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INCOME MOBILITY IN THE SEE REGION: A COMPARATIVE ANALYSIS WITH THE EU COUNTRIES [*]

ABSTRACT

The aim of this paper is to revisit the broad researches performed on income mobility. To that end, first, we synthesize the commonly used concepts and corresponding measures in three classes, namely, movement, temporal dependence and equalization of incomes. Second, since the unit of analysis is country, we reformulate the mobility indicators to take into account the countries sizes. Third, in the empirical approach, we compare income mobility in the SEE (South-Eastern Europe) region and in the EU (European Union) countries over the 1990-2009 time period. The results suggest that, in the long-term, income mobility is greater in the SEE than in the EU. However, the opposite holds in the last decade. Moreover, income mobility is mostly a divergent process in the SEE region, whereas the EU experienced a convergent mobility. In addition, unlike the EU, income mobility has disequalized longer-term incomes in the SEE region throughout the period of study. Accordingly, these results can serve as a basis for decision-making in the field of regional development policies that are used in the process of European integration.

Key words: Income mobility, South-Eastern Europe, European Union

JEL classification: C00; O47; O52, O57

1. INTRODUCTION

It is well-established in the literature that income mobility is the movement between and within income distributions occurring over time (Schiller, 1977; King, 1983; Fields and Ok, 1996; 1999; among others). However, there is no clear consensus on how to measure this notion. In fact, as it is argued by Fields (2007), there are various concepts of income mobility, which gave rise to a large number of indicators. This diversity of approaches makes irrelevant all comparison between indicators capturing different concepts.

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The contribution of this paper is to offer a comprehensive presentation of income mobility from a comparative analysis. To this end, we synthesize the commonly used measures in three classes of concepts. The first one captures the *concept of income movement* (see Fields and Ok, 1996; 1999). This concept is interested in the income flux that takes place, and shows how stable or unstable incomes in a region. What lies behind this concept is the notion of absolute mobility while highlighting the individual gains/losses generated by income growth. The second concept is concerned with *temporal dependence/independence* between initial and final income distributions. This concept is based on the notion of correlation between present and past situations (see, among others, Hart, 1981; Atkinson, *et al.*, 1992; Glewwe and Nguyen, 2002). This line of research focuses on the relative notion of income mobility (see Shorrocks, 1978a). A related approach rests on a simple regression of the logarithm of the final income distribution on the initial one, and a value of the slope coefficient lower than one means that income mobility is higher among the poor countries than among the rich ones. The regression coefficient is so-called beta convergence (Barro and Sala-i-Martin, 1995). It is also arguable that the mobility in beta-sense is compatible with a rise or a fall in short-term inequality, i.e., sigma convergence (for more discussion, see Friedman, 1992; Quah, 1993). The third concept considers the mobility in terms of its potential to *equalize long-term incomes* (see Shorrocks, 1978b; Fabig, 1999; Fields, 2010). That is to say, the income mobility is judged by its capacity to reduce or, on the contrary, to worsen the inequalities between people. This concept appears as a mixture between absolute and relative notions of income mobility, and focuses on the long-term mobility outcomes.

The methodology considered in this paper aims to present, for each concept, a selected measures which seem, to us, to summarize the most commonly used mobility indices in the literature. The main objective of the analysis is to identify the existence of notable differences in income mobility between six countries in the South-Eastern Europe region (thereafter SEE6) and the countries of the European Union (thereafter EU27). The term 'income' is defined by the per capita GDP at constant prices. Furthermore, as our unit of analysis is country instead individual (i.e., household), which is the case in the majority of mobility studies, we reformulate the mobility indices to take into account the different sizes of countries. We use population level for weightings. One final methodological consideration is the time period employed, 1990-2009. As it is argued by Atkinson *et al.* (1992), the longer the observation period, the greater is the level of mobility. It is then more appropriate, especially in a comparative analysis, to assess the levels of income mobility in different sub-periods of time. Thus, the empirical illustration distinguishes between medium-term (10 or 11-years period), mid-long-term (16-years period) and long-term (20-years period).

The results show that the long run income mobility is greater in the SEE region compared to the EU27. These results are corroborated by all the indices and the concepts they measure. More importantly, the income mobility is a divergent process among countries in the SEE, whereas it is a convergent mobility which characterizes the EU27. In addition, unlike the EU27, income mobility has disequalized longer-term incomes in the SEE region. However, in the last decade, the results point out a noticeable deceleration in income mobility in the SEE region. This slowdown must be regarded as a signal of the risk of an aggravation of the inequalities, already fairly marked in the region (for more discussion, see El ouardighi and Somun, 2007; 2009). Accordingly, these results can serve as a basis for decision-making in the field of regional development policies that are used in the process of European integration.

The remainder of the paper is organized as follows. Section 2 introduces the framework analysis and presents successively the three aforementioned concepts and their corresponding measures. Section 3 presents the empirical application and discusses the results. Section 4 concludes the paper.

2. INCOME MOBILITY: CONCEPTS AND MEASUREMENT

In what follows, we adopt the following notations. Let $X = (X_1,\ldots,X_N)'$ be the vector of initial per capita incomes defined for N countries, and denoting by μ_X the mean income in the initial time. Likewise, let $Y = (Y_1,\ldots,Y_N)'$ and μ_Y be the vector of final incomes and their mean, respectively. We use the miniscule letters x and y for the logarithm transformations of the vectors X and Y, i.e., $x = \ln(X)$ and $y = \ln(Y)$. Furthermore, since the unit of observation is country, this approach raises two issues. The fist one is related to the different sizes of countries in the sample. Accordingly, we reformulate the income mobility measures to take account of countries' weights. Thus, the indicators that we will discuss are, in a sense, a generalized specification of measures commonly used in the literature. We use the population size for weights. In particular, the weight assigned to a country i, noted w_i, is defined by the ratio of its population level to the total population of all countries in the sample. The second issue comes from the weights themselves, which may affect the possible results. Indeed, the mobility implies a comparison of income distributions observed between two periods. It thus raises the question which periods, initial or final, must be retained for weightings. By comparing the sensitivity of the results according to the period choice, it is worth noticing that the results remain less sensitive if one uses the initial-weights or final-weights.

2.1. MOVEMENT CONCEPT

Fields and Ok (1996; 1999) systematize and discuss extensively some desirable properties for absolute income mobility measures. We synthesize their measures in the two following general specifications:

$$M_{ND}(X_i, Y_i, w_i) = \sum_{i=1}^{N} w_i \left| f(Y_i) - f(X_i) \right|, \qquad (1)$$

$$M_D(X_i, Y_i, w_i) = \sum_{i=1}^{N} w_i \left(f(Y_i) - f(X_i) \right), \qquad (2)$$

where the function $f(.)$ is a linear transformation of incomes. In particular, for a variable $Z_i = \{X_i, Y_i\}$, $f(Z_i) = Z_i$ in Fields and Ok (1996), and $f(Z_i) = \ln(Z_i)$ in Fields and Ok (1999). Thus, the first specification, termed non-directional income movement by Fields and Ok, does not distinguish between upward or downward movements. That is to say, only the absolute values of the aggregate fluctuations of incomes are taken into account. By contrast, the second specification incorporates a welfare evaluation of the change in incomes between time periods. The measure is a directional income movement since it shows the sign income variations. Notice that Fields and Ok (1996; 1999) consider $w_i = 1/N$ since the data used are longitudinal in which an individual has the same weight.[3] One of the principal characteristics of the indicators (1) and (2) is their decomposability into several sources,

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[3] Fields and Ok (1996) derived another measure that one can easily obtain by considering $w_i = \left(\sum_i^N X_i \right)^{-1}$.

including, for instance, growth effect, re-ranking or exchange effect and inequality effect (e.g., see Van Kerm, 2004; Rodriguez *et al.*, 2008).

A country can experience a change of its relative position in income distribution even if the level of its income does not change. This can result from the incomes movement of the other countries in the sample. Thus, it is interesting to determine the extent of the absolute variations of the relative position of countries. The instability index[4] tracks changes in countries' shares over time. In particular, we derive the indicator of income instability by considering in (1) $f(Z_i) = Z_i / \sum_i^N Z_i$ for $Z_i = \{X_i, Y_i\}$. By replacing $w_i = 1/N$, we obtain the index of shares movement suggested by Fields (2007).

2.2. TEMPORAL DEPENDENCE CONCEPT

The incomes movement informs us on the magnitude of the absolute changes that took place during a period of time. However, the movement concept does not necessarily imply either re-ranking or convergence. Thus, to shed more light on the movement process, it is essential to evaluate how much the present is related to the past.

The first indicator is interested in the change of countries' position in the income distribution. That is to say, the positional change of incomes occurs when countries change their ranks over time. A simple way to capture the re-ranking is to calculate the Spearman correlation coefficient. In particular, let $r_X = (r_{X1}, \ldots, r_{XN})'$ and $r_Y = (r_{Y1}, \ldots, r_{YN})'$ the ranks vectors of initial and final income levels, respectively. Spearman's mobility index is defined as follows:

$$M_S(r_X, r_Y, w) = 1 - \rho_S(r_X, r_Y, w),\qquad(3)$$

where $\rho_S(r_X, r_Y, w)$ is the population-weighted correlation coefficient of ranks. If incomes ranks do not change at all between time periods, $\rho_S(.) = 1$ and $M_S(.) = 0$. On the contrary, in the extreme situation of a completely reversed re-ranking, $\rho_S(.) = -1$ and $M_S(.) = 2$. This supposes that the richest countries in the initial time period would be the poorest in the final time period. The case where $\rho_S(.) = 0$ means that r_X and r_Y are completely uncorrelated. The major disadvantage of Spearman's mobility lies in the fact that the measure attaches importance to ranks of incomes instead of incomes themselves. Thus, in the case of no-re-ranking, the index shows the same things even if the relative positions of countries change.[5] Therefore, there is the need for an indicator highlighting this situation. This is what the next measure allows.

The second indicator tracks the degree of the dependence between the current and the past income distributions. A commonly used indicator is the β – convergence coefficient. In particular, there is β – convergence if poor economies tend to grow faster than the wealthy ones. This indicator can be easily derived as follows:

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[4] The index was initially devised by Hymer and Pashigian (1962), and it is extensively used to study the market structure in the industrial organization theory.

[5] Other approaches to analyse the positional changes, which we do not delve deeply in this paper, can be considered. For instance, the analysis of the transition matrices between states informs on how individuals shift among quantile of decile classes (see Shorrocks, 1978a; Jarvis and Jenkins, 1998). King (1983) derived a broad class of positional movement indices axiomatically. The Gini correlation, a mixture of the properties of Spearman and Pearson correlation coefficients (see Schechtman and Yitzhaki, 1999), is promising in the analysis of the positional mobility (see Wodon and Yitzhaki, 2005; Jenkins and Van Kerm, 2006; O'Neill and Van Kerm, 2008).

$$\beta(x, y, w) = \rho_H(x, y, w) \times \frac{\sigma(y, w)}{\sigma(x, w)}, \tag{4}$$

where $\rho_H(x, y, w)$ is the population-weighted Pearson correlation coefficient. $\sigma(x, w)$ and $\sigma(y, w)$ are the standard deviations (population-weighted) of the initial and final income distributions, respectively. Thus, $\beta(x, y, w) > 1$ means divergence, which implies an increase of income inequality, i.e., $\sigma(y, w) > \sigma(x, w)$. By contrary, a convergence process among countries occurs when $\beta(x, y, w) < 1$. However, one cannot judge the evolution of income inequality (for more discussion, see Friedman, 1992). A third indicator which can be derived form (4) is the Hart mobility index:

$$M_H(x, y, w) = 1 - \rho_H(x, y, w). \tag{5}$$

Thus, in the situation of persistence which means that $\beta(x, y, w) \equiv 1$ and $\sigma(y, w) \equiv \sigma(x, w)$, $M_H(.) = 0$. By contrast, Hart's index tends towards a value of 2 in the extreme situation of a complete re-ranking. It is noteworthy that the concept of temporal dependence or time independence (see Fields, 2010) necessarily implies income movement. Thus, the indicators discussed above make it possible to know if the movement has been accompanied by a positional change (e.g., Spearman's index) or if income growth has been higher among the poor (convergence process) or among the rich (divergence process). Nevertheless, one cannot conjecture about the income inequality. The next sub-section examines an important aspect of income mobility by showing which situation the mobility leads to.

2.3. EQUALIZER LONG-TERM INCOMES CONCEPT

The last notion of income mobility seeks to know how the income changes experienced by countries imply that the long-term inequality differs from the sub-periods inequalities (see, for more discussion, Jenkins and Van Kerm, 2009). This is what the concept of mobility as an equalizer of longer-term incomes treats. This approach is well-established in the literature (see, among others, Shorrocks, 1978b; Atkinson *et al.*, 1992; Jarvis and Jenkins, 1998), and it finds a renewed interest recently (see Fields, 2010). In this paper, we focus the analysis on two indicators which seem fairly representative of the equalizer long-term incomes concept.

The first indicator is attributed to Shorrocks (1978b), according to whom the mobility is related to the concept of rigidity, i.e., income mobility is the opposite of rigidity. Thus, Shorrocks (1978b) defines income mobility as the process which leads to income equalization as the observation period is lengthened. He proposes the following measure:

$$M_{Sh}(X, Y, w) = 1 - R_{Sh}(X, Y, w), \quad 0 \leq R_{Sh}(.) \leq 1, \tag{6}$$

where $R_{Sh}(X_i, Y_i, w_i)$ measures the rigidity of incomes which depends on the levels of income inequality in short and long periods. In particular, let $Z = X + Y$ the vector of the total incomes of initial and final periods, and let μ_Z the mean income of Z. The rigidity index is defined as follows:

$$R_{Sh}(X, Y, Z, w) = \frac{I(Z, w)}{(\mu_X / \mu_Z)I(X, w) + (\mu_Y / \mu_Z)I(Y, w)}, \tag{7}$$

where $I(.)$ is a weighted cross-sectional inequality measure (e.g., Gini, Theil, etc.). In this paper, we use the standard deviation of the logarithm of per capita income. Thus, $M_{Sh}(.) = 0$ captures a situation of a complete rigidity of incomes. By contrast, the higher the value of $M_{Sh}(.)$, i.e., $M_{Sh}(.) \to 1$, the greater is the income mobility.

The principal concern with Shorrocks' measure which has been underlined in the literature resides in the fact that $M_{Sh}(.)$ conveys any information about whether the mobility process is equalizing or disequalizing (Bénabou and Ok, 2001). Accordingly, Fields (2010) emphasizes that any measure of the equalizer long-term incomes must be negative in the case of a divergence process (i.e., the richest gets richer), positive in the case of convergence (i.e., if the richest gets poorer), and equal zero if incomes remain unchanged. Thus, Fields (2010) suggests the following measure:

$$M_F(X,Y,\overline{\overline{Z}},w) = 1 - \frac{I(\overline{\overline{Z}},w)}{I(X,w)},$$
(8)

where $\overline{\overline{Z}}$ are the average incomes. Income mobility is qualified as equalizer long-term incomes if $M_F(.) > 0$, and disequalizer long-term incomes if $M_F(.) < 0$.

3. EMPIRICAL ANALYSIS

The empirical illustration addresses the per capita income mobility of the SEE region compared to the EU between 1990 and 2009. Table 1 lists countries in the two samples. The income definition is the GDP in PPPs (Purchasing Power Parities) at 2005 constant US dollars. The data on per capita GDP and population level are extracted from the GGDC database (GGDC, 2010). Notice that the data are not available separately for Serbia and Montenegro, but both as unit observation.

The 1990-2009 period experienced a more political instability, especially in the SEE region, during the 1990s. Thus, it is important to distinguish between sub-periods income mobility, and in the same time one must be careful when drawing conclusions on the degree of mobility in a short interval of time. We then adopted the following procedure. First, by considering 1990 as a base year, we have distinguished the patterns of income mobility in three time periods 1990-2000, 1990-2005 and 1990-2009. Hence, it is appropriate to refer to the three sub-periods as a medium-term (11-years), mid-long-term (16-years) and long-term (20-years) respectively. Second, we have varied the base years in order to compare the extent of change in income mobility between the first and the last decade. Thus, 1995 and 2000 have been chosen as two additional base years, and we have examined the situation in three sub-periods, namely 1995-2005, 1995-2009 and 2000-2009.

