 = 0.2$
B&H	**Headcount index**	0.18114	0.14032	0.16073	0.17298
	Poverty gap index	0.04546	0.06922	0.05734	0.05021
	Poverty severity index	0.01725	0.07958	0.04842	0.02972
FB&H	**Headcount index**	0.16885	0.10316	0.13601	0.15571
	Poverty gap index	0.04157	0.04384	0.04270	0.04202
	Poverty severity index	0.01557	0.04565	0.03061	0.02159
RS	**Headcount index**	0.20006	0.20578	0.20292	0.20120
	Poverty gap index	0.05160	0.11812	0.08486	0.06491
	Poverty severity index	0.02007	0.14549	0.08278	0.04515
BD	**Headcount index**	0.25802	0.23033	0.24417	0.25248
	Poverty gap index	0.06724	0.05811	0.06268	0.06541
	Poverty severity index	0.02399	0.05519	0.03959	0.03023

Source: Author's calculations based on HBS 2007 databases

In accordance with the results presented in Table 3, the poverty rate (headcount index) in B&H, FB&H and Brcko District is greater when it is calculated based on consumption than when it is calculated based on deprivation, while in the RS the rates are approximately equal.

On the other hand, in the case of entire B&H, FB&H and RS, the depth and severity of poverty, measured by poverty gap and poverty severity index, are greater when they are based on deprivation compared to consumption. Thus, in the case of mentioned areas, the larger part of population is affected by poverty measured by consumption, but that kind of poverty is slighter and more homogeneous than in the case of poverty measured by deprivation.

In the case of BD, the depth of poverty is greater and its strength is lower when the poverty is measured by consumption compared to poverty measured by deprivation.

Some of these conclusions are included in the behavior of multidimensional indices, with different values of the weights. For example, in the case of FB&H, where the poverty rate measured by consumption is larger than the poverty rate measured by deprivation, with increasing of weight assigned to consumption (from 0.5 to 0.8) multidimensional headcount index grows.

13 The results are generated by SPSS 17.0, ©SPSS Inc., 2010.

Multidimensional poverty indices, created in this way, can be used as a basis for analyzing poverty in the future. It would be useful to enrich the set of lacks with the intangible dimensions of lacks, such as social or psychological dimension.[14] In that way, this type of analyses will be deeper and more comprehensive.

Multidimensional poverty indices have often been based on consumption and education. In order to investigate and analyze poverty through these two measures, the one-dimensional and two-dimensional poverty indices are determined, based on data from HBS 2004 and HBS 2007. "Educationally poor person" was defined as a person aged 15 or more, who has not completed primary education. In order to compare and combine poverty based on consumption and education, analysis and indices were limited to the population aged 15 or more.

Table 4 shows the values of one-dimensional and two-dimensional Foster-Greer-Thorbecke's indices (education and consumption), calculated on the basis of data from the HBS 2004 and HBS 2007. The consumption was weighted by the weight of 0.8 and the education was weighted by the weight of 0.2.

Table 4[15]. One-dimensional and two-dimensional headcount index, poverty gap index and poverty severity index in terms of adjusted per adult equivalent monthly consumption and education, based on data from the HBS 2004 and HBS 2007.[16]

Area	Index	One-dimensional				Two-dimensional	
		Consumption		Education		$w_1 = 0.8; w_2 = 0.2$	
		2004	2007	2004	2007	2004	2007
B&H	Headcount index	0.18120	0.18023	0.19668	0.20056	0.18430	0.18429
	Poverty gap index	0.04335	0.04610	0.04462	0.05245	0.04360	0.04737
	Poverty severity index	0.01594	0.01790	0.02231	0.02623	0.01722	0.01956
FB&H	Headcount index	0.18529	0.16539	0.17875	0.18006	0.18398	0.16832
	Poverty gap index	0.04722	0.04080	0.04151	0.05011	0.04608	0.04266
	Poverty severity index	0.01789	0.01540	0.02076	0.02505	0.01847	0.01733
RS	Headcount index	0.17879	0.20276	0.22671	0.23758	0.18837	0.20972
	Poverty gap index	0.03835	0.05455	0.05015	0.05730	0.04071	0.05510
	Poverty severity index	0.01329	0.02207	0.02508	0.02865	0.01565	0.02339
BD	Headcount index	0.09555	0.26064	0.19689	0.20938	0.11582	0.25039
	Poverty gap index	0.01464	0.06782	0.03816	0.04297	0.01934	0.06285
	Poverty severity index	0.00389	0.02465	0.01908	0.02148	0.00693	0.02402