Table 1. List of countries used in the empirical framework – 1990-2009

South-Eastern Europe (SEE6)	European Union (EU27)			
Albania	Austria	Finland	Latvia	Romania
Bosnia-Herzegovina	Belgium	France	Lithuania	Slovak Republic
Croatia	Bulgaria	Germany	Luxembourg	Slovenia
Macedonia	Cyprus	Greece	Malta	Spain
Moldova	Czech Republic	Hungary	Netherlands	Sweden
Serbia and Montenegro	Denmark	Ireland	Poland	United Kingdom
	Estonia	Italy	Portugal	

Table 2 presents the results for the first class income mobility, i.e., the movement concept. Columns 1 and 4 show the extent of movement of absolute incomes in SEE6 and EU27 respectively. As can be seen, for all sub-periods, the patterns of income mobility are higher in the SEE6 compared to the EU27 (see Figure 1, the continuous curves).[6] Looking at the situation in the medium-term and long-term, we observe no significant change for the SEE region, whereas the EU27 exhibits an upward rise of the non-directional movement index from 0.189 in the medium-term to 0.310 in the long-term (see the first part of Table 2). The results also indicate that the movement of absolute incomes decreased in the SEE6 region from 0.541 to 0.231 between the 1990s and the 2000s. The fall remains moderate in the case of the EU27. Columns 2 and 5 point to an interesting result. The long-term income growth rates, i.e., the aggregate change welfare, are negative for the SEE6 but positive for the EU27 (see Figure 1, the dashed curves). By contrast, the last decade shows the positive patterns, higher for the SEE region (i.e., 0.231) compared to the EU27 (i.e., 0.142). This finding is not surprising owing to the fact that the growth slowdown in the SEE region during the first half of the 1990s was accompanied by a strong recovery in the end of 1990s and the start of 2000s. Furthermore, the previous results are confirmed by the evolution of income instability (see Table 2, columns 3 and 6, and Figure 2). The indicator points out that the per capita incomes are more unstable in the SEE6 than in the EU27 in almost all sub-periods. Indeed, as it is shown in the bottom of Table 2, the instability is decreased in the SEE region from 0.208 in the first decade to 0.068 in the last decade. In contrast, the level observed in the 1990-2000 for the EU27 is the same as in the 2000-2009 period (i.e., 0.099).

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[6] In this figure and the following ones, the base year is 1990. Hence, each point *t* from 1991 to 2009 corresponds to mobility as measured between *t* and 1990.

Table 2. Income mobility: indicators of the movement concept

	(1)	(2)	(3)	(4)	(5)	(6)
	SEE6			EU27		
	Non-directional movement	Directional movement	Instability index	Non-directional movement	Directional movement	Instability index
Base year 1990						
1990-2000	0.541	-0.400	0.208	0.189	0.166	0.099
1990-2005	0.511	-0.258	0.238	0.271	0.271	0.106
1990-2009	0.523	-0.170	0.236	0.310	0.310	0.120
Base year 1995						
1995-2005	0.317	0.301	0.163	0.239	0.239	0.117
1995-2009	0.389	0.389	0.183	0.277	0.277	0.136
Base year 2000						
2000-2009	0.231	0.231	0.068	0.142	0.142	0.099

Source: Authors' calculation.

Notes: all measures are initial population-weighted. See Section 2 for details on sample and indicators definitions.

Figure 1. Income mobility in the SEE and the EU, 1990-2009: Directional and Non-directional movements
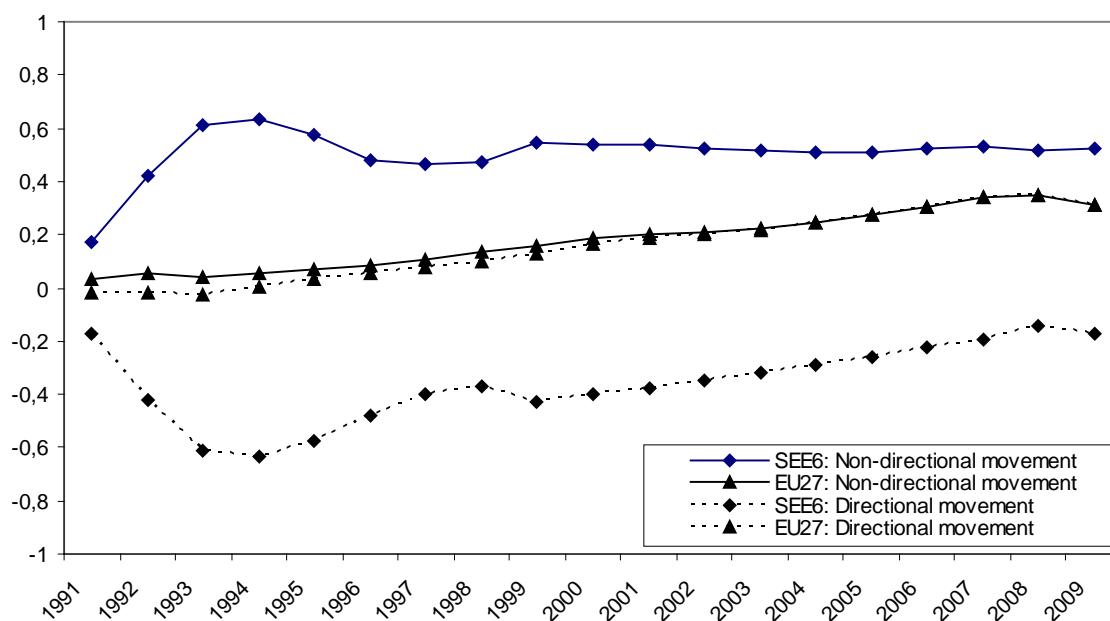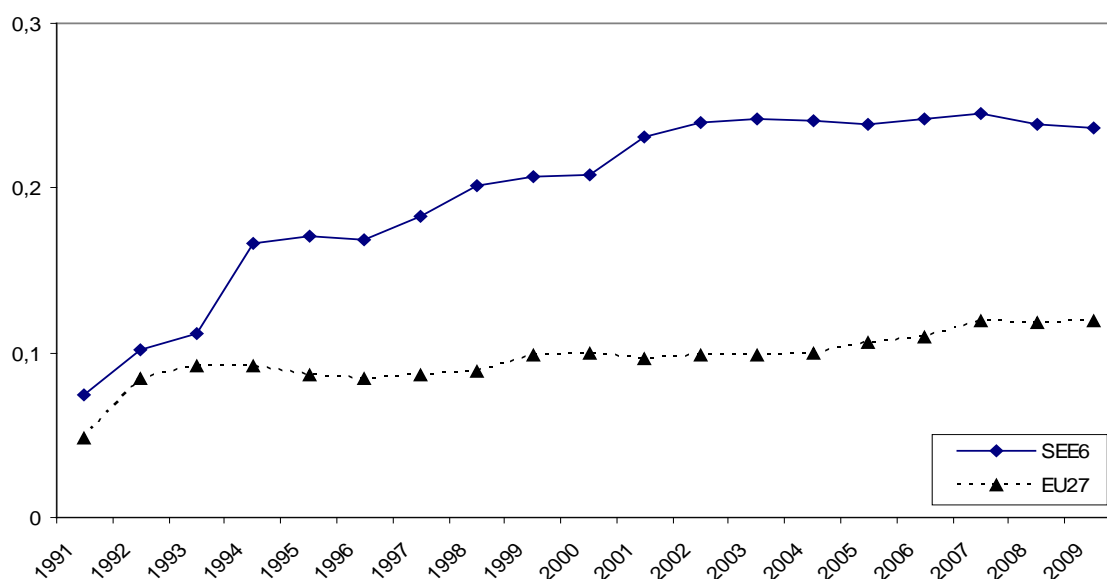
Figure 2. Income mobility in the SEE and the EU, 1990-2009: Instability index

The results of the temporal dependence of incomes are presented in Table 3. The results are quite clear. Indeed, the Spearman mobility indices suggest little incomes positional change in the two samples of countries (see columns 1 and 3). Albeit the re-ranking is slightly more marked in the case of the SEE6, the positional change stopped during the 2000s. More importantly, one can note a convergence process of incomes among countries of the EU27, but a divergence process among SEE counties. The estimated parameters of (unconditional) convergence are greater than one for the SEE6 in all sub-periods (see column 2). The reverse holds for the EU27. As a result, the weaker mobility process shown by the Hart indices (see columns 3 and 6) is explained by the fact that the inequality has outweighed the convergence effect (see Figure 3).

Table 3. Income mobility: indicators of the temporal dependence concept

	(1)	(2)	(3)	(4)	(5)	(6)
	SEE6			EU27		
	Spearman's index	Beta converg.	Hart's index	Spearman's index	Beta converg	Hart's index
Base year 1990						
1990-2000	0.181	1.185	0.076	0.044	1.054	0.039
1990-2005	0.181	1.270	0.061	0.067	0.886	0.045
1990-2009	0.181	1.292	0.065	0.085	0.749	0.071
Base year 1995						
1995-2005	0.118	1.137	0.030	0.060	0.819	0.031
1995-2009	0.118	1.158	0.032	0.081	0.699	0.049
Base year 2000						
2000-2009	0.0	1.073	0.005	0.033	0.722	0.019

Source: Authors' calculation.
Notes: all measures are initial population-weighted. See Section 2 for details on sample and indicators definitions.

Figure 3. Income mobility in the SEE and the EU, 1990-2009: Inequality and Convergence
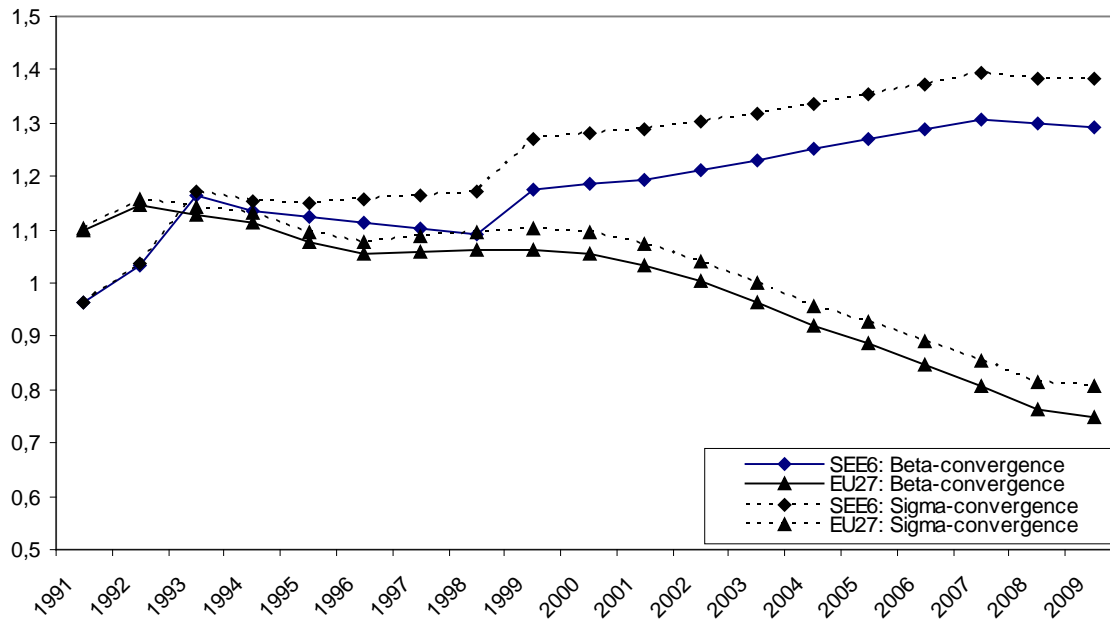

Table 4 presents the results for the third class of income mobility, namely, the mobility as an equalizer of longer-term incomes. Before examining the results of Shorrocks' and Fields' indices, columns 1 and 4 show the ratios of end-level and starting-level of income inequality. As we can see, the ratios remain greater than one in the SEE region, meaning that the income inequality among countries persists. In contrast, a decrease trend was observed among the EU countries (see also Figure 3, the dashed curves). Looking now at the results of the mobility indicators as an equalizer process, two striking findings emerge. First, income mobility was disequalizing long-term incomes in the SEE region, but it was equalizing incomes in the EU27 (see Figure 4). Second, in the last decade, the disequalizing process of income mobility slowed down in the SEE region, whereas the equalizing process is still higher in the EU.

Table 4. Income mobility: indicators of inequality and equalizer long-term incomes concept

	(1)	(2)	(3)	(4)	(5)	(6)
		SEE6			EU27	
	Inequality	Shorrocks's index	Fields's index	Inequality	Shorrocks's index	Fields's index
Base year 1990						
1990-2000	1.282	0.029	-0.095	1.096	0.017	-0.035
1990-2005	1.352	0.037	-0.132	0.927	0.014	0.053
1990-2009	1.382	0.042	-0.150	0.805	0.024	0.133
Base year 1995						
1995-2005	1.171	0.013	-0.089	0.846	0.011	0.096
1995-2009	1.197	0.015	-0.107	0.734	0.021	0.167
Base year 2000						
2000-2009	1.078	0.003	-0.042	0.736	0.014	0.152

Source: Authors' calculation.

Notes: all measures are initial population-weighted. See Section 2 for details on sample and indicators definitions.

Figure 4. Income mobility in the SEE and the EU, 1990-2009: Equalizer long-term incomes concept
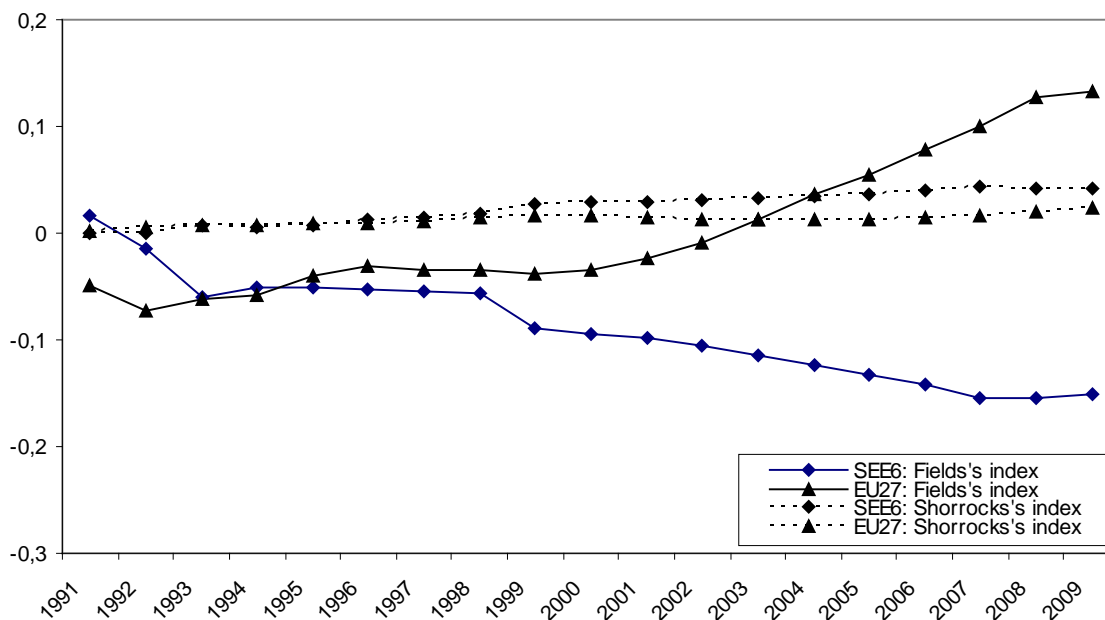
4. CONCLUSION

This paper contributes to studies of income mobility in two manners. On the one hand, the commonly used concepts and measures in the literature have been synthesized in three classes. The first class captures the concept of income movement. What lies behind this concept is the notion of absolute mobility by assessing the gains/losses generated by income growth. The second concept is concerned by temporal dependence/independence between income distributions. This concept is based on the notion of correlation between present and past situations. The third concept considers the mobility in terms of its potential to equalize long-term incomes. On the other hand, the empirical illustration comes to fill a vacuum on the extent of income mobility in the SEE region during the last two decades.

The main results from the three different classes of income mobility are as follows. (*i*) Income mobility is higher in the SEE region compared to the EU. (*ii*) The income mobility is essentially a divergent process among the SEE countries, whereas it is convergent process in the EU case; (*iii*) The long-term income is equalizing in the EU but disequalizing in the SEE region. All in all, it is noteworthy that after a greater instability during the 1990s, income mobility has considerably slowed in the SEE region in the last decade.

From political economy perspective, the slowdown in income mobility observed in the 2000s can reflect economic, political and social changes of the environment in the region. Within countries, it can also express a situation of efficiencies in allocation and production, a restricted opportunity, etc. Accordingly, further research is needed in order to identify the explanatory factors of the deceleration of income mobility in the SEE region.

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MOBILNOST PRIHODA U REGIJI JUGOISTOČNE EUROPE: KOMPARATIVNA ANALIZA SA DRŽAVAMA EU

SAŽETAK

Cilj rada je ponuditi pregled istraživanja mobilnosti prihoda. U tu svrhu smo prije svega saželi često korištene pojmove i odgovarajuće mjere u tri grupe, odnosno, kretanje, vremenska ovisnost i izjednačavanje prihoda. Nakon toga, s obzirom da je jedinica analize država, reformulirali smo indikatore mobilnosti kako bismo u obzir uzeli veličinu država. Zatim, u empirijskom pristupu uspoređujemo mobilnost prihoda u zemljama jugoistočne Europe (SSE) i u EU u periodu od 1990-2009. Rezultati ukazuju da je, dugoročno gledano, mobilnost prihoda veća u jugoistočnoj Europi nego u EU. Ipak, u posljednjem je desetljeću bilo obrnuto. Osim toga, mobilnost prihoda je uglavnom divergentan proces u zemljama jugoistočne Europe, dok EU bilježi konvergentnu mobilnost. Povrh svega, za razliku od EU, u zemljama jugoistočne Europe mobilnost prihoda pokazuje neujednačene dugoročne prihode tijekom cijelog analiziranog perioda. Stoga ovi rezultati mogu poslužiti kao temelj za donošenje odluka vezanih za politike regionalnog razvoja koje se koriste u procesu europske integracije.

Ključne riječi*: Mobilnost prihoda, Jugoistočna Europa, Europska Unija*
JEL klasifikacija*: C00; O47; O52, O57*

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OIL CONSUMPTION AND ECONOMIC GROWTH INTERDEPENDENCE IN SMALL EUROPEAN COUNTRIES[3]

ABSTRACT

The paper examines the existence and the direction of causality between the oil consumption and the economic growth in small European countries over the period 1980–2007 for the developed countries and 1993-2007 for the transition countries. Our findings show that small European states can be divided into two groups. The first group is characterized by the causality running from real GDP to oil consumption and is composed of the most developed European countries and a number of transition countries. In the former case, the direction of causality is a consequence of a highly developed post-industrial society with a strong tertiary sector. In the case of transition economies the direction of causality can be related to deindustrialization process and transition depression that resulted in a sharp industrial decline and decreased industrial oil demand. The second group is characterized by the causality running from oil consumption to economic growth, in which case the state should employ additional resources in subsidizing oil prices and securing long term and stable oil sources for its economy. In such countries the reduction of oil consumption because of different reasons (external prices shocks, increased taxes on oil and its derivatives, restrictive ecological laws regarding CO_2 emission) could lead to a fall in economic growth.

Key words: oil consumption, economic growth, small European countries, Granger causality, Error Correction Model (ECM)

1. INTRODUCTION

During the last two decades there have been a number of papers dealing with the causality between economic growth and energy, although only a few studies specifically focused on the causal relationship between oil consumption and economic growth. Since the economic relevance of oil and its derivatives is increasing in times of energy crises, especially for small countries, it is worthwhile examining this causality in the case of small economies that are especially vulnerable to exogenous supply shocks which directly change their oil consumption. The exogenous supply shocks, such as an increase in the price of oil or constraints in the oil supply have a strong impact on the open and import-dependent small countries' macroeconomic indicators, especially gross domestic product (GDP) growth rate

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and macroeconomic stability. Therefore we focus our research on a sample of small European countries, taking into consideration their level of development and economic characteristics, since it can significantly influence their growth and oil consumption patterns.

The purpose of this paper is to investigate the existence and the direction of causality between the economic growth and the oil consumption in small European countries. There are several reasons why such an analysis is worthwhile. First, in the light of escalating tensions with some large oil and gas producers, there has been an ongoing debate, in Europe and worldwide, on how to reduce dependence on foreign (import) energy supply in a reasonable time-frame without reducing economic growth. Therefore it is very important to know the direction of the causality between energy imports and consumption on one hand, and GDP growth on the other. If causality runs from energy to GDP, it would imply that the reduction in energy net imports would considerably harm economic activities. Second, pollution and global worming has become an important issue for economic policy. Since energy production and consumption are one of the main sources of CO_2 emissions, the dilemma whether the reduction of energy production and use would lower economic growth has become a crucial issue for economic and energy policy. Third, in the context of European goal to increase energy efficiency, it is important to know what this target would mean for the GDP growth.

Our hypothesis is that energy-development relationship differs considerably along the different stages of development. Therefore small developed countries will show similar causality pattern, i.e. causal relationship running from GDP growth to oil consumption due to the income effect. The GDP and income growth increases the demand for all goods in an economy and consequently for the energy required to produce them. Over time, at higher level of development, consumers use more energy due to increases in transportation, services appliances, housing etc. On the other hand, in small, less developed countries that have undergone a transition from planned to market economy; one could expect a reverse causal relationship running from oil consumption to GDP growth. This can be explained by the fact that in these economies the share of industrial oil consumption exceeds the share of residential oil consumption and therefore one could assume that the total oil consumption causes economic activity and economic growth.

The paper is organized in the following manner: Section 2 analyses the economic characteristics of small countries discuses the economic consequences of oil shocks on national economies. Section 3 provides empirical findings on the role of energy in economic growth. Section 4 describes the applied econometric methodology and presents the obtained empirical results. Final section summarises the conclusions.

2. ECONOMIC CHARACTERISTICS OF SMALL COUNTRIES

An early introduction to the discussion relating to the economic growth of small economies began in the early 1960s with the publication of Kuznets (1960) seminal work. The issues of small states in theory have than again been ignored till 1989, which was the turning point in the global balance of power and changing European geography. With the fall of the iron curtain and the break-up of Soviet Union the number of small countries has increased dramatically, in Europe and worldwide, and consequently the research focus has been turned towards advantages, disadvantages and dilemmas that are being faced by the small countries.

It is obvious that the small size of a country has both some advantages and disadvantages. With the beginning of new a millennium it seemed that there was significant evidence that small countries were in a better position than they had been in modern history. Therefore some economists concluded that small countries were benefiting more than they were losing in global market conditions and that liberalised and globalised environment represented a new honeymoon for small states (Daniels and Svetličič, 2001). With the right policies, institutional setting and flexibility the small countries could expect to overcome their "natural" disadvantages. Today, majority of the countries are, de facto, becoming small, especially European ones, in terms of their diminishing influence on the world economy, but still there are some well-established criteria to defining the size of an economy. There are various criteria, such as: the population size, the level of GNP or GDP, geographical area and ability to affect world prices. The mostly widely accepted and probably the best single criteria is the population size since it implies the size of the domestic demand, the size of human resources and aggregate supply. We use the usual benchmark of 10 million inhabitants in defining small countries. We are aware that small countries do not represent a homogenous group and that their growth and oil consumption patterns are different, depending to a large extent on their level of development. We define the developed countries as high-income OECD countries while other European countries are treated as transitional. The interdependence between energy, other inputs and economic activity change significantly as an economy moves through different stages of development. For example, oil consumption in the developed small countries is mostly used in final consumption (transport, heating and cooling) rather than in the production processes. In such cases the external shocks have less effects on economic growth, while, at the same time, economic growth has a more significant impact on the level of oil consumption. It can be assumed that less developed small countries with relatively higher share of industry in their GDP will show a causality pattern that runs from oil consumption to economic activity because of the high industrial oil-intensity in comparison to their service sector.

The main economic features of small countries, relevant for our research, are related to their high trade dependence and limited energy (oil) resources. In contrast to the large countries, small economies generally export a higher proportion of their output and import a higher proportion of their consumption. Of course, the development process significantly affects the extent of trade openness. According to Damijan (2001), the relationship between the level of development and trade openness is not linear but log-linear, which means that the ratio of exports to GDP grows much faster at the beginning of the development process than at the later stages of development. Additionally, the size of a country determines the trade openness, especially in the advanced countries since the production structure in the transition countries may not be concentrated enough to allow for significant exports. Since the sample of small European countries is not homogenous, the differences in the level of development among European countries could be the factor that drives the differences in the trade openness. The more open an economy is through trade, the more vulnerable it becomes to economic and political conditions outside its control.

In the context of our research, an important economic characteristic of small countries is their limited and less diversified natural and energy resource endowment. Indeed, most of the small countries are net energy importers especially of oil and its derivatives. The importance of oil in the total final energy consumption in small European countries is presented in Table 1.

Table 1 The final consumption of oil in small European countries in 2006

Country	Final Consumption of Oil (Mtoe)	Total Final Consumption of Energy (Mtoe)	Share of Final Consumption of Oil in TFC of Energy (%)
Lower-middle-income economies*			
Albania	1,31	1,80	72,77
Moldova	0,62	2,14	28,97
Upper-middle-income economies*			
Bulgaria	4,24	10,76	39,41
Bosnia and Herzegovina	1,14	2,77	41,16
Latvia	1,51	4,23	35,70
Lithuania	1,84	5,51	33,39
Macedonia	0,71	1,72	41,28
High-income non-OECD economies*			
Croatia	3,49	7,10	49,15
Cyprus	1,16	1,61	72,05
Estonia	0,99	2,99	33,11
Malta	0,20	0,36	55,56
Slovenia	2,60	5,24	49,62
High-income OECD economies*			
Austria	13,12	27,97	46,91
Belgium	21,60	43,55	49,60
Czech Republic	9,55	28,35	33,69
Denmark	7,59	15,93	47,65
Finland	8,86	27,14	32,65
Ireland	8,79	13,40	65,60
Norway	8,89	20,78	42,78
Slovakia	3,05	11,43	26,68
Sweden	13,03	34,99	37,24
Switzerland	12,57	22,24	56,52

*Note: According to the World Bank's classification, countries are divided according to 2008 GNI per capita, calculated using the World Bank Atlas method. The groups are: low income, $975 or less; lower middle income, $976 - $3,855; upper middle income, $3,856 - $11,905; and high income, $11,906 or more.

Source: IEA Statistics, Energy balances of non-OECD countries, Edition 2009 and Energy balances of OECD countries, Edition 2008

Though the share of oil in total energy consumption has decreased over the years, the data shows that oil is still the most important energy resource in small European countries, regardless of their level of development. The share of the oil consumption in the total consumption of energy ranges from 27% in case of Slovakia to 83% in Albania. In contrast to most of its other uses, consumption of oil by the transport sector has continued to grow strongly over the recent decades, reflecting the high income elasticity of demand for private transport[4] (OECD, 2004). The differences between the developed and the transition countries with regards to elasticities is reflected in the fact that the latter typically have lower price elasticities and often higher income elasticities, particularly if they are fast growing

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[4] Estimates of the long-run income elasticity of demand for transport fuels is generally estimated to be greater than one, while the long-run price elasticity is estimated to be between -0.6 and -0.8.

economies. As far as import dependence is concerned, all small European countries are net importers of oil (with the exception of Norway) and strongly depend on developments in the global oil markets.

High oil dependency becomes a significant economic constraint in times of expensive and volatile energy, especially oil, since an increase in the oil prices may reduce the oil consumption, the size of which depends on the price elasticity of oil demand. The exogenous supply shocks are much stronger for the open and import dependent small countries and may significantly affect their level of output, GDP growth rate, trade balance and external debt. According to the macroeconomic theory, in the short run, an increase in oil prices leads to an increase in the domestic price level and a decrease in output due to higher costs. This situation decreases the aggregate demand and may lead firms to change or even cancel their investment plans, especially because increased oil prices can result in higher interest rates. The reduced demand and lower investments cause the fall in tax revenues and an increase in budget deficit due to the rigidities in government spending. The oil-price increase also leads to the pressure on nominal wages and together with lower demand tends to cause higher unemployment. The impact on output and employment is determined by the relative supply responses of labour and capital. To the extent that labour market institutions inhibit the adjustment of real wages to the shocks - i.e. higher oil prices imply higher input prices which reduce the profitability - the deterioration in the terms of trade following an oil shock can affect the equilibrium employment by creating a wedge between the value-added and consumer prices. In general, the short-term economic impact of an oil shock on output and employment would be smaller, the higher the proportion of the price rise that can be passed on to consumers and/or the more flexible are wages, in case that the price rise cannot be passed on (OECD, 2004).

On the country level it leads to the transfer of income from importing to exporting countries due to the shift in terms of trade. The extend of the direct impact depends on the importance of oil in national income, the import dependence of an economy and the ability of end-users to reduce their consumption and switch away from oil. It also depends on to the rise in gas prices as a response to an oil-price increase, the oil as well as gas-intensity of the economy and the impact of higher prices on other forms of energy that compete with oil (and gas) or are generated from oil (and gas), like electricity. Besides changing the balance of trade between countries the oil shocks can also influence their exchange rates. Usually net oil-importing countries experience the deterioration in their balance of payments, which creates pressure on their exchange rates. It makes their imports more expensive and exports less valuable which causes a decrease in real national income. Although the macroeconomic effects of oil shocks have changed over time, producing steadily smaller effects on prices and wages, as well as on output and employment, they still have significant negative effects on the whole economy and economic growth. McKillop (2004) argues that higher oil prices reduce economic growth, generate stock market panics and produce inflation, which eventually leads to monetary and financial instability. High oil prices can also lead to higher interest rates and even a plunge into recession. Jin (2008) argues that a sharp increase in the international oil prices and violent fluctuation of the exchange rates are generally regarded as factors that discourage economic growth. Edelstein and Kilian (2007) document a decrease in the effects of oil shocks on a number of aggregate variables using a vector autoregression (VAR) approach. According to Blanchard and Gali (2007), the weak response of inflation to oil price shocks in recent years can be explained by stronger anti-inflation policy, while the evidence of a smaller decline in employment and GDP suggests that an enhanced anti-inflation credibility may also have played a role. In the medium and long run context, the negative

impact of an oil price rise on the domestic demand and income will diminish over time as consumers and producers modify their behaviour. However, recent research (OECD, 2004) seems to indicate that there is an asymmetric effect, insofar as the oil demand does not revert to its initial level as oil prices fall. This means that the income losses experienced by energy importers may eventually be partly reversed. Where fluctuations in the oil prices create uncertainty, there may be a reduction in trend investment activity, but it is less clear that the effects on profitability or capacity utilisation are asymmetric.

3. EMPIRICAL FINDINGS ON THE ROLE OF ENERGY IN ECONOMIC GROWTH

Although strong interdependence and causality between economic growth and energy consumption is a stylized economic fact, the direction of causality between economic growth and energy consumption is not clearly defined. In the last two decades, a number of academic papers explored the relationship between economic growth and energy, mostly energy consumption, as it is stated in the remainder of this section. On one hand, it is argued that energy is a vital and necessary input along with other factors of production (such as labour and capital). Consequently, energy is a necessary requirement for economic and social development so that energy is potentially a "limiting factor to economic growth" (Ghali and El-Sakka, 2004, 225). On the other hand, it is argued that since the cost of energy is a very small proportion of GDP, it is unlikely to have a significant impact; hence there is a "neutral impact of energy on growth". The overall findings vary significantly with some studies concluding that causality runs from economic growth to energy consumption, other conclude the complete opposite, while a number of studies find bidirectional causality. One of the first relevant studies was the one from Kraft and Kraft (1978) that examined energy consumption and GNP of the USA over the period from 1947 to 1974. They found that the causality runs from GNP to energy consumption. This pioneering study intensified the interest in the research of the relationship between economic growth and energy consumption. Akarca and Long (1980) changed the time period used in Kraft and Kraft and found no statistically significant causal relationship. Erol and Yu (1987) found a significant causal relationship between energy consumption and income in the case of Japan for the period 1950-1982, supporting the view that Granger causality runs from energy consumption to income. Inconsistent results for the causality direction might be due to the methodological differences and the choice of different time periods. Mozumder and Marathe (2007) find unidirectional causality running from GNP to energy consumption in Bangladesh. Shiu and Lam (2004) report unidirectional causality running from energy consumption to GNP in China, while Jumbe (2004) found bidirectional causality between energy consumption and GNP in Malawi. On the other hand, the neutrality hypothesis is found by Yu and Hwang (1984), Yu and Choi (1985), Yu and Jin (1992) and Cheng (1995). For Taiwan, Yang (2000) investigated the causal relationship between real gross domestic product (GDP) and several disaggregate categories of energy consumption, including coal, oil, natural gas, and electricity, and found that there is unidirectional causality running from economic growth to oil consumption in Taiwan without any feedback effect. Similarly, in the case of South Korea, Yoo (2006) finds unidirectional short term causality from economic growth to coal consumption, and long term bidirectional causality.