Source: Author's calculations based on HBS 2004 and HBS 2007 databases

Based on the values of poverty indices, presented in Table 4, the general conclusion is that the state of poverty in Bosnia and Herzegovina and its constituent parts was worse in 2007 than in 2004.

In fact, only in FB&H, poverty measured by headcount index, poverty gap index and poverty severity index (based on consumption) decreased in 2007 compared to 2004. In the RS and BD, poverty rate measured by consumption increased significantly, as well as its depth

14 There were not data on psychological and social dimensions of deprivation, in the used databases. Variables related to social and psychological component of living in Bosnia and Herzegovina are planned in the next wave of Household Budget Survey.

15 Cases when calculated index in 2007 was higher than in 2004 i.e. the state of poverty in 2007 worse than in 2004, are bolded.
16 The results are generated by SPSS 17.0, ©SPSS Inc., 2010.

and severity. As a result of these changes, at the level of entire B&H, there was a slight decline in poverty from 18.12% to 18.02%, but its depth and strength increased, as is evident from poverty gap index and poverty severity index.

In the case of educational poverty, the situation is worse in all segments in 2007 than in 2004. In B&H in general, and in FB&H, RS and Brcko District, the rate of educational poverty, its depth and strength have increased.

Two-dimensional headcount index, poverty gap index and poverty severity index, which contain the results of one-dimensional indices, also show an increase in rate, depth and strength of poverty in the case of combining the consumption and education. Only in FB&H the two-dimensional poverty declined, as a result of greater weight (0.8) assigned to consumption compared to weight (0.2) assigned to education.

4. CONCLUSION

The investigation of poverty in terms of its multidimensionality is an imperative in modern studies and poverty analysis. It is expected that the researches in this field have to find operational ways for the selection, calculation and analysis of the multidimensional indicators of poverty.

Poverty is measured and analyzed through a variety of available monetary and non-monetary measures of poverty / welfare, such as income, consumption, education, health, standard of living, housing conditions, social inclusion and many other measures. This paper provides an assessment of poverty in Bosnia and Herzegovina based on consumption, education and deprivation.

An analysis of poverty based on consumption and deprivation was performed at the level of entire Bosnia and Herzegovina and its constituent parts and was based on the one-dimensional and two-dimensional Foster-Greer-Thorbecke's poverty indices. It was concluded that, in most of the country, poverty rate measured by consumption is greater than poverty rate measured by deprivation, but its depth and strength are lower when measured by consumption than by deprivation. Therefore, although poverty measured by consumption included a larger percentage of the population, it is less severe and more homogeneous than poverty measured by deprivation. It seems that population in Bosnia and Herzegovina is not poor to the point obtained by estimates based on consumption. Reasons for that situation probably lie in family transfers from abroad, covering actual consumption in order to avoid taxes, the underground economy etc.

One-dimensional and two-dimensional Foster-Greer-Thorbecke's poverty indices were calculated and analyzed based on consumption and education. Indices were determined for entire Bosnia and Herzegovina and separately for its constituent parts. We have compared the state of one-dimensional and two-dimensional poverty in 2004 and 2005 for all examined areas.