Most of the studies focus developing countries, which is understandable because these countries are economies with the highest energy intensity aiming to increase the energy efficiency. Still, the empirical evidence is mixed for industrialized countries as well. Erol and Yu (1987) found a significant causal relationship between energy consumption and income in

the case of Japan for the period 1950-1982, supporting the view that Granger causality runs from energy consumption to income. Inconsistent results for the causality direction might be due to the methodological differences and the choice of different time periods. Chontanawat, Hunt and Pierse (2008) tested the causality between GDP and energy on large sample of OECD and non-OECD countries. They find that causality from energy to GDP is found to be more prevalent in the developed OECD countries compared to the developing non-OECD countries, implying that a policy to reduce energy consumption aimed at reducing emissions is likely to have greater impact on the GDP of the developed rather than the developing world.

Although the direction or the intensity is not clear, based on the published research one may conclude that there is strong evidence to support the thesis of bidirectional or unidirectional causality between economic growth and energy consumption. The direction of causality has significant policy implications because knowing the direction of causality has direct implications on forming government policies regarding the energy conservation and subsidies system. Under the assumption that there exists unidirectional causality going from economic growth to energy consumption, it means that energy conservation policies will have little or no adverse effects on economic growth of a country. The policymakers may then use these findings in decreasing the tax burden and attracting the investments or in increased government spending. On the other hand, if unidirectional causality runs from energy consumption to economic growth, state should employ additional resources in subsidizing energy prices and securing long term and stable energy sources for its economy. In such a situation, reducing energy consumption, for example through bringing domestic energy prices in line with market prices, could lead to a fall in income and employment.

4. METHODOLOGY AND RESULTS

The data used in this paper is the real GDP annual series in US$, obtained from the UN database (2008) and oil consumption in thousands of barrels per day obtained from the Energy Information Administration (2008). The time period used in the analysis differs among the developed and the transition countries due to data availability. For the developed countries we used the period from 1980 to 2007, while for the transition countries the period from 1993 to 2007 was used. A serious problem of the analysis is the length of the analysed time period due to the short period of independence for a number of countries. Analysis would be far more robust if the quarterly data were available but the lack of the quarterly data on oil consumption prevents this approach. Given the vast amount of estimation undertaken, only a summary of the results is given here and is presented in table 3.

The first attempt at testing for the direction of causality was proposed by Granger (1969). Granger's test is a convenient and a very general approach to detecting the presence of a causal relationship between two variables. A time series *X* is said to Granger-cause another time series *Y* if the predication error of current *Y* declines by using past values of *X* in addition to past values of *Y*. The application of the standard Granger's causality test requires that the series of variables be stationary. Therefore, two variables have to be first transformed to covariance stationary processes. This is usually done by taking their first differences. The Phillips-Perron test or Augmented Dickey-Fuller test is used in examining the unit roots and stationary property of the two variables. To test for the Granger's causality between oil consumption and GDP, two bivariate models are specified, one for oil consumption and another for GDP. If the two variables are stationary, the standard form of the Granger's causality test used in this paper can be specified accordingly as follows:

$$\Delta GDP_t = \alpha_{11} + \sum_{i=1}^{n} \beta_{11i} \Delta GDP_{t-i} + v_{11t} \tag{1}$$

$$\Delta GDP_t = \alpha_{12} + \sum_{i=1}^{n} \beta_{11i} \Delta GDP_{t-i} + \sum_{j=1}^{m} \beta_{12j} \Delta OIL_{t-j} + v_{12t} \tag{2}$$

$$\Delta OIL_t = \alpha_{21} + \sum_{i=1}^{m} \beta_{21i} \Delta OIL_{t-i} + v_{21t} \tag{3}$$

$$\Delta OIL_t = \alpha_{22} + \sum_{j=1}^{m} \beta_{21j} \Delta OIL_{t-j} + \sum_{i=1}^{n} \beta_{22i} \Delta GDP_{t-i} + v_{22t} \tag{4}$$

We used the Phillips–Perron (1988) method to test for the existence of unit roots and identify the order of integration for each variable. Unit root tests are performed allowing for an intercept and a time trend. The Newey and West (1987) method was applied to choose the optimal lag lengths. We test for the possibility of structural breaks in the analysed variables by using the Chow test but find no evidence of their existence (due to the limited space the statistics are not reported here but are available from authors upon request)[5] Unit root test for the level and the first differenced real GDP and oil consumption in small European countries in the period 1980-2007 (developed countries) and 1993-2007 (transition countries) is presented in table 2.

Table 2 Unit root test for small European countries

Countries	Level Phillips-Perron values		First difference Phillips-Perron values	
	GDP	OIL	GDP	OIL
Austria	1.2225	-0,1064	-4.2357*	-4.3154*
Belgium	1,3364	-0,6135	-3.6425*	-4.0830*
Denmark	1,5786	-3.9802*	-4.1992*	-5.6173*
Finland	0,7667	-4.4298*	-2,4741	-4.9244*
Ireland	3,3152	0,5188	-3.3903*	-3.6604*
Norway	0,0789	-1,3535	-3.5772*	-5.9941*
Sweden	-0,7491	-4.9733*	-3,0257	-3.5829*
Switzerland	0,3420	-4.8712*	-3.3759*	-7.2949*
Albania	0,1203	-1,9258	-4.0799*	-2,5520
B&H	0,1998	-0,3433	-4.4597*	-3.7109*
Bulgaria	-1,4073	-1,3476	-3.5033*	-2,8082
Croatia	4,9174	-2,6525	-2,4106	-7.2684*
Cyprus	3,4744	0,0053	-3.0332*	-7.6193*
Czech R	2,0644	-0,7731	-1,4440	-2,6436
Estonia	3,5317	-1,3827	-3.0310*	-2.8131*
Latvia	13,7307	-1,5285	-0,7283	-3.9749*
Lithuania	3,1588	-1,5000	-3.4593*	-2,6005
Macedonia	1,2556	-3.9049*	-2,5888	-6.6053*
Malta	-0,1168	-0,6328	-2.6502*	-7.1333*
Moldova	0,5098	-5.8099*	-1,2699	-6.3775*
Slovakia	2,0346	-3,0753	-0,2198	-4.6836*
Slovenia	-0,1639	-1,7867	-2,9573	-1,9656

* Signification at the 10% level. The critical value of the Phillips-Perron statistic at the 10% level is approximately 3.13
Source: Authors' calculation

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[5] We would like to thank an anonymous reviewer for suggesting it

Table 2 shows that we can reject stationarity in the level of GDP for all countries, which is not the case for the level of oil consumption. Since the level of oil consumption is a stationary process for some countries, we can assume that in such a case there is no cointegration between oil consumption and GDP.

Recent developments of the cointegration concept indicate that a vector autoregressive (VAR) model specified in differences is valid only if the analysed variables are not cointegrated. If they are cointegrated, an error correction model (ECM) should be estimated rather than a VAR as in a standard Granger causality test (Granger, 1988). Hendry and Juselius (2000) emphasize the importance of an error correct model specification. Following Granger (1988), we use an ECM instead of a VAR model, since a VAR model is misspecified in the presence of cointegration. A VAR model may suggest a short run relationship between the variables because the long run information is removed by the first differencing, while an ECM can avoid such shortcomings. In addition, the ECM can distinguish between a long run and a short run relationship between the variables and can identify sources of causation that cannot be detected by the usual Granger causality test.

The ECM model used in this paper can be written as:

$$\Delta GDP_t = \alpha_{12} + \sum_{i=1}^{n} \beta_{11i} \Delta GDP_{t-i} + \sum_{j=1}^{m} \beta_{12j} \Delta OIL_{t-j} + \theta ECM_{t-1} + u_t \qquad (5)$$

$$\Delta OIL_t = \alpha_{22} + \sum_{j=1}^{m} \beta_{21j} \Delta OIL_{t-j} + \sum_{i=1}^{n} \beta_{22i} \Delta GDP_{t-i} + \lambda ECM_{t-1} + \varepsilon_t \qquad (6)$$

Regardless of the formulation used, similar studies have shown that the result of causality is very sensitive to the lag length adopted in the models. Hsiao (1981) introduced a way to help determine the optimum lags to be used, by combining the Granger definition of causality and Akaike's FPE criterion. The Hsiao procedure involves two steps. For the first step Eq. (2 and 4) or Eq. (5 and 6) are estimated with various lag lengths for ΔGDP but with the ΔOIL and ECM terms omitted. The final prediction error (FPE) is computed for each lag length of ΔGDP with the optimal lag (n*) being the one with the minimum FPE, denoted as FPE(I). For the second step Eq. (2 and 4) or Eq. (5 and 6) is estimated, with the lag length on the ΔGDP terms pre-determined by step one, but different lag lengths for the ΔOIL terms. Again a form of the FPE is calculated with the optimal lag length (m*) being that with the minimum FPE, denoted as FPE(II). Finally FPE(II) is compared with FPE(I): if FPE(II) < FPE(I) then OIL (Granger) causes GDP; whereas if FPE(II) > FPE(I) then OIL does not (Granger) cause GDP. These tests determine whether OIL causes GDP. These findings can than be confirmed by using a number of statistical tests. For the standard Granger model, Eq. (2 and 4), causality can be confirmed by doing a joint *F*-test for the coefficients of the lagged ΔOIL variables. For the error correction model, Eq. (5 and 6), where causality comes from two sources, the ECM term and the lagged ΔOIL variables, causality can be confirmed by undertaking a joint *F*-test of the ECM coefficient and the lagged ΔOIL coefficients. The Hsiao (1981) procedure enables a systematic approach which minimizes arbitrary decisions on an individual level.

By using standard Wald test we evaluate Granger weak causality by testing H_0: $\beta_{12j} = 0$ for all *j* in Eq. (5) or H_0: $\beta_{22i} = 0$ for all *i* in Eq. (6). Asafu-Adjaye (2000) interpreted the weak Granger causality as short run causality in the sense that the dependent variable responds only to short-term shocks from the stochastic environment. The ECM terms in Eqs. (5 and 6) provide for another possible source of causation. The coefficients on the ECMs

represent how fast the deviations from the long run equilibrium are eliminated following the changes in each variable. If, for example, θ is zero, then GDP does not respond to a deviation from the long run equilibrium in the previous period. This can be tested by using a simple *t*-test. If there is no causality in either direction, the "neutrality hypothesis" holds.

The maximum likelihood approach to cointegration developed by Johansen (1988, 1991) makes it possible to test for the cointegration rank, that is, the number of cointegrating vectors. It also allows the estimation of these vectors and to test linear restrictions on the vectors using standard asymptotic inference. In addition, the small sample biases and normalization problems inherent in the OLS approach do not arise in the Johansen method. When testing for cointegration using the Johansen procedure, we employed the specification that allows for a linear trend in the data with an intercept but no trend in the co-integrating vector. The suitability of this choice was tested using Akaike Information Criterion (AIC) and Schwarz Information Criterion (SIC). To determine the number of the cointegrating vectors, we make use of both the Trace test and the Maximum Eigenvalue test using the critical values of MacKinon–Haug–Michelis (1999).

In the empirical literature the Wald test computed from an unrestricted vector autoregressive (VAR) model also appears frequently. Toda and Phillips (1993) show that the asymptotic distribution of the test in the unrestricted case involves nuisance parameters and nonstandard distributions. An alternative procedure to the estimation of an unrestricted VAR consists of transforming an estimated error correction model (ECM) to its levels VAR form and then applying the Wald type test for linear restrictions to the resulting VAR model. Lütkepohl and Reimers (1992) present the distribution of the Wald statistic for the bivariate case based on Johansen and Juselius' (1990) maximum likelihood estimator of ECMs. The limiting distribution of the statistic for the p-variates model is discussed in Toda and Phillips (1993). Toda and Yamamoto (1995) propose an interesting yet simple procedure requiring the estimation of an "augmented" VAR, even when there is cointegration, which guarantees the asymptotic distribution of the Wald statistic. An analysis and Monte Carlo results for cointegrated data is presented in Dolado and Lütkepohl (1996).

Toda and Yamamoto (1995) prove that the Wald test for restrictions on the parameters of a VAR(k) has an asymptotic χ^2 distribution when a VAR(k + d$_{max}$) is estimated, where d$_{max}$ is the maximal order of integration suspected to occur in the process. Dolado and Lütkepohl (1996) using a different approach, prove the same result and analyze the power properties of this test. The Wald statistic is computed using only the first k coefficient matrices. This procedure does not require knowledge of either the cointegration properties of the system or the order of integration of the variables. Thus, if there is uncertainty as to whether the variables are I(1) or I(0), the adding of an extra lag insures that the test is being performed on the safe side. The computation of this Wald test is simple (Zapata, Rambaldi, 1997):

(1) Estimate a VAR(k+d$_{max}$) process by multivariate least squares, where k is the known or pre-determined optimum lag of the system. Denote by $\Phi(L)^k_{k+d\max}$, the least squares estimator of the simple VAR parameters with only the coefficients of the first k lags considered;

(2) Let $\hat{\Sigma}^k_{k+d\max}$ be a consistent estimator of the variance-covariance of $\Phi(L)^k_{k+d\max}$. Then

$$\lambda_W = T\left(R\hat{\Phi}^k_{k+d\max}\right)'\left(R\hat{\Sigma}^k_{k+d\max}R'\right)^{-1}\left(R\hat{\Phi}^k_{k+d\max}\right)$$ has an asymptotic $\chi^2_{(N)}$ distribution, with N being equal to the rows of the restriction matrix R.

Zapata, Rambaldi (1997) present results of a Monte Carlo experiment which studies the performance of two Wald tests, a Wald statistic computed from an estimated "augmented" VAR (MWALD) and a Wald statistic computed from an estimated ECM, and a classical LR tests for Granger non-causality in cointegrated systems. Estimation and testing for two of the tests follows the ML approach of Johansen and Juselius (1990). The third test is computed from the multivariate least squares estimates of a VAR (Toda and Yamamoto (1995) and Dolado and Lütkepohl (1996)). The MWALD test is based on an estimator that does not incorporate the information about the degree of integration and/or cointegration of the variables in the system. An advantage of the MWALD test is that it has a limiting chi-squared distribution even if there is no cointegration or the stability and rank conditions are not satisfied[7]. On the other hand, as the estimator (VAR) is less efficient than the maximum likelihood estimator for cointegrated systems, MWALD would be expected to have a lower power of the test than the WALD and the LR tests in all cases studied in this experiment. The results show this to be the case for small samples all three tests have a high power of the test in moderate to large samples regardless of model structure. In small samples (50 or less observations), the MWALD test suffers the most loss in power, with the LR performing best in terms of power. Furthermore in small samples, when bidirectional causality is expected, the LR seems to be the only test with enough power to detect a false null hypothesis in the bivariate models. Based on these results and our small sample we proceed with using the LR approach.

After obtaining cointegration relations among GDP and oil we estimated the error correction models for the real GDP and oil to derive their short-run elasticities. The ECM has the obtained cointegration relations built into the specification so that it restricts the long-run behaviour of the endogenous variables to converge to their cointegrating relationships while allowing for short-run adjustment dynamics. The cointegration term is known as the error correction term since the deviation from long-run equilibrium is corrected gradually through a series of partial short-run adjustments. Results of Johansen cointegration test and causality between GDP and oil consumption are presented in table 3.

Table 3 GDP and oil consumption causality in small European countries

Countries	Cointegration	Causality		
		oil → gdp	gdp → oil	bidirectional
Developed				
Austria	√	√		
Belgium	√		√	
Denmark			√	
Finland				
Ireland	√		√	
Norway	√		√	
Sweden			√	
Switzerland				
Developing				
Albania				
B&H	√	√		
Bulgaria		√		
Croatia	√		√	
Cyprus				
Czech R	√	√		
Estonia				
Latvia	√		√	
Lithuania	√		√	
Macedonia				
Malta	√	√		
Moldova			√	
Slovakia	√	√		
Slovenia	√		√	

Source: Authors' calculation

The direction of causality has significant policy implications for all countries, but especially the small ones, since they do not have sufficient energy resources to meet their demand and have limited economic resources in general. The direction of causality should have direct implications on government policies regarding the energy conservation and subsidies system. As we found that 12 out of 22 tested small European countries exhibit cointegration between GDP and oil consumption, there must be either unidirectional or bidirectional Granger causality, since at least one of the error correction terms (ECMs) is significantly nonzero by the definition of cointegration. As expected, we found that in all of the analysed small European countries causality is unidirectional.

From the obtained results we can conclude that all of the diagnostic test statistics are satisfactory. Considered by the significance of the *t* statistics, the coefficients are well determined. The disequilibrium error term is statistically significant in all equations which confirms the existence of long-run relationship between the variables in the error correction models. In addition, all the equations are statistically significant and the overall statistical goodness of fit is acceptable. It can be concluded that the regression coefficients are significantly different from zero. In assessing the robustness of the estimated ECM we conducted several residual tests; Portmanteau autocorrelation tests, ECM residual normality and pairwise Granger causality/Block exogeneity Wald tests. For example, the ECM residual Portmanteau autocorrelation test shows that there is no residual autocorrelation in the bivariate GDP-oil models even up to the 5th lag. The residual normality test is computed

using the Jaque–Berra statistic with Cholesky (Urzua) orthogonalization and shows that residuals for all EC models can be viewed as being multivariate normally distributed. Pairwise Granger causality/Block exogeneity Wald test tests whether an endogenous variable can be treated as exogenous.

There are some similarities but also some significant differences between our findings and findings by Chontanawat, Hunt and Pierse (2008), which analyse energy consumption and GDP in the period 1960-2000. We find the same direction of causality from energy (oil) to GDP in case of Czech Republic, Slovakia and Austria while opposing results for Bulgaria, Denmark, Norway and Malta.

Based on the obtained results we can divide the small European countries into two groups. The first group consists of countries where the causality is running from real GDP to oil consumption: Belgium, Denmark, Ireland, Norway, Sweden, Croatia, Latvia, Lithuania, Moldova and Slovenia. The group seems heterogeneous, but is actually composed of two homogenous groups of countries. The reasons for causality from GDP to oil consumption in the most developed countries (Scandinavian economies, Ireland and Belgium) and in the transition countries (Croatia, Latvia, Lithuania and Moldova) are completely different. In the former case, the direction of causality is a consequence of a highly developed post-industrial society with a strong tertiary sector. These countries have reached an improvement in energy efficiency, which has the same effect as lower oil prices, and leads to faster economic growth. This growth effect caused by more efficient technologies leads to increased energy used, which is known as "macroeconomic feedback" (Howarth, 1997) or rebound effect. In the case of transition economies the direction of causality can be related to deindustrialization process and transition depression that resulted in a sharp industrial decline and decreased industrial oil demand. The causality in the transitional countries between real GDP and oil consumption is more related to personal transportation, cooling and heating needs rather then the industry. Under the assumption that there exists unidirectional Granger causality going from economic growth to oil consumption, it could mean that the policies aimed at decreasing oil dependency should not have a significant effect on economic growth of a country. The state may then use potential proceeds from higher duties and taxes on oil to decreasing the overall tax burden on earnings and attracting investments or stimulating the economy by increased government spending.

The second group of countries where the causality is running from oil consumption to real GDP is composed of the following countries: Austria, Czech Republic, Slovakia, Malta, Bulgaria and Bosnia and Herzegovina. Although these countries are also heterogeneous, all of them use oil mostly for industrial purposes and this direction of causality is logical. In these states, where unidirectional Granger causality runs from oil consumption to economic growth, state should employ additional resources in subsidizing oil prices and securing long term and stable oil sources for its economy. In such a situation, reducing oil consumption, because of: external prices shocks, increased taxes on oil and its derivatives, problems in procurement or transportation of oil, as well as restrictive ecological laws regarding CO_2 emission, could lead to a fall in economic growth.

Our results are different from most of the studies analysing developing-transitional countries, which found that causality runs from energy variables to economic growth. On the other hand, opposite causality is common in developed, post-industrial economies with strong tertiary sector. The interdependence between energy, other inputs and economic activity changes significantly as an economy moves through different stages of development. Energy

consumption in developed countries is mostly used in final consumption (transport, heating and cooling) rather than in production processes. In such cases the external shocks have less effects on economic growth, while, at the same time, economic growth has a more significant impact on the level of energy consumption, production and imports. Although Croatia, Latvia and Lithuania are transition countries, they show similar economic structure to developed countries with dominant service sector that makes up to 60% of their GDP. Privatisation process in these countries has resulted with brown-field investments in service sector, especially telecommunications and financial sector (Demekas et.al., 2005), because of the high profits in these oligopolistic markets. On the other hand, the industrial production dropped sharply due to the closure and restructuring of heavy industry which was the biggest energy consumer and thus the energy consumption in industry decreased considerably. Uncompetitive position of the industry in transition countries has been additionally enforced by extensive trade liberalisation which led to further decline in industrial production and industrial energy consumption. An important problem that negatively impacts the competitiveness of industry in transition countries is related to higher energy prices for industry in comparison to prices for households. During the 90s in most transition countries industrial tariffs used to be higher than residential tariffs, which is in sharp contrast with the situation in Western Europe where industrial tariffs have been on average two-third of the price charged to households, reflecting the relative costs of supplying these two customer categories (Broadman et.al. 2004). Regarding electricity, prices for industry in EU-27 in 2009 are even 23.8% lower than prices for households, while in EU-27 gas industry the relationship between industry and households prices is even more favourable for industry and is 26.15% lower than for residential costumers (Eurostat, 2010). Despite regular increases in household tariffs in transition countries, cross-subsidisation still exists from industry to households and the latest increases in the oil and gas prices for the industry have further deteriorated their competitiveness. National energy policy should tackle these problems, but it should also include support measures to neutralize the negative economic impact of cost-reflective energy prices on socially vulnerable households.[6]

5. CONCLUSION

We examine the causal relationship between oil consumption and economic growth for small European countries over the period 1980–2007 for developed countries and 1993-2007 for transition countries. We used a bivariate model of real GDP and oil consumption. Since the presence of cointegration was found in over 50% of the analysed countries we used an ECM instead of a VAR model, since the VAR model is misspecified in the presence of cointegration. Apart from that, VAR models may only suggest a short run relationship between the variables because long run information is removed in the first differencing, while an ECM avoids this shortcoming.

Our findings show that small European states can be divided into two groups. The first group consists of countries where the causality is running from real GDP to oil consumption: Belgium, Denmark, Ireland, Norway, Sweden, Croatia, Latvia, Lithuania, Moldova and Slovenia. The group seems heterogeneous, but is actually composed of two homogenous groups of countries. The reasons for causality from GDP to oil consumption in the most developed countries (Scandinavian economies, Ireland and Belgium) and in the transition

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[6] These measures may combine social support for households that suffer from energy poverty with support for increased energy efficiency.

countries (Croatia, Latvia, Lithuania and Moldova) are completely different. In the former case, the direction of causality is a consequence of a highly developed post-industrial society with a strong tertiary sector. In the case of transition economies the direction of causality can be related to deindustrialization process and transition depression that resulted in a sharp industrial decline and decreased industrial oil demand. The causality in the transitional countries between real GDP and oil consumption is more related to personal transportation, cooling and heating needs rather then the industry. Under the assumption that there exists unidirectional Granger causality going from economic growth to oil consumption, it could mean that the policies aimed at decreasing oil dependency should not have a significant effect on economic growth of a country. The state may then use potential proceeds from higher duties and taxes on oil to decreasing the overall tax burden on earnings and attracting investments or stimulating the economy by increased government spending.

The second group of countries where the causality is running from oil consumption to real GDP is composed of the following countries: Austria, Czech Republic, Slovakia, Malta, Bulgaria and Bosnia and Herzegovina. Although these countries are also heterogeneous, all of them use oil mostly for industrial purposes and this direction of causality is logical. In these states, where unidirectional Granger causality runs from oil consumption to economic growth, state should employ additional resources in subsidizing oil prices and securing long term and stable oil sources for its economy. In such a situation, reducing oil consumption, because of: external prices shocks, increased taxes on oil and its derivatives, problems in procurement or transportation of oil, as well as restrictive ecological laws regarding CO_2 emission, could lead to a fall in economic growth.

A significant limitation of this study is the short time period for the transition countries and questionable quality of data in the early 1990s. In the future it may be interesting to investigate causality over a longer time span and with higher frequency data, for example, quarterly data, since temporal aggregation of higher frequency data to annual data may weaken causal relationships between the variables. Despite these limitations this is, as far as we known, the first systematic analysis of causality between oil consumption and economic growth performed on a larger group of countries. The results we obtained have important consequences for small countries in light of the ongoing desire to reduce oil dependency and CO_2 emissions.

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MEĐUZAVISNOST POTROŠNJE NAFTE I EKONOMSKOG RASTA U MALIM EUROPSKIM ZEMLJAMA[7]

SAŽETAK

Rad istražuje postojanje i smjer kauzalne povezanosti između potrošnje nafte i ekonomskog rasta u malim europskim zemljama u periodu 1980.-2007. za razvijene zemlje i 1993.-2007. za tranzicijske zemlje. Naši rezultati pokazuju da se male europske zemlje mogu podijeliti u dvije grupe. Prvu grupu karakterizira smjer kauzalnosti od realnog BDP-a prema potrošnji nafte, a čine ju najrazvijenije europske zemlje te jedan dio tranzicijskih zemalja. U prvom slučaju, smjer kauzalnosti posljedica je visokorazvijenih post-industrijskih društava sa snažnim uslužnim sektorom. U slučaju tranzicijskih zemalja, ovakav smjer kauzalnosti može se povezati s procesom deindustrijalizacije i tranzicijskom depresijom koji su rezultirali snažnim padom industrijske proizvodnje i smanjenom industrijskom potražnjom za naftom.

Drugu grupu zemalja karakterizira kauzalnost u smjeru od potrošnje nafte prema ekonomskom rastu, a u takvom slučaju država treba angažirati dodatne resurse za subvencioniranje cijene nafte i osiguranje dugoročnih i stabilnih izvora nafte za ekonomiju. U ovim zemljama smanjenje potrošnje nafte zbog različitih razloga (eksternih cjenovnih šokova, porasta poreza na naftu i naftne derivate, restriktivnih ekoloških zakona zbog CO_2 emisija) mogu voditi padu ekonomskog rasta.

Ključne riječi: *potrošnja nafte, ekonomski rast, male europske zemlje, Granger kauzalnost, Error Correction Model (ECM)*

İmre Ersoy[1]

THE IMPACT OF FINANCIAL OPENNESS ON FINANCIAL DEVELOPMENT, GROWTH AND VOLATILITY IN TURKEY: EVIDENCE FROM THE ARDL BOUNDS TESTS

ABSTRACT

The aim of this paper is to investigate the impact of financial openness on financial development, growth and output volatility in Turkey. Results of the bounds test reveal that financial openness is in a long run equilibrium relationship with financial development, growth and output volatility. Granger causality tests disclose the existence of unidirectional causality from financial development to financial openness in the long run and from financial openness to output volatility in the short run. Yet, no Granger causality is detected neither from financial openness to growth nor from financial openness to financial development. Results call for further financial development and more conscientious monetary and fiscal policy design for financial openness in Turkey.

Key words: *International Investment; Long Term Capital Movements; Short Term Capital Movements; Open Economy Macroeconomics; Economic Growth of Open Economies; Bounds test; Granger causality*

Jel Classification: *F21; F32; F41; F43; C32*

1. INTRODUCTION

Financial openness is achieved by removing impediments to cross-border flow of capital and financial services; by broadening and deepening of cross border financial ties and by removing less favorable treatment to foreign investors and foreign capital (Herrero and Wooldridge, 2007). The cross border financial asset holdings that were less than half of world GDP by 1970s has reached to over 3 times of the world GDP by mid-2000s. Financial openness, according to standard economic theory, is assumed to provide lower cost of financing, efficient allocation of resources, international risk sharing, increase in investments, financial development and growth. The emerging market economies (EMEs) started to open their capital accounts after mid-1980s with the main aim of attracting capital to grow, following the globalization trend prevalent in the developed world.

Financial openness, in the mean time, increased the vulnerability of EMEs to financial crises mainly through sudden stops, capital flow reversals and contagion which created "liquidity constraints" in the host country due to "flight to quality (liquidity)" and impaired

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growth. The pro-cyclical "capital flow bonanzas" driven by the scarcity of capital and high remuneration in EMEs due to their catching up process has been the major culprit of the boom and bust cycles particularly in East Asia in 1997, Russia in 1998 and in Turkey, Argentina, Brazil in 2001 and 2002. The recent global financial turmoil has also led EMEs to face "sudden stops" due to deleveraging of positions in advanced countries.

There is no consensus on whether the risks of increased financial integration in terms of more volatility introduced, outweigh the benefits. The openness-growth nexus also provide inconclusive results for the EMEs. However, financial development level is considered as an important indicator for the cost-benefits trade-off from financial openness. Financial development is measured by the size, depth, access, efficiency and stability of the markets, intermediaries, assets, institutions and regulations of the financial system (Roubini and Bilodeau, 2009). The impact of financial openness on financial development is important as financial development is empirically proven to drive growth, both in the developed world and in the developing (i.e. King and Levine, 1993; Levine, 2004; Soukhakian, 2007; Katırcıoğlu, Kahyalar and Benar, 2007).

The first steps of financial liberalization started by 1980 in Turkey with the structural adjustment program that aimed financial liberalization besides export-led growth. The period then after is marked by deregulation of financial markets, trade liberalization, de jure[2] capital account liberalization, establishment of organized money, foreign exchange and stock exchange markets, followed by a final step of capital account liberalization with Decree No.32, in 1989 (Esen, 2000). Yet, the first financial crisis that hit Turkey after the financial openness was in 1994. 1998 was also a drastic year due to contagious effects of the crises in East Asia and Russia. However, the most devastating crisis, due also to the existing distortions and weak institutional settings, was in 2001 in Turkey. The period after 2002 is marked with banking sector restructuring, more stable economic outlook in line with the global developments and high FDI inflows until the global financial crisis. On the other hand, Turkey has developing financial markets, with total financial assets of 130% of its GDP and ranks 44th amongst 54 countries as of 2007, in the Financial Development Index of Roubini and Bilodeau (2009). The securitization and derivatives markets are almost inexistent and the private bond issuances, which are detrimental for financial development, account for 0.1% of Turkey's GDP (Beck and Demirgüç - Kunt, 2009); whereas 70% of the Turkish stock exchange market shares belongs to foreigners.

The aim of this paper is to investigate the impact of financial openness on the financial development, growth and output volatility of Turkey. To that end, the paper employs the bounds test for cointegration, to search if financial openness is in a long run equilibrium relationship with financial development, growth and output volatility. On the other hand, Granger causality tests are employed to investigate the direction of causality between financial openness and financial development, growth and output volatility in Turkey.

The paper is motivated, to the best knowledge of the author, by the following voids in the literature: First, the inconclusiveness on the openness - growth nexus necessitates the topic to be scrutinized on the country level. Second, this paper investigates the long-run relationship and direction of causality between financial openness and financial development and also between financial openness and volatility that have not been researched so far for Turkey. Last but not least, this paper investigates the relation between financial openness and financial development, growth and output volatility by employing Bounds test for co-integration within the ARDL (Autoregressive Distributed Lag) modeling approach.

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[2] De jure measures of financial openness show the regulatory state of financial openness (i.e. the index of Chin and Ito, 2008). De facto measures, on the other hand, are quantity-based capital account openness measures.

The rest of the paper unfolds as follows: Section 2 reviews the literature. Section 3 describes the data and the methodology for the empirical analyses. Section 4 discusses the empirical results. Section 5 comments on policy implications and concludes.

2. LITERATURE REVIEW

The empirical literature on the drivers of financial openness generally point out to trade openness, financial development level and economic growth. To cite only a few; Vo and Daly (2007) in their analysis of 79 developed and developing countries for 1980 - 2003 find that international financial integration has a positive relationship with rich and well-educated countries, trade openness, financial development level, soundness of the banking system and economic growth and a negative relationship with capital control measures, inflation and taxes. Lane and Milesi-Ferretti (2008) empirically prove that international financial integration is strongly and positively correlated with financial development, being a financial centre, economic growth and lower home bias; positively but not as strongly correlated with trade.