The analysis showed that only in FB&H, poverty rate measured by consumption, its depth and strength decreased in 2007 compared to 2004. At the level of entire B&H the poverty

rates were approximately equal. At the other levels (RS and BD), the poverty rates measured by consumption, its depth and strength were significantly increased in 2007 compared to 2004. In the case of the educational poverty, at the level of the entire B&H and its constituent parts, the rate of educational poverty, its depth and intensity were higher in 2007 than in 2004.

Two-dimensional poverty indices, based on consumption and education, reflect the behavior and values of one-dimensional indices, in accordance with the assigned weights. These indices also show that, except in the case of FB&H, two-dimensional poverty, measured by consumption and education, increased in terms of poverty rate and its depth and intensity. This situation reflects increased unemployment rate, increased education costs, distance of the schools in rural areas and inadequate government response in address these issues.

In order to monitor changes in the state of poverty in Bosnia and Herzegovina, it is desirable to determine the same indices based on the new data, in further analysis of multidimensional poverty in the country. It would also be useful to introduce other, non-monetary measures of poverty/welfare, which could reflect the social and psychological dimensions of poverty and especially social inclusion issues. After completion of the third wave of the survey, is expected to estimate the impact of the economic crisis and reduced economic activity at the calculated measures of poverty and living standard in the country. It will be significant help to the government in an effort to reduce poverty and adjustment measures for the protection of vulnerable population groups.

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MULTIDIMENZIONALNI ASPEKTI SIROMAŠTVA U BOSNI I HERCEGOVINI

SAŽETAK

Ovaj članak se bavi istraživanjem mogućnosti za proširivanje postojećih standardnih analiza siromaštva u Bosni i Hercegovini, baziranih na monetarnim mjerama siromaštva/ blagostanja. Istraživanjem dostupnih ranijih studija i odgovarajućih baza podataka ustanovljeno je da je moguće kreirati nove, nemonetarne mjere siromaštva koje mogu poslužiti pri određivanju multidimenzionalnih indikatora siromaštva. U radu se predlažu dvije nove nemonetarne mjere siromaštva: obrazovanje i deprivacija, koje doprinose preciznijoj procjeni stanja i analizi siromaštva u zemlji. Na osnovu izračunatih novih indikatora siromaštva, baziranih na potrošnji, obrazovanju i deprivaciji, izvedeni su zaključci o stanju siromaštva u zemlji te date preporuke za buduća istraživanja.

Ključne riječi: *multidimenzionalni indikatori siromaštva, siromaštvo, Foster-Greer-Thorbecke-ovi indeksi, deprivacija, obrazovno siromaštvo*

Mr.sc. Marta Božina Beroš

Book Review

"COUNTRY ANALYSIS: UNDERSTANDING ECONOMIC AND POLITICAL PERFORMANCE"

BY DAVID M. CURRIE, PHD

PROFESSOR OF FINANCE AND ECONOMICS

AT THE CRUMMER GRADUATE SCHOOL OF BUSINESS, ROLLINS COLLEGE

The global economy today is at an important juncture, as it tries to sail past numerous threats of instability of different origin (financial, political, institutional, etc.) that could distort future macroeconomic decisions and thus harm anticipated economic growth. As a result the generalized concern about policy competencies and economic performances, perceived among policy makers and potential investors, is completely understandable. In this context, the only way forward to global macroeconomic stability seems to be well-known – namely, that of knowledge. Only economic policymakers, who are well-versed in economic theory and the intricacies of the global political context together with knowledgeable investors that make perceptive business decisions based on economic policy decisions, can turn the global economy into a more vibrant investment environment. But to deliver well-versed policymakers and knowledgeable investors is a challenge: it requires rigorous knowledge of economic theory as well as practical skill to use the theory as the basis for policy and/or investment recommendations. The experience of the last economic and financial crisis of 2007-08 and the resulting fear of economic recession voiced by policymakers in countries around the globe indicates that, apparently, there has been a disconnection between academic training in economic theory and the practice of evaluating macroeconomic performances at national level.