The literature on openness-growth nexus is rich, albeit inconclusive.[3] Edwards (2001), by employing Quinn index, proves that financial globalization enhances growth in countries that are financially developed. Aizenman, Pinto and Radziwill (2007) show that no evidence of growth is associated with increases in the share of portfolio investments in developing countries. Prasad, Rajan and Subramanian (2007) also confirm a negative relationship between growth and foreign capital. Butkiewicz and Yanıkkaya (2008) provide, however, evidence that FDI and equity flows have a positive effect on growth both in developed and developing countries; whereas volatile short term flows hinder growth and that capital account liberalization enhances growth especially in developed countries. Yet, Gamra (2009) demonstrates that domestic financial liberalization has a positive, stock market openness has an insignificant, capital account liberalization has a strong negative, full liberalization has a negative whereas partial liberalization has a positive impact on growth. Rodrik and Subramanian (2009) suggest, on the other hand, that if FDI is accompanied by capital inflows then the distinction between the two becomes less important due to the exchange rate appreciation they both introduce.

For the effect of financial openness on volatility, Frankel and Cavallo (2004) find that financial openness has insignificant and negative relationship with sudden stops, whereas Calvo, Izquierdo and Mejia (2004) find a positive relationship. Edwards (2007) finds that financial openness has a negligible positive impact on the probability of "capital flow contractions" (CFC)[4] whereas a higher FDI to GDP ratio has a negative impact on CFC. On the other hand, Nicolo and Juvenal (2010) empirically demonstrate that advances in financial integration from 1985 to 2009 had a positive relationship with financial development, equity market liquidity, higher growth, lower growth volatility and lower probability of risk both in advanced countries and EMEs. Umutlu, Akdeniz and Altay-Salih (2010) also document a negative relationship between financial openness and aggregated stock exchange volatility and assert that to decrease volatility; the investor base should be broadened in stock exchange markets. Aizenman, Chinn and Ito (2010) find that high levels of financial openness, when

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[3] Edwards (2007) claim that the difficulties in measuring the level of capital mobility caused unhealthy empirical results. Schindler (2009) advocates that the reason for inconclusiveness is the scarcity of de jure financial globalization indexes which are under the control of policymakers. Butkiewicz and Yanıkkaya (2008) attribute the inconclusiveness to the measurement of short and long-term capital flows together.

[4] CFC is defined as abrupt declines of 3% of GDP in capital inflows per year, taking also into account the sudden stops and capital flights.

only coupled with high levels of financial development reduces output volatility in EMEs but developing countries which are net receivers of hot money, in the form of cross country bank lending or portfolio flows, experience high output volatility.

For the relationship between financial openness and financial development, Baltagi, Demetriades and Hook (2009) find that in lower income countries, the marginal impact of financial openness on financial development is high, whereas financial development through additional financial integration in already open ones is proved to be limited. Baltagi, Demetriades and Hook (2009) empirically demonstrate that banking sector development has a positive relationship with financial openness and with trade openness, independently, both for developing and industrialized countries. Their result partially contradicts Rajan and Zingales (2003) who suggest that for financial development, both financial openness and trade openness are prerequisites due mainly to political economy reasons.

On the other hand, some empirical studies provide evidence that host countries must be at a certain development level to benefit from financial openness. Mishkin (2006) suggests that there are prerequisites to be able to reap the benefits of financial globalization, including developing strong property rights, improving corporate governance, reducing corruption, strengthening the legal system. However, the response of Rodrik and Subramanian (2009) to this argument is that; the developing countries that manage successfully these reforms will no more be poor and financial globalization would then be dispensable. Yet, a new literature on financial openness suggests that the indirect benefits of financial openness are more important than the inconclusive growth enhancing role of financial openness. Köse, Prasad, Rogoff and Wei (2009) argue that financial globalization have collateral-benefits, in other words indirect effects like financial development, institutional development and macroeconomic discipline. Furthermore Köse, Prasad, Taylor (2010) claim that countries can reduce the risks of financial openness and reap these indirect benefits only after reaching a certain quantifiable threshold level of financial and institutional development, which are lower for FDI and portfolio equity liabilities but higher for debt liabilities. Köse et al. (2010) empirically provide evidence for certain quantifiable threshold levels after the breach of which, the merits of financial openness in terms of growth and the cost-benefit trade-off from financial openness improves considerably.

For Turkey, Katırcıoğlu (2009) investigates the long-run equilibrium relationship and the direction of causality between FDI inflows and real GDP by employing ARDL bounds testing approach and Granger causality tests. Results of the empirical analysis for the period of 1970 – 2005 suggest the existence of cointegration only when FDI inflows are the dependent variable and unidirectional causality that runs from real GDP growth to FDI inflows in Turkey. Klasra (2011) investigates the existence of long run equilibrium relationship and direction of Granger causality between foreign direct investment, trade openness and economic growth during the periods of 1975–2004 for Pakistan and Turkey. The results of the empirical analyses depict no Granger causality running between FDI and growth. Özdemir and Erbil (2008) analyze the impact of financial openness on per capita income and growth of 10 new EU members and Turkey by employing quarterly longitudinal panel for the period of 1995 – 2007. Their analysis suggests that financial openness is negatively associated with growth in Turkey. Ilgun, Koch and Orhan (2010) establish a VAR Model to examine the FDI-Growth relation and also run impulse-response, variance decomposition analyses and Wald statistic for the causality test between 1980 and 2004. They find, in contrast to the existing literature, a bi-directional causality between FDI and growth in Turkey in their model where they assume a Cobb-Douglas production function but deviate from the standard literature by using *A* for the factors that impact growth including FDI.

This study is different from the existing literature on Turkey in three respects: First, the existing literature investigates only the relationship between financial openness and

growth, whereas this study investigates the impact of financial openness on financial development, growth and output volatility. Second, this study investigates financial openness by taking into account FDI inflows, FDI outflows and net portfolio investments; whereas Katırcıoğlu (2009) and Ilgun et al. (2010) concentrates only on FDI inflows and Klasra (2011) only on FDI. Yet, their empirical findings lend support to the findings of this study. Third, this study is different from Özdemir and Erbil (2008) as it employs ARDL bounds testing for level relationship and Granger causality for direction of causality between financial openness and growth.

The inconclusiveness in the literature on the openness - growth nexus as well as the importance of the relationship between financial openness and volatility and between financial openness and financial development render the empirical scrutiny of a country level analysis indispensable for Turkey.

3. DATA AND METHODOLOGY

The paper employs annual data covering the period from 1980 to 2008. The data source for all the variables employed is the World Development Indicators (WDI, 2010). Financial openness (FO) is calculated as the sum of **FDI** net inflows, FDI net outflows and net portfolio investments to GDP. For financial development (FDP), M2/ GDP is used which stands for the ratio of liquid liabilities (currency, demand and interest bearing liabilities of banks and other financial intermediaries) to GDP. FDP is a measure of the overall size of the financial intermediary sector and is used as a traditional indicator of financial depth since the seminal work of King and Levine (1993). Real gross domestic product (GDP) is used to proxy for growth. For output volatility (V-GDP), the 5 year rolling standard deviation of real GDP growth rate is calculated as also employed by Jalil, Ma and Naveed (2008). The variables FO, FDP, GDP and v-GDP are in their natural logs.

The paper employs the Augmented Dickey & Fuller (ADF) and Phillips & Perron (PP) unit root tests to search for the integration level between FO, FDP, GDP and v-GDP.[5] The integration level is searched to verify that the variables are not integrated of order two, I (2).

Then, the bounds test for cointegration within the Autoregressive Distributed Lag (ARDL) modeling approach developed by Pesaran, Shin and Smith (2001) is employed to investigate if FO is in a long-run relationship with FDP, GDP and v-GDP. The ARDL modeling approach can be employed irrespective of whether regressors are purely I (0), purely I (1) or mutually co-integrated. The ARDL modeling approach involves estimating the following error correction models:[6]

$$\Delta \ln Y_t = a_{0_Y} + \sum_{i=1}^{n} b_{i_Y} \Delta \ln Y_{t-i} + \sum_{i=0}^{n} c_{i_Y} \Delta \ln X_{t-i} + \sigma_{1_Y} \ln Y_{t-1} + \sigma_{2_Y} \ln X_{t-i} + \varepsilon_{1t} \qquad (1)$$

$$\Delta \ln X_t = a_{0_X} + \sum_{i=1}^{n} b_{i_X} \Delta \ln X_{t-i} + \sum_{i=0}^{n} c_{i_X} \Delta \ln Y_{t-i} + \varpi_{1_X} \ln X_{t-1} + \varpi_{2_X} \ln Y_{t-i} + \varepsilon_{2t} \qquad (2)$$

In equations 1 and 2, Δ is the difference operator; ε_{1t} and ε_{2t} are serially independent random errors with mean zero and finite covariance matrix. In the above equation with Y as the dependent variable, the null hypothesis of no cointegration is $H_0 : \sigma(1_Y) = \sigma(2_Y) =$

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[5] The PP unit root test is applied besides ADF as it computes a residual variance that is robust to auto-correlation.

[6] Formatting and styles of equations and tables 1 to 4 and even some notations heavily draw from the various publications of Katırcıoğlu, S.T. (i.e. Katircioglu and Yorucu 2010) who, amongst his other publications, created an extensive literature on Bounds testing for cointegration.

0 and the alternative hypothesis of co-integration is $H_1: \beta(1_1Y) \neq \beta(2_1Y) \neq 0$. In the second equation with X as the dependent variable, the null hypothesis of no cointegration is $H_0: \beta 1Y = \beta 2Y = 0$ and the alternative hypothesis of co-integration is $H_1: \beta(1_1Y) \neq \beta(2_1Y) \neq 0$.

As the next step, the paper runs the Granger causality tests under the vector error correction model (VECM) for the cointegrated variables. In the absence of cointegration, the Granger causality tests are run under the vector autoregressive (VAR) model. Hence, the VAR model in equation 3 and the VECM in equation 4 can be expressed as follows:

$$(3) \quad \Delta \ln Y_t = \alpha_0 + \varphi_{11}^p(L)\Delta \ln Y_t + \varphi_{12}^q(L)\Delta \ln X_t + u_{1t}$$

$$\Delta \ln X_t = \alpha_1 + \varphi_{21}^p(L)\Delta \ln X_t + \varphi_{22}^q(L)\Delta \ln Y_t + \delta ECT_{t-1} + u_{2t}$$

(4)

$$\varphi_{ij}^p(L) = \sum_{n=1}^{P_{ij}} \varphi_{ijn} L^1 \qquad \varphi_{ij}^q(L) = \sum_{n=1}^{q_{ij}} \varphi_{ijn} L^1$$

where,

$$\varphi_{21}^p(L) = \sum_{i=1}^{P_{21}} \varphi_{21,i}^p L^i \qquad \varphi_{22}^p(L) = \sum_{i=0}^{q_{22}} \varphi_{22,i}^p L^i$$

In equations (3) and (4), Δ symbolizes the difference operator and L symbolizes the lag operator where $(L)\Delta \ln Y_t = \Delta \ln Y_{t-1}$. On the other hand, u_{1t} and u_{2t} are serially independent random errors with mean zero and finite covariance matrix. ECT_{t-1} is the lagged error correction term derived from the long-run cointegration model. For Granger causality under VECM, the F and t-test statistics for ECT_{t-1} in equation 4 should be statistically significant to infer causality from Y to X. In the case of VAR in equation 3, the statistical significance of only the F test is enough to infer short-run Granger causality from X to Y.

4. RESULTS AND DISCUSSIONS

Table 1 illustrates ADF and PP unit root test results for FO, FDP, GDP and v-GDP. FO is stationary at level, or in other words, integrated of order zero, I (0). FDP, GDP and v-GDP are stationary at first differences, I (1) according to both the ADF and the PP tests.

As the second step, the bounds test within the ARDL modeling approach is applied irrespective of whether regressors are purely I (0), purely I (1) or mutually co-integrated, to investigate if FO is in a long run equilibrium relationship with FDP, GDP and v-GDP. Table 2 depicts the critical values for F and t statistics that are taken from Pesaran et al. (2001). The calculated F-statistics value is compared with two sets of critical values estimated by Pesaran et al. (2001), one assuming that all variables are I(0) and the other assuming that they are all I(1) .

Table 3 demonstrates the results of the bounds test for cointegration for each pair of dependent variable and its regressor for three different scenarios of Pesaran et al. (2001). FIII is the first scenario without deterministic trends and unrestricted intercepts. FIV is with restricted deterministic trends and unrestricted intercepts. Finally, FV is the scenario with unrestricted deterministic trends and unrestricted intercepts.

Results in Table 3 depict that the application of the bounds F-test using ARDL modeling approach suggests the existence of long-run equilibrium relationships as F-statistics exceed the upper critical value and the null hypotheses of $H_0: \beta(1_1Y) = \beta(2_1Y) = 0$ and of $H_0: \beta 1Y = \beta 2Y = 0$ are rejected at 0.10, 0.05 or 0.01 levels except for the cases when FDP and v-GDP are the dependent variables. There is a long-run equilibrium relationship between each pair of dependent variable and its regressor, with the above

mentioned exceptions. Yet, the results of the bounds test for cointegration under the ARDL approach reveal that financial openness is in a long-run equilibrium relationship with financial development, real GDP growth and output volatility in Turkey. The result from the application of the bounds t-test of each ARDL model also shows that trend restrictions may be imposed in (FO/FDP), (FO/GDP) and (FO/v-GDP) relationships according to the significance of the t-statistics.

As the last step, the Granger causality tests are run under the VECM for the cointegrated variables and under the VAR model for variables that are not cointegrated, to search for the direction of causality. The Granger causality tests are run for up to 3 lags to ensure that the results are not sensitive to lag length choice as suggested by Pindyck and Rubinfeld, (1991). Results of the VECM under ARDL in Table 4 suggest unidirectional causality from FDP to FO. Whereas, results of the VAR model in Table 4 suggests short-run causality running from FO to v-GDP.

5. CONCLUDING REMARKS AND POLICY IMPLICATIONS

This study investigates the impact of financial openness on financial development, growth and output volatility in an EME that started financial globalization by mid-1980s and lived through recurrent financial crisis particularly since mid-1990s. This analysis is even more important today because the global financial crisis refueled the debate on the costs and merits of financial openness. Results of the bounds test reveal that financial openness is in a long run equilibrium relationship with financial development, growth and output volatility in Turkey. Granger causality tests, on the other hand, disclose the existence of unidirectional causality running from financial development to financial openness in the long run and from financial openness to output volatility in the short run. Yet, no Granger causality is detected neither from financial openness to growth nor from financial openness to financial development in Turkey.

The findings of this study call for more conscientious and proactive monetary and fiscal policy design for financial openness and further development of financial markets in Turkey. First, it seems that the Central Bank of Turkey should implement even more proactive monetary policy measures to dampen the output volatility induced by the non growth enhancing short term portfolio investment inflows. Second, it seems that for financial openness to impact growth positively, fiscal incentives should be introduced i.e. to encourage that the profits of FDIs are kept in Turkey for certain durations rather than their immediate transfer back to the home countries. Third, it seems that incentives should be introduced in line with the suggestions of Umutlu et al. (2010) to broaden the investor base in the Turkish financial markets to dampen the volatility stimulated by financial openness. Fourth, it seems that it should be spotted by the policy makers that Turkey needs to have more developed financial markets particularly due to the empirical findings of Köse et al. (2010), who assert that a certain threshold level of financial development is necessary for financial openness to impact the growth of a country positively. To that end, fiscal incentives may be introduced to limit the increasing shares of local currency denominated domestic public debt in Turkish banks' portfolios that negatively affect financial development (Ersoy, 2011). Last but not least, the only long run causality detected in this study shows that the level of financial development attained after opening up of the financial markets stimulates FDI and net portfolio investment inflows to Turkey. This is important as Turkey is a capital constraint country. Yet, the second causality detected in this study that runs in the short term from financial openness to output volatility should be recognized as the cost of these financial inflows that replace for savings in Turkey.

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ANNEX:

Table 1: ADF and PP Tests for Unit Root

Statistics (Levels)	lfo	lag	lfdp	lag	lgdp	lag	lvgdp	lag
τ_T (ADF)	-4.35*	(0)	-2.92	(0)	-2.55	(0)	-1.77	(0)
τ_μ (ADF)	-2.21	(0)	-1.35	(0)	-0.61	(0)	-1.67	(0)
τ (ADF)	- 2.80*	(0)	1.81	(0)	5.64	(0)	-1.21	(0)
τ_T (PP)	-4.36*	(2)	-2.92	(0)	-2.55	(1)	-2.03	(2)
τ_μ (PP)	-2.20	(3)	-1.31	(5)	-0.62	(1)	-1.95	(2)
τ (PP)	-2.96*	(3)	5.10	(25)	6.25	(1)	-1.26	(1)

Statistics (First Differences)	Δlfo	lag	Δlfdp	lag	Δlgdp	lag	Δlvgdp	lag
τ_T (ADF)	-7.58*	(0)	-5.56 *	(0)	-5.86*	(0)	-4.57*	(0)
τ_μ (ADF)	-7.77*	(0)	-5.68 *	(0)	-5.97*	(0)	-4.64*	(0)
τ (ADF)	-7.38*	(0)	-5.25 *	(0)	-1.66***	(1)	-4.71*	(0)
τ_T (PP)	-9. 62*	(6)	-6.29 *	(6)	-5.86*	(0)	-4.56*	(1)
τ_μ (PP)	-9.90 *	(6)	-6.32 *	(6)	-5.97*	(0)	-4.64*	(1)
τ (PP)	-7.38 *	(1)	-5.32 *	(2)	-3.11*	(2)	-4.71*	(1)

Note: τ_T represents the model with a drift and trend; τ_μ is the model with a drift and without trend; τ is the model without a drift and trend. Lag lengths are chosen by Schwarz Information Criterion (SIC). *, ** and *** denote rejection of the null hypothesis at 1%, 5% and 10% levels respectively.

Table 2: Critical Values for ARDL Modeling Approach

	0.10		0.05		0.01	
k = 2	I (0)	I (1)	I (0)	I (1)	I (0)	I (1)
F_{IV}	3.38	4.02	3.88	4.61	4.99	5.85
F_V	4.19	5.06	4.87	5.85	6.34	7.52
F_{III}	3.17	4.14	3.79	4.85	5.15	6.36
t_V	-3.13	-3.63	-3.41	-3.95	-3.96	-4.53
t_{III}	-2.57	-3.21	-2.86	-3.53	-3.43	-4.10

Source: Pesaran et al. (2001): p.300-301 for F-statistics and p.303-304 for t-ratios.
Notes: k is the number of regressors for dependent variable in ARDL models. t_V and t_{III} are the t ratios for testing $\sigma_{1Y} = 0$ and $\varpi_{1Y} = 0$ respectively with and without deterministic linear trend.

Table 3. The Bounds Test for Co-integration

Variables	With Deterministic Trends			Without Deterministic Trend		Conclusion
	F_{IV}	F_V	t_V	F_{III}	t_{III}	H_0
(1) FO and FDP						
F_{FO} (FO/FDP)	5.89c	8.56c	-4.10c	4.03b	-2.73b	Rejected
F_{FDP} (FDP/FO)	2.50a	3.75a	-2.73a	1.83a	-1.91a	Accepted
(2) FO and GDP						
F_{FO} (FO/GDP)	8.46c	12.25c	-4.95c	12.56c	-4.92c	Rejected
F_{GDP} (GDP/FO)	3.61b	5.35c	-3.04a	0.15a	-0.07a	Rejected
(3) FO and v-GDP						
F_{FO} (FO/v-GDP)	6.36c	9.23c	-4.23c	2.62a	-2.26a	Rejected
$F_{v\text{-}GDP}$ (v-GDP/FO)	1.98a	2.75a	-2.15a	2.93a	-2.39a	Accepted

Note: Akaike Information Criterion (AIC) and SIC are used to select the number of lags required in the co-integration test.

[a] indicates that the statistic lies below the lower bound, b that it falls within the lower and upper bounds, and c that it lies above the upper bound.

Table 4: Granger Causality Tests under VECM and VAR model

Null Hypothesis	Lag Level						Result
	1		2		3		
	F Stat	$t_{ECTt\text{-}1}$	F Stat	$t_{ECTt\text{-}1}$	F – Stat	$t_{ECTt\text{-}1}$	
(1) FO and FDP							
FO does not Granger cause FDP	0.02	-	0.52	-	0.06	-	
FDP does not Granger cause FO	3.14[***]	1.92[***]	1.06	1.44	3.28[**]	2.54[**]	FDP → FO
(2) FO and GDP							
FO does not Granger cause GDP	0.30	-2.24[**]	0.25	2.51[**]	0.08	-2.76[**]	
GDP does not Granger cause FO	3.68[***]	-0.00	2.15	-0.30	1.44	-0.62	
(3) FO and v-GDP							
FO does not Granger cause v-GDP	4.77[**]	-	3.28[***]	-	2.05	-	FO → v-GDP
v-GDP does not Granger cause FO	0.67	-0.92	2.57	-2.16[**]	1.30	-1.43	

Note: *, ** and *** denote significance respectively at 1%, 5% and 10% levels.

UČINAK FINANCIJSKE OTVORENOSTI NA FINANCIJSKI RAZVOJ, RAST I VOLATILNOST U TURSKOJ: DOKAZI DOBIVENI ARDL GRANIČNIM TESTOVIMA

SAŽETAK

Cilj ovog rada je istražiti učinak financijske otvorenosti na financijski razvoj, rast i volatilnost u Turskoj. Rezultati graničnog testa (bounds test) otkrivaju da je financijska otvorenost u odnosu dugoročne ravnoteže s financijskim razvojem, rastom i volatilnosti proizvodnje. Grangerov test kauzalnosti pokazuje, dugoročno gledano, postojanje jednosmjerne kauzalnosti od financijskog razvoja do financijske otvorenosti, dok kratkoročno postoji kauzalnost od financijske otvorenosti prema volatilnosti proizvodnje. Ipak, Grangerova kauzalnost se ne otkriva niti od financijske otvorenosti prema rastu, niti od financijske otvorenosti prema financijskom razvoju. Rezultati ukazuju na potrebu za daljnjim financijskim razvojem i savjesnijom monetarnom i fiskalnom politikom usmjerenima na financijsku otvorenost u Turskoj.

Ključne riječi: *međunarodna ulaganja, dugoročna kretanja kapitala, kratkoročna kretanja kapitala, makroekonomija otvorenog gospodarstva, gospodarski rast otvorenih gospodarstava, granični test, Grangerova kauzalnost*

JEL klasifikacija: *F21; F32; F41; F43; C32*

Ana Grdović Gnip[*]

DISCRETIONARY MEASURES AND AUTOMATIC STABILIZERS IN THE CROATIAN FISCAL POLICY

ABSTRACT

The role of fiscal policy as a tool to stabilize business cycle fluctuations has been at the center of recent public debates. If governments allow automatic fiscal stabilizers to work fully in a downswing but fail to resist the temptation to spend cyclical revenue increases during an upswing, the stabilizers may lead to bias toward budget positions. This paper assesses to what extent some items of the Croatian central government budget operate to smooth the business cycle. For disentangling automatic stabilizers from discretionary measures, this research relies on the European Commission methodology. Results show that the structural budget balance was on average 1.74% of GDP in deficit in the period between 1995 and 2009. Automatic stabilisation in Croatia is relatively weak and supplemented by discretionary measures, which led to "destabilizing" the economic activity in a pro-cyclical manner in Croatia in several observed periods.

Key words: *fiscal policy, automatic stabilizers, discretionary measures, cyclically adjusted budget balance, Croatia*

1. INTRODUCTION

The public economics literature has shown that economic cycles have important short-term effects on public finance. To look at the cyclical properties of the overall budget balance, it is common to split it in two components: the cyclical balance and the cyclically adjusted (or structural) balance (Gali and Perotti, 2003). Variations in the cyclical balance are out of the control of fiscal authorities and show the work of automatic stabilizers, while changes in the cyclically adjusted budget balance are generally interpreted as resulting from discretionary actions taken by policy makers. Moreover, the latter can be used to provide an early warning of the need for budgetary adjustment and changes in the future direction of policy (Chourquai, Hagemann and Sartor, 1990).

Recently, the cyclically adjusted budget balance became important as an indicator for surveillance of fiscal discipline, especially in the context of the European Monetary Union and the related Stability and Growth Pact (SGP). According to the latter, the cyclically adjusted budget balance is calculated to assess whether the prevailing fiscal situation in individual member states is sufficient to adhere to the requirements of the Pact. Based on these calculations the European Commission is able to determine whether the member states' position is strong enough to guarantee that the actual budget deficit does not exceed the threshold of three percent of GDP during a cyclical downturn (European Commission, 2006). In this way the European Commission accents that fiscal stabilization should be primarily left to automatic stabilizers, while discretionary fiscal policy should be an exemption (Buti and van den Noord, 2004).

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The main issue of this paper is to discuss the role and impact of fiscal policy in Croatia by disentangling the budget balance in its cyclical and structural (i.e. cyclically adjusted) component. The purpose of calculating cyclical components of the budget balance is to obtain a clearer picture of the impact of cyclical variations in economic activity on the Croatian government budget and to use this information as an indicator of the degree of economic stabilization resulting from «automatic» fiscal policy. Emphasizing the structural component of the budget balance along with its changes for Croatia aims at identifying the fiscal policy stance in contraction and expansion times in Croatia. Still, although a similar research is done by Švaljek, Vizek and Mervar (2010) using the methodology developed by the European System of Central Banks, this paper tries to accents how would the European Commission and European Council evaluate the Croatian fiscal policy in the context of the SGP (i.e. in the framework of the so called *preventive* and *dissuasive arm*) and enlighten eventual fiscal policy rules. Moreover, the motivation for this paper lies also in assessing the fiscal policy stance as well as the role, extent and strength of automatic stabilization in Croatia, which should be an important input for future empirical and theoretical research in economic policy on the Croatian case.

The rest of the paper is organized as follows. Section 2 presents a theoretical framework of fiscal policy's channels for macroeconomic stability and the reason why the cyclically adjusted budget balance became crucial for deriving policy conclusions. Section 3 is divided in three parts. The first part deals with some empirical facts about business cycles, budget balance and fiscal ratios in the case of Croatia. The second part shows the estimation results of the cyclical and structural component of the budget balance using the European Commission approach, while the third part questions the implications of the structural budget balance in managing public debt in a very intuitive manner. Section 4 considers some policy implications and recommendations while Section 5 is reserved for concluding remarks.

2. THEORETICAL FRAMEWORK

Fiscal policy can contribute to macroeconomic stability through three main channels. The *first* channel involves automatic stabilizers. They reflect the capability of the tax and public spending system to adjust over the business cycle without direct government intervention[i]. Automatic stabilization occurs because tax revenues tend to be broadly proportional to national income and expenditure, whereas public spending reflects government commitments independent of the business cycle and unemployment benefits designed to support spending during downturns. The *second* channel embraces discretionary measures. Governments can deliberately change public spending and tax instruments to offset business cycle fluctuations. The *third* channel deals with the fact that the structure of tax and transfer system can be designed to maximize economic efficiency and thereby enhance the flexibility of the economy in the face of shocks.

Nominal figures of the actual budget balance reflect both, automatic stabilizers and discretionary measures. Therefore, they are not useful when trying to assess the positioning of underlying fiscal policy and possible structural imbalances, i.e. fiscal positions generated under the potential level of output.

In order to capture the cyclical properties of the actual budget balance it has to be divided in two components: the *cyclical balance* and the *cyclically adjusted* or *structural balance* (Gali and Perotti, 2003). The cyclical budget balance requires two inputs: (1) a measure of the cyclical position of the economy, generally estimated using the output gap and (2) a measure of the link between economic cycle and budget, generally outlined by the elasticity parameters that represent a percentage change in a budgetary item associated with a

percentage change in the level of economic activity. Hence by construction, the cyclical balance is zero when the output gap is closed (i.e. actual output equals the trend level of output). Subtracting the cyclical balance from the actual budget balance provides the cyclically adjusted budget balance (or structural budget balance). The latter shows a hypothetical balance that would be observed if output was on potential or trend level. Changes in the cyclically adjusted budget balance are generally interpreted as discretionary actions taken by fiscal authorities, while the cyclical budget reflects the functioning of automatic stabilizers.

According to the OECD (Giorno, 1995) estimates of the structural balance help to *"provide a clearer picture of government's underlying fiscal situation"* and can be used *"as a guide to fiscal policy analysis"*. Being that the fact, the cyclically adjusted budget balance started to play a crucial role for deriving concrete policy conclusions and different methodologies for its evaluation emerged, among which the most commonly used are those developed by international institutions such as the IMF, OECD, ECB and EC (for an overview of all approaches see Boije (2004)).

Given its raising popularity, measures of the cyclically adjusted balance started to reveal some shortcomings. A first set of shortcomings appeared in the late 1980s when Blanchard (1990) pointed out that the cyclically adjusted budget balance, along with its predecessor, the *full employment surplus[ii]*, was used as *«jack-of-all-trades»*. Although its original purpose was to tell what would be the balance if the economy was operating at full employment, the OECD relied on it as *«index of discretionary changes in fiscal policy, index of sustainability, index of fiscal policy on the economy and as normative index»* (Blanchard, 1990). A second set of shortcomings appeared when the cyclically adjusted budget balance started to be targeted for fiscal surveillance, mainly by the European Commission in context of the SGP[iii]. A fiscal surveillance based on such an indicator has to be taken with caution for several reasons. Larch and Salto (2005) point out that whenever potential output turned out to be lower or higher than assumed, observed changes in the cyclical budget balance were off the target even if budget plans were implemented accurately[iv]. Additionally, the assumption of constant tax elasticities may be acceptable as long as the variations in the tax content of economic growth remains small[v]. Nevertheless, the revealed shortcomings during the EU fiscal surveillance were actually linked to a specific economic event. Therefore the European Commission did not abandon the cyclically adjusted budget balance, but strived to understand the reasons of the shortcomings and tried to look ways to improve the accuracy of the indicator[vi] (Larch and Turrini, 2009). However, nowadays the main shortcoming of the structural budget balance is related to the estimation of potential output, which is taken as reference path when estimating balance measures (for potential output estimation methods see Boije (2004), Giorno et. al (1995) or Bouthevillain et al (2001)).

Moreover, empirical practice showed that targeting the cyclically adjusted, instead of the actual, budget balance results in a number of benefits. For instance, such targeting facilitates the implementation of counter-cyclical fiscal policy, leads to an increase in public saving during periods of strong growth while reducing government's needs for foreign financing and ensures financial stability of social policies and facilitates their long-term planning. Fiscal rules involving the cyclically adjusted budget balance are also considered to be important when monitoring public debt sustainability.

3. AUTOMATIC STABILIZERS VS. DISCRETIONARY MEASURES: CASE OF CROATIA

This Section focuses on disentangling the cyclical and the structural component of the budget balance in the Croatian case and analyses their implications. As a rule, the measurement of the cyclically adjusted budget balance includes *three steps*. The *first step* involves the estimation of the potential output that could be obtained in the absence of cyclical fluctuations in the economy. The difference between the actual output and the estimated potential level of output results in the output gap. The *second step* takes into account the estimated output gap and budgetary revenues and expenditure elasticities in order to evaluate the sensitivity of budgetary items and reveal what would be their size (value) in a case of closed output gap. The correction for cyclical changes is important because the budget balance tends to deteriorate (improve) during recessions (expansions) as a result of automatic stabilizers. The *third step* consists of the estimation of the cyclically adjusted budget balance (or structural budget balance) by subtracting from the actual budget balance the cyclical budget balance.

The analysis in this paper is based on quarterly data for the period 1995:1 to 2009:4 (i.e. 60 observations) and the following two facts are important to be noticed.

First of all, empirical practice shows that the estimation of cyclically adjusted budget balance is usually based on general government data. This paper uses **quarterly data at the central government level**, mainly because quarterly data about total revenue and expenditures for the general government are not available for the period between 1995 and 2004. Nevertheless, this should not pose a limitation for this research principally for two reasons: firstly, in Croatia the central government carries all the discretionary policy actions and local governments have no «fiscal power» in this sense, and secondly, the share of local government in the general government is on average less than 10%, so its omission should not significantly influence the estimation results[vii].

Secondly, in 2004 the government finance statistic in Croatia registered a structural break due to a methodological change in government accounting. Specifically, a switch from the Government Finance Statistics 1986 (GFSM 1986) to the Government Finance Statistics 2001 (GFSM 2001) methodology occurred. In order to have a more consistent series this research uses quarterly data on central government based on **GFSM 1986** only. That is, data after the second quarter 2004 were reclassified from GFSM 2001 to GFSM 1986 (a broad overview of the reclassification method is presented in Appendix 1). Although the newer version of GFSM is more accurate, especially because it integrates acquisition and sale flows of nonfinancial and financial assets in government accounting, the lack of a detailed statistics on general government prior to year 2004 excluded the possibility to have a consistent series based on GFSM 2001.