Having in mind the above mentioned arguments, it seems as there could not be a better timing for Professor's David M. Currie book "Country Analysis: Understanding Economic and Political Performance" to be published. This is a book which takes a noteworthy take on the subject of macroeconomic performances and stability of global investments by emphasizing the relationship between theory and application in investing practices. The book is founded on a perceptive premise: "Globalization is breaking down many of the barriers that previously prevented investing, or at least limited it to a few major companies with a global reach. (...) The ability to invest abroad doesn't mean you know what you're doing. Ability doesn't equal knowledge. (...) There are myriad issues to consider." To put the book's central issue crudely – how to assess global investment opportunities, on the basis of country specific economic performances?

The book sets a very ambitious goal: to demonstrate to potential investors how to use economic principles to interpret national economic performances and hence, make better informed business decisions in a volatile (and sometimes, hostile) economic environment. In it, the author successfully eschews some of the most common entanglements when analyzing and

discussing countries' performances; namely that of being "too practical" (e.g. when investors try to note common economic principles they have used in making business decisions, and thus the logic behind them is often compromised or lost), or that of "talking mathematics" (e.g. when policymakers' and investors' decisions rely solely on mathematical principles and economic models, and thus limit the potential for transformative insights to well-known principles). This been said, we can observe that Professor Currie's book follows a "political economy path", one which acknowledges national governments as major macroeconomic agents in contemporary economics and which places the academic discipline of economics in a real-life context.

The content of the book follows the reasoning of the Washington Consensus, focusing mainly on three key categories of economic decisions: fiscal, monetary and trade policy. However, it does not omit to discuss some of the most complex aspects of international macroeconomics as well (i.e. currency risk management and balance of payments). The clear objectives of the book are never lost during the author's argumentation; these are to:

1) Present economic theory relevant to global business investments in a more succinct manner, by focusing on economic and political circumstances;

2) Raise investors' awareness that economic policy decisions as well as business environments are vitally dependant on national governments and their creation of a country-specific political and cultural context;

3) Reiterate that investors' should keep a global perspective when making business decisions, and remember that well-known economic principles do not apply only to industrialized countries but globally; and finally

4) Use the Washington Consensus as a frame of reference in determining what constitutes good or bad economic performance from a country perspective when taking their investment decisions.

The pace of the chapters are carefully planned by the author, as he introduces key business concepts and elaborates macroeconomic principles gradually, in a manner which does not require from the reader to have a sophisticated command of economics or economic models. Each chapter of the book includes a series of text-boxes with real-life examples of complex business decisions, taken from relevant business periodicals. In this way, the reasoning and arguments put forward in the chapter are reinforced and cleared for the readers' benefit, as they are enabled to identify and interpret business-relevant information on their own. Upon reading the book, the reader is reaffirmed in the belief that Professor Currie is on of those rare academics who combines an excellent command of economic theory with first-hand, practical experience, which makes the book all the more refreshing and authentic in its aim. Although mainly intended for an US audience, the book's global orientation and multidisciplinary perspective on the subject make it a valuable read for anyone who wishes to understand the complex issue of cross-country investments, no matter of his/hers geographical site. Moreover, the book will certainly prove useful to finance students (of both undergraduate and graduate

level), MBA students as well as to professionally more skilled individuals.

In conclusion it is worth noting that one of the strengths of the book is that it partially departs from the recently criticized tendency to demonstrate country analysis in a sequel of mathematical formulas, but rather chooses to rely on the logical nexus between the political, economic and cultural environment in which real-life business decisions are being made. This fact, together with the author's superb command of the subject and excellent academic writing skills, makes Professor's Currie book "Country Analysis: Understanding Economic and Political Performance" a highly recommendable read for both professionals as well as scholars and advanced students in this academic area.

Ana Jovičić[1]

BOOK REVIEW

TITLE: MENADŽMENT I STRATEGIJA
AUTHORS: Dragan N. Đuričin PhD, Stevo V. Janošević PhD and Đorđe M. Kaličanin PhD
PUBLISHER: Publishing Centre of the Faculty of Economics in Belgrade
PLACE AND YEAR OF PUBLISHING: Belgrade, 2011.

Menadžment i strategija (eng. Management and Strategy) (2011) was published by the Publishing Centre of the Faculty of Economics in Belgrade. The authors of the book are professor Đuričin Dragan PhD, a professor at the Faculty of Economics in Belgrade, the author of a great number o books in the field of strategic management, project management and transition economics; Janošević Stevo PhD, a professor at the Faculty of Economics in Belgrade, also the author of numerous books and scientific papers in the field of strategic management, quality and innovations; Kaličanin Đorđe PhD, an associate professor at the Faculty of Economics in Belgrade and the manager of the Publishing Centre of the Faculty of Economics in Belgrade, who is also the author of numerous scientific papers in the field of strategic management, business planning and value based management.

This book deals with management process and strategy as its main decision. This book's primary goal is to enable the students of Economics and Management to master the basic terminology of management and make them familiar with the process of management and its basic phases. It also enables them to approach the topic of strategic management and its phases in a comprehensive way as well as the basic challenges in each phase and the practical use of strategic management.

The book was written in Serbian and it consists of seven mutually related parts which extend to 32 chapters in 740 pages. The first three parts of the book deal with the management development and management process which consists of certain phases where strategy is the main decision based upon the environmental scanning. Strategic concepts are then being defined and integrated throughout the context of strategic management as well as the phases of strategy formulation, its valuation and its implementation by pointing out to the significance of strategic resources in this process. By using a great number of illustrations as well as practical examples, the authors strive to familiarize the readers and enable them to better understand the previously explained theoretical concepts. After the fourth part of the book, there is an Appendix, in which practical problems and the tasks related to the previous chapters are being reviewed and which helps the students in mastering and comprehending the material. The key is on the CD-ROM which comes with the book. In the end of each chapter there is a bibliography and in the end of the book, titled Dictionary, there are basic terminology definitions in the field of strategic management, as well as their English translation. The authors' intention is to additionally help the readers in comprehending the material. This book's primary goal is to sum up and integrate relevant

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research in the field of strategic management and related fields in order to develop adequate tools in decision-making. A model of this is also shown in the book covers, which gives this book an additional touch.

The first part of the book, titled Management Development defines the basic notions in management and the development of management in three periods: the mass production era, the mass marketing era and the informatics era. The next part titled Management Process deals with the basic phases in management process: planning, organization, conduction, monitoring, prediction and decision-making. Part of this chapter deals with the transformation of management into strategic management i.e. transformation of function management into management process and value based management. The last chapter in this part defines strategic management, where the reader becomes familiar with the basic concepts of strategic management and strategy as its main decision. The third part of the book, titled Environmental Scanning is significant as environment is the basic concept in strategic management with balanced use of the characteristics of internal and external environment in its essence. In defining strategy, it is necessary to analyze the general, competitive and internal environment by using various methods and techniques of strategic management. Strategy Formulation is the title of the fourth part of the book where different strategies in the enterprise level as well as the business level are being analyzed. Different chapters are dedicated to the methods of growth, rhythm of growth, investments and financing of the rhythm of organizations. The fifth part of the book, titled Strategy Evaluation describes in two chapters the significance of validity criteria of performance in relation to the profit criteria and analyzes the essential problems of the use of concept of Management based on the value in strategy evaluation. The next part of the book titled Strategy Implementation deals with the basic strategy principles where strategy creates elements, relations and coordination systems and a chapter is dedicated to the informatics view of new methodology in strategic management i.e. IT support in strategy implementation. The last part of the book titled Use of Strategic Resources points out that the resource strength of a company create its competitive strengths, which are: human resources with their knowledge skills and experience; technology; research and development function; marketing with the elements of marketing mix; production, where the inputs are being transformed into market-friendly outputs; management of logistics and quality, which is becoming a significant factor of competitiveness in the contemporary business.

This is the sixth issue of this title, which has been revised and updated with the addition of chapter 10, titled Strategic Management, which deals with its basic concepts as well as the improvement of the chapters which deal with Research and Development and Quality Control.

In addition to being a good textbook for the students of economics and management this book also serves as a guide to the organizations, theorists and management practitioners. It can also be a useful material for laics who consider Strategic management to be loosely related to their area of specialty. It is well-written, with a clear style, its language being strictly scientific, its scientific methodology being correct and its text being of high quality. It also consists of a great number of bibliographic units. In a comprehensive way, this book combines contemporary knowledge in the field of strategic management which makes it one of the best titles to be found in Serbia.

We are living in a time of fast, dramatic complex and unpredictable changes which affect the shaping of management theory and practice and organizational behavior in general, which is why the study of strategic management is becoming more and more significant. The basic task in contemporary management is to provide for the organization to be able to react to the changes and the challenges in its environment, especially now when the global financial crisis is becoming a threat again. Menadžment i strategija is a useful guide to contemporary knowledge in strategic management in every-day practice, which is why this book is welcome to the world of economics and management.

Prof. Marija Bušelić, Ph.D.
Sanja Blažević

Review of the Fifth Interchair Meeting of economic theories and similar chairs on social sciences faculties in the Republic of Croatia entitled „The Role of Theoretical Economy in the Education of Economists, Jurists and Politologists – Experiences and Proposals of Reform of the Bologna System of Higher Education"

The consideration of the role of theoretical economy in the education of economists, jurists and politologists in the context of changes in the higher education is necessary in order to pinpoint problems arising from an orthodox reflection on economy and the demands of the Bologna reform. With these facts in mind, the Chair of Economic Theory at the Faculty of Economics in Zagreb organized the 5th Interchair Meeting on 28 and 29 November 2011 entitled "The role of theoretical economy in the education of economists, jurists and politologists – experiences and proposals of reform of the Bologna system of higher education". The meeting was organized through moderated conferences; five conferences were divided in two thematic groups entitled "Theoretical Economy and Its Role in the Education of Economists and Jurists in the Bologna System of Education" and "Theoretical Economy and Experiences of the Bologna Reform of Higher Education". The conference saw the participation of 35 teachers from Croatia, 5 from Bosnia and Herzegovina and two teachers from Serbia.

The main goals of the conference were the consideration of connections and relations between theoretical economy and its disciplines or courses (political economy, economical methodology, history of economic thought, economic history, schools of economic thought, macroeconomics, microeconomics, international economy, foundation of economics, theory of economic policy, etc.) on one hand, and numerous business and applied courses on the other (accounting, marketing, management, managerial economics, business environment, tourism, trade, business finances, bank management, etc.). As the invitation to the meeting says, most of the attention is directed to experience in the teaching of theoretical disciplines from the start of the Bologna reform of higher education to the present day, as well as to the proposals of amendments of the Bologna system on social sciences faculties.

The first conference, which was oriented towards papers dealing with theoretical economy and current changes, was headed by Prof. Dragomir Sundać, PhD. The speakers, Prof. Đuro Medić, PhD, Ivo Eškinja Ec. S., Associate Prof. Slavica Manić, PhD, Prof. Rajko Odobaša, PhD, and others, all agreed on the need to point out the importance of theoretical economy in the perception of real economical and general cognitive problems. As Prof. Đuro Medić, PhD, says, theoretical economy has been put aside because of the "monopolization of knowledge by the neoclassical economics". The common idea was that there is need for models and forecast based on heterodox theory and that the students' attitudes should be shaped so as to get introduced with various notions through history in order to avoid, as Prof Rajko Odobaša, PhD, says, "moral nihilism".

The second conference, headed by Prof. Đula Borozan, PhD, began with the presentation of a paper by a group of authors from the Rijeka Faculty of Economics, Prof Dragomir Sundać, PhD, Associate Prof. Dunja Škalamera and Mirela Ahmetović, M.Sc., on the motivations and expectations of students at the economics department. What was interesting was the conclusion that the intrinsic factors for the choice of studies were more accentuated among students of the "new generation" in 2011 compared to students from the year 1990, which points out a greater self-confidence of students, a fact often neglected and insufficiently emphasized when creating teaching programs and the teaching process in general. The other papers on this conference dealt with political economy issues and the reform of the education system, i.e. its role in the development of the system of modern economic education of economists as well as jurists. The authors, among which are Paula Letunić, M. Sc., Valentina Vučković, M.Sc., Prof. Marija Bušelić, PhD. Ass. Prof. Ivana Bajakić, PhD, showed the importance of political economy as scientific discipline and that of the postulates coming from its studying and development in the system of higher education as crucial for the understanding of the world from a wider perspective. According to Prof. Vojmir, Franičević, PhD, who participated to the conference, the neglect of political economy leads to a "deintellectualization of the study of economics" and the role of every scientist, teacher and political economist is "to be intellectually honest" and point out various achievements in economic thought and polit-economical relations through history.

The third conference, headed by Prof. Marija Bušelić, PhD, and Prof. Đuro Medić, PhD, concentrated on the changes arising from the implementation of the Bologna process (in the paper by Prof. Mirjana Dragičević, PhD, Prof. Lorena Škuflić, PhD and Velibor Mačkić, BA, and another paper by Prof. Lorena Škuflić, PhD, Mladen Turuk, Ec.S., and Petra Rkman, BSc. math), on a comparative analysis of economic and theoretical courses aided by concepts and criteria of the Croatian classification framework (paper by Ass. Prof. Aleksandra Krajnović, PhD, Dijana Čičin-Šain, B.Ec. and Ivina Mikulandra Volić, B.Ec.) while, with the aim of regional comparison, part of the papers dealt with the role of theoretical economy in the education system of Bosnia and Herzegovina (authors Prof. Đoko Slijepčević, PhD and Prof. Mladen Ivanić, PhD).

The fourth conference, headed by Prof. Đuro Medić, PhD, discussed the theories of international migrations and their role in the education of economists and jurists (Prof. Đula Borozan, PhD and Prof. Ivana Barković Bojanić, PhD) and, connected, the papers authored by Prof. Nihada Mujić, PhD and Martina Mirkut, and Prof. Jelena Legčević, PhD, and Prof. Rajko Odobaša, PhD, dealt with the topic of students' perception of international mobility and quality of lectures within theoretical subjects at the Faculty of Economics in Osijek. The results of the research of students' perception of international mobility were very interesting as they showed that internal factors, such as the incomprehension of the system of acknowledgement of exams and acquired qualifications, were more important for students than external factors such as travel and accommodation costs, suggesting the need for better communication between students and those in charge of mobility between institutions, all with the aim of better student mobility. There was also discussion of new economics as science with the aim of developing a better system for the interpretation of real problems (authors Prof. Marinko Škare, PhD, Dean Sinković, PhD

and Romina Pržiklas Družeta, M.Sc.). The last paper of this conference was presented by Prof. Aleksandra Jovanović, PhD, from the Faculty of Law in Belgrade, on the development of economic analysis of law and its role in economic and legal education, proving that theoretical economy goes beyond the mere economic consideration of problems and relations.

The last, fifth conference, headed by Prof. Mirjana Dragičević, PhD, started with a paper by Edina Sudžuka, M.Sc., about the legal framework of the Bologna process in Bosnia and Heryegovina. Two papers dealt with teaching issues, in particular with the main points of discordance between expectations and satisfaction of the students with theoretical courses (authors Perica Vojnić, M.Sc. and Nebojša Stojčić, PhD) and the role of economic growth theories and international trade in the education of economists, authored by Nebojša Stojčić, PhD. The last paper by Prof. Mladen Vedriš, PhD, Prof. Uroš Dujšin, PhD and Ružica Simić, B.Sc, analized the role of the course "Economic Policy" in the education of jurists.

The fifth inter-chair meeting was closed by the president of the programme board Prof. Đuro Medić, PhD, thanking all the participants and the programme and organizational board for their activity which contributed to having joint meetings of economic theory chair members and similar chairs on faculties of economics and law, as well as faculties of political sciences for a number of years. Beside Prof. Đuro Medić, PhD, from the Faculty of Economics in Zagreb, the members of the programme board were Prof. Branko Blažević, PhD, from the Faculty of Tourist and Hotel Management in Opatija, University of Rijeka, Prof. Đula Borozan, PhD, from the Faculty of Economics of the Josip Juraj Strossmayer University in Osijek, Prof. Marija Bušelić, PhD, from the Department of Economics and Tourism "Dr. Mijo Mirković" at the Juraj Dobrila University in Pula, Associate Prof. Aleksandra Krajnović, PhD, from the Department of Economics at the University of Zadar, Prof. Zlatan Reić from the Faculty of Economics at the University of Split, Nebojša Stojčić, PhD, from the Department of Economics at the University of Dubrovnik and Prof. Dragomir Sundać, PhD, from the Faculty of Economics at the University of Rijeka. The members of the organizational board were Prof. Lorena Škuflić, PhD, from the Faculty of Economics, University of Zagreb, as board president, Prof. Luka Brkić, PhD, from the Faculty of Political Sciences at the University of Zagreb, Prof. Marinko Škare, PhD, from the Department of Economics and Tourism "Dr. Mijo Mirković" at the Juraj Dobrila University of Pula, Prof. Mladen Vedriš, PhD, from the Faculty of Law at the University of Zagreb, Prof. Nela Vlahinić – Dizdarević, PhD, from the Faculty of Economics at the University of Rijeka and Assist. Prof. Ilko Vrankić, PhD, from the Faculty of Economics at the University of Zagreb.

Summing up the analyses, experience and theses of the presented papers, Prof. Đuro Medić emphasized a few conclusions and proposals. First of all, the scientific contributions and discussion at the meeting show that faculties of economics and law (as well as other social sciences) need to harmonize the concepts and contents of the courses in economic theory on one hand and courses in applied economics on the other hand (especially in the area of public policies and business economics). Today there is a noticeable discordance in this area so that improvements are a long-term process and a task for the university professors. Secondly, there is a noticeable process of suppression of the complete theoretical (especially heterodox, i.e.

Keynesian, Marxist and institutionalist) economics at the faculties of economics in Croatia, Bosnia and Herzegovina and Serbia, and a trend to turn faculties into professional business schools. This process was not arrested by the Bologna process, it only continued in the same direction. Thirdly, the Bologna reform in the field of theoretical economics has both positive and negative results. The positive ones can be seen in the standardization of the contents of single courses, exchanges of experiences, greater domestic and international student and professor mobility, etc. The negative results are seen in the suppression of theoretical economics at the expense of business economics. The reduction of extensive courses in theoretical economics (like Elements of Economics, Macroeconomics, Microeconomics, History of Economic Thought, etc.) to one semester, with the teaching material staying basically the same, did not have any positive impact on the quality of lectures and the success of students. The students achieving better results in introductory and theoretical courses also have better results in specialist courses in business economics, economics and public policies. Fourth, there is need for reaffirmation of the complete (especially heterodox) theoretical economics and a coordination of contents and levels of teaching on single courses.

In the end, the participants of the meeting have accepted the idea that the Faculty of Economics in Zagreb publish the meeting proceedings showing papers presented at the meeting. Furthermore, the participants also accepted the proposal for the next (sixth) inter-chair meeting in 2013 to be organized by the Faculty of Economics and the Faculty of Law of the Josip Juraj Strossmayer University in Osijek.