3.1 EMPIRICAL FRAMEWORK: OUTPUT GAP, BUDGET BALANCES AND FISCAL RATIOS

In order to assess the cyclically adjusted budget balance the evaluation of the output gap, budget balances and fiscal ratios is needed. This research bases the estimation of output gaps on the **Hodrick-Prescott filter[viii]**. Such a filtering requires an appropriate selection of the smoothing parameter λ. When the estimation is derived from quarterly data, it is empirical practice to choose the smoothing parameter being 1600 as suggested by Hodrick and Prescott (1980) in their original work. The choice of the weight parameter λ in this research is actually lower than the latter and follows the suggestion given by the ESCB (ECB) in the

work of Bouthevillain et al (2001). After a detailed analysis of a «reasonable» length of the business cycle over which budgets should be balanced the ESCB (ECB) suggests a value of λ=30 for annual data and the value of **λ=480** for quarterly data[ix].

After the initial and highest contraction in the beginning of the 1990s[x], output growth has been more stable in Croatia. The real GDP growth rate in the observed period resulted to be on average 3.44%, reaching the lowest rate in 2009 (-5.8%) as a spill over effect of the global recession. Figure 1 shows output growth rates and estimated output gaps in the period between 1995 and 2009.

Figure 1 *Output gap (left scale) and real output growth rates (right scale) in Croatia in the period between 1995 and 2009*
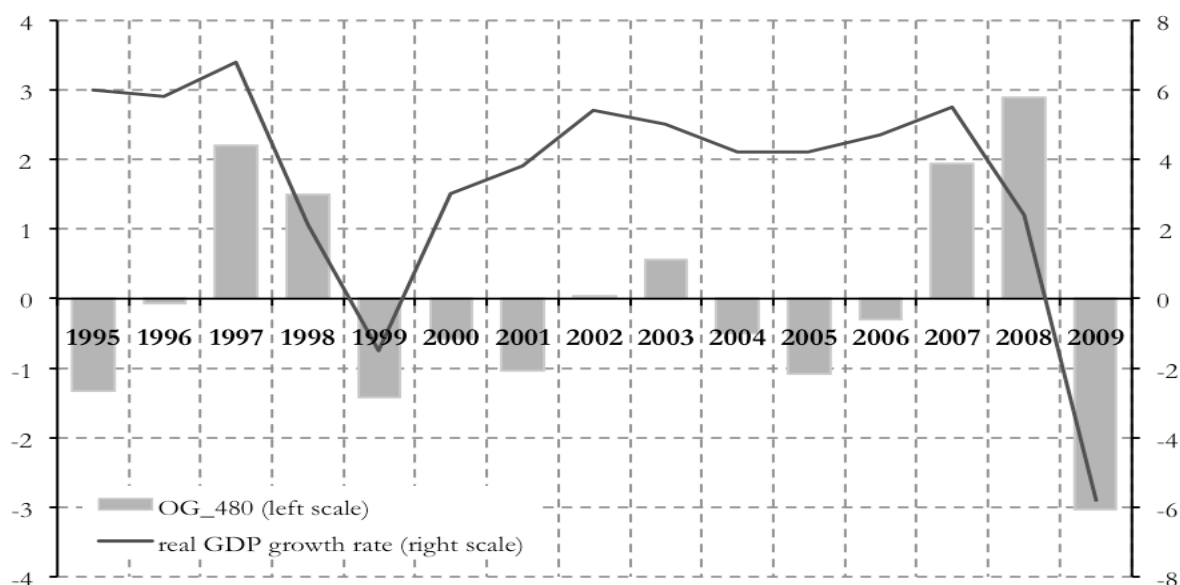
Source: Croatian Bureau of Statistics (2010); Author's calculation

When considering the relations between the output growth and the output gap it may be concluded that in the observed period Croatia faced twice phases of late contraction and twice of late expansions. The negative output gap and negative output growth rate were registered in 1999 and 2009, while a positive output gap along with positive growth rate was evidenced in 1997 and in the two-year period 2007-2008. Interesting to notice is that the early expansion phase in the period between 2000 and 2002 was not followed by a late expansion phase but by an early contraction phase in 2003, meaning that there was no boom (or prosperity) in the Croatian economy but just a recovery phase[xi].

In the observed period the central government budget balance was on average 3.8 billions kunas in deficit (Figure 2). Nominally speaking, the highest deficit is registered in 2009 (10.1 billions kunas), but still, when expressing the balance in per cent of gross domestic product the lowest deficit was recorded in 2000 (4.18% GDP).

Figure 2 *Central government budget balance in millions HRK (left scale) and in percentage GDP (right scale) in Croatia in the period between 1995 and 2009*
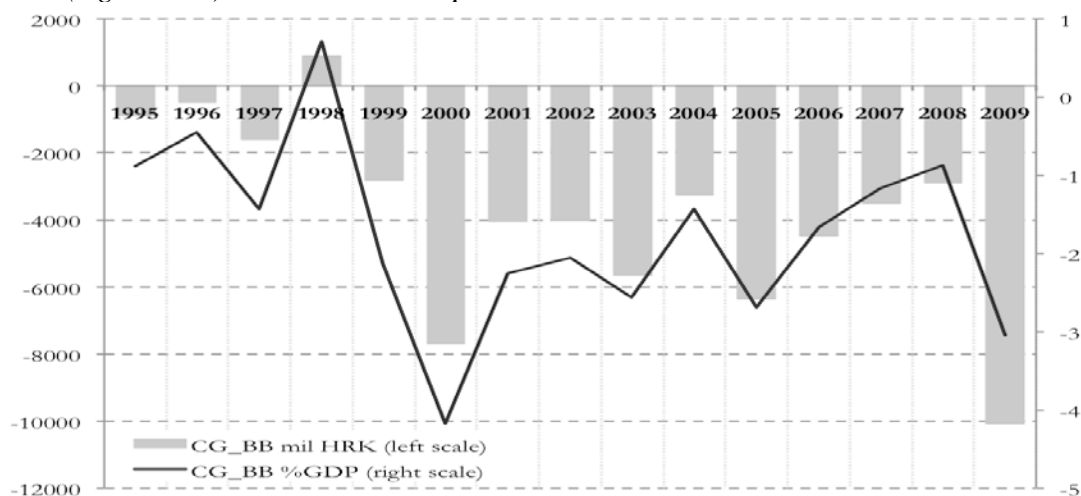
Note: Central government (CG) budget balance is expressed according to GFSM 1986
Source: Ministry of finance's Statistical Report (several issues); Author's calculation

The central government budget balance faced a deficit through the whole observed period fluctuating around -1.75% of GDP, except in 1998 when the newly introduced value added tax (VAT) replaced the sales tax and lead to a rapid growth in budgetary revenues. From then on, VAT revenues became the most abundant tax revenue in Croatia, accounting on average 12.47% of GDP in the observed period.

Direct taxes add up to 6.06% GDP on average and have a small contribution to central government revenues. Interesting to notice is that the personal income tax (PIT) revenue decreased its financial importance during the observed period, while the corporate income tax (CIT) revenue moved in the opposite direction (Table 1). Lower PIT revenues are due to numerous changes in the personal income tax legislation, that included raising the level of personal allowance, widening and adding tax brackets, reducing tax rates and introducing deductions[xii].

Table 1 *Fiscal ratios in Croatia, percent GDP*

	1995	1997	1999	2001	2003	2005	2007	2009	Average 95-09
TOTAL REVENUE	43.96	43.02	47.54	37.09	35.67	35.15	36.26	34.41	**38.89**
Direct taxes	*6.82*	*6.86*	*6.99*	*4.72*	*5.04*	*5.02*	*6.74*	*5.96*	*6.06*
Personal income tax	5.80	5.41	5.32	3.69	3.69	3.52	3.94	3.13	4.38
Corporate income tax	1.02	1.44	1.67	1.04	1.36	1.50	2.81	2.83	1.68
Indirect taxes	-	-	*18.30*	*16.22*	*15.82*	*15.22*	*15.87*	*14.42*	*16.22**
Value added tax	-	-	13.97	12.19	12.38	12.14	12.01	11.12	12.47*
Excise	5.04	4.33	4.33	4.02	3.44	3.08	3.86	3.30	3.95
Social security contributions	*16.25*	*16.01*	*13.76*	*11.34*	*10.53*	*10.38*	*10.34*	*12.04*	*12.36*
TOTAL EXPENDITURE	44.84	44.46	49.68	39.35	38.24	37.84	37.43	37.46	**40.64**
Unemployment-related expenditure	0.27	0.43	0.38	0.38	0.33	0.34	0.24	0.38	0.34
BUDGET BALANCE - CG	-0.88	-1.44	-2.13	-2.26	-2.57	-2.69	-1.17	-3.05	**-1.75**

Note: * The average value accounts for the period from 1998 until 2009

Central government (CG) budget balance is expressed according to GFSM 1986

Source: Ministry of finance's Statistical Report (several issues)

In the observed period total revenue amounted on average 38.89% of GDP, while total expenditure 40.64% of GDP. When considering taxes only, Croatia has a relatively high level of indirect taxes measured in terms of GDP, which is usually a characteristic of developing (or emerging) countries, while developed countries' tax system rely mostly on revenue from direct taxation. Indirect tax revenues in Croatia on average amount to 16.22%. The important role of indirect taxes among fiscal revenues may result in a greater influence of fluctuations in private consumption on the overall budget balance.

3.2. THE CYCLICALLY ADJUSTED BUDGET BALANCE

As mentioned previously, a variety of approaches have been developed to decompose government revenue and expenditure into cyclical and structural components. This research is based on the **European Commission approach**.

At the Ecofin Council meeting of May 2004, the European Commission decided that for the estimation of the output gaps the production function constitutes the reference method when assessing the cyclically adjusted budget balance. Moreover, the Hodrick-Prescott filter is to be used when assessing the stability and convergence programme for the new member states (NMS-12)[xiii] and remains a backup method for old member states.

The European Commission estimates budgetary elasticities for different revenue and expenditure categories according to the approach developed by the OECD and outlined in Giorno et al. (1995), van den Noord (2000) and Girouard and Andre (2005). The revenue sensitivity is a weighted average of four revenue elasticities (i.e. PIT, CIT, social security contributions and indirect taxes), whereby different components are weighted by their respective share in total revenue[xiv]. The expenditure sensitivity takes only into account unemployment related expenditure, which are assumed to be the only expenditure that «automatically» reacts to cycle fluctuations. However, it is important to notice that in their recent research, Darby and Melitz (2008) show that social spending like health and retirement benefits schemes are more countercyclical than generally acknowledged.

The overall cyclical sensitivity of the budget to the economic cycle measured by the semi-elasticity of the budget balance (as % GDP) with respect to the output gap for Croatia is shown in Table 2.

Table 2 *Summary of elasticities and the overall budget sensitivity in Croatia*

| Personal income tax	Social security contributions	Corporate income tax	Indirect taxes	Current expenditure	**Overall budget balance elasticity**
0.36	0.32	1.31	0.50	-0.01	**0.47**

Note: Estimations for the mentioned budgetary items is presented in Appendix 2
Source: Author's calculation

The overall output elasticity of income tax in Croatia is estimated to be 0.36% of GDP[xv]. This result is lower than the same in OECD countries and EU member states, where amounts on average to 1.0%. Such a result is due to a lower degree of progressivity in the personal income taxation[xvi] (OECD average 1.7%, Euro area average 2,0%, Croatia 1.2%) and lower output elasticity of employment (OECD average 0.6%, Croatia 0.2%). The elasticity of social security contributions in Croatia is also below the EU and OECD average[xvii].

The CIT elasticity is consistent with the OECD and Euro area average (1.5% and 1.4% respectively). Although the corporate tax in Croatia is proportional (as in most countries), the elasticity above unity is due to the fact that profits are fairly elastic with respect to output (Girouard and Andre, 2005). Additionally, when interpreting this elasticity, it is important to have in mind the treatment of profits and losses, and the provisions for carrying losses forward in other tax years, which in Croatia accounts for most five years. Figure 3 shows the estimation of the cyclical and structural component along with the actual budget balance and output gap for Croatia between 1995 and 2009.

Figure 3 *Output gap (OG) and actual, cyclical and cyclically adjusted budget balance (ABB, CBB and CABB respectively) in Croatia in the period between 1995 and 2009, percent GDP*
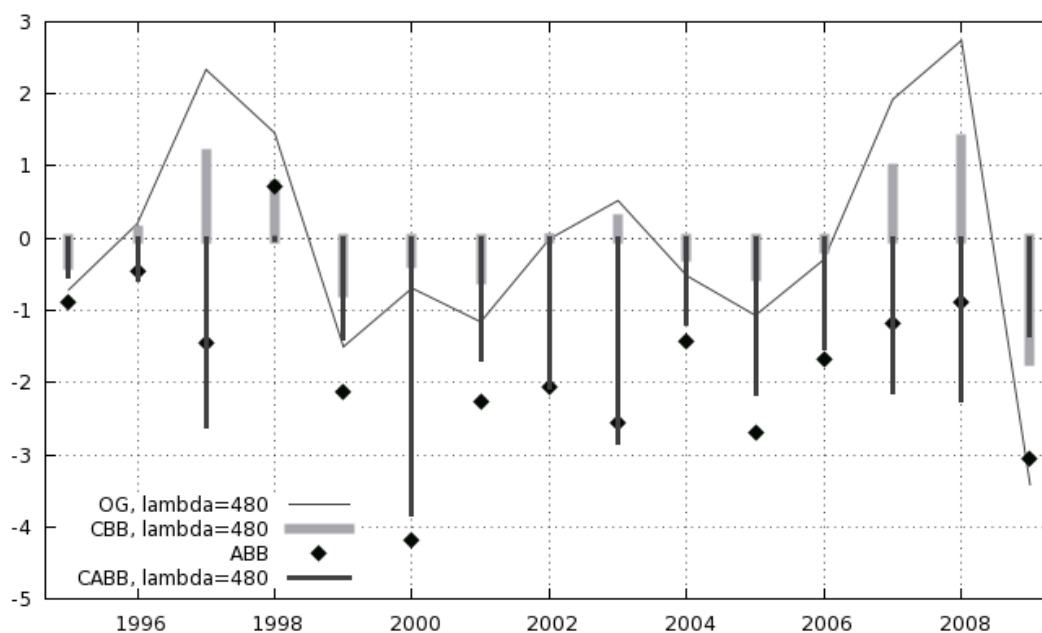

Source: Author's calculation

In the observed period the cyclical and cyclically adjusted budget balance were both on average in deficit by 0.01% and 1.74% of GDP, respectively. In the phases of late expansion and negative budget balance, the cyclical component registers a surplus, mainly because a high revenue's reaction to the increase in aggregate demand, which makes the actual budget deficit lower than the cyclically adjusted budget deficit.

When considering the size of the cyclical component, under a level of uncertainty it may be concluded that automatic stabilizers are not so strong in Croatia. This may be due to the fact that they may be constraint by the combination of low tax elasticities and a relatively low share of taxes in GDP that tends to reduce the responsiveness of revenues to demand shocks. Additionally, the role of expenditure stabilizers may be small because of the general absence of formal unemployment and social security compensation schemes.

Moreover, Debrun and Kapoor (2010) show that automatic stabilizers strongly contribute to output stability regardless of the type of economy (advanced or emerging), confirming the effectiveness of timely, predictable and symmetric fiscal impulses in stabilizing output. Deroose, Larch and Schaechter (2008) argue that *«it is predominantly the differences in size of governments that impact **how strong automatic stabilizers are»** and stress that the government size reveals sufficient information on the magnitude of automatic stabilizers in different countries. In addition, van den Noord (2000) firstly, and Girouard and Andre (2005) afterwards, suggest that the most important factor in determining the cyclical sensitivity of the fiscal position is the size of the general government sector. The larger the share of government expenditure in domestic output, the greater the sensitivity of fiscal position to fluctuations in economic activity. The IMF (2009) uses for instance the aggregate tax to GDP ratio as a proxy for size of automatic stabilizers in G-20 countries.

Figure 4. *Overall budget sensitivity and the government size (proxied by government expenditure in upper panel and by government revenue in lower panel) in EU and Croatia*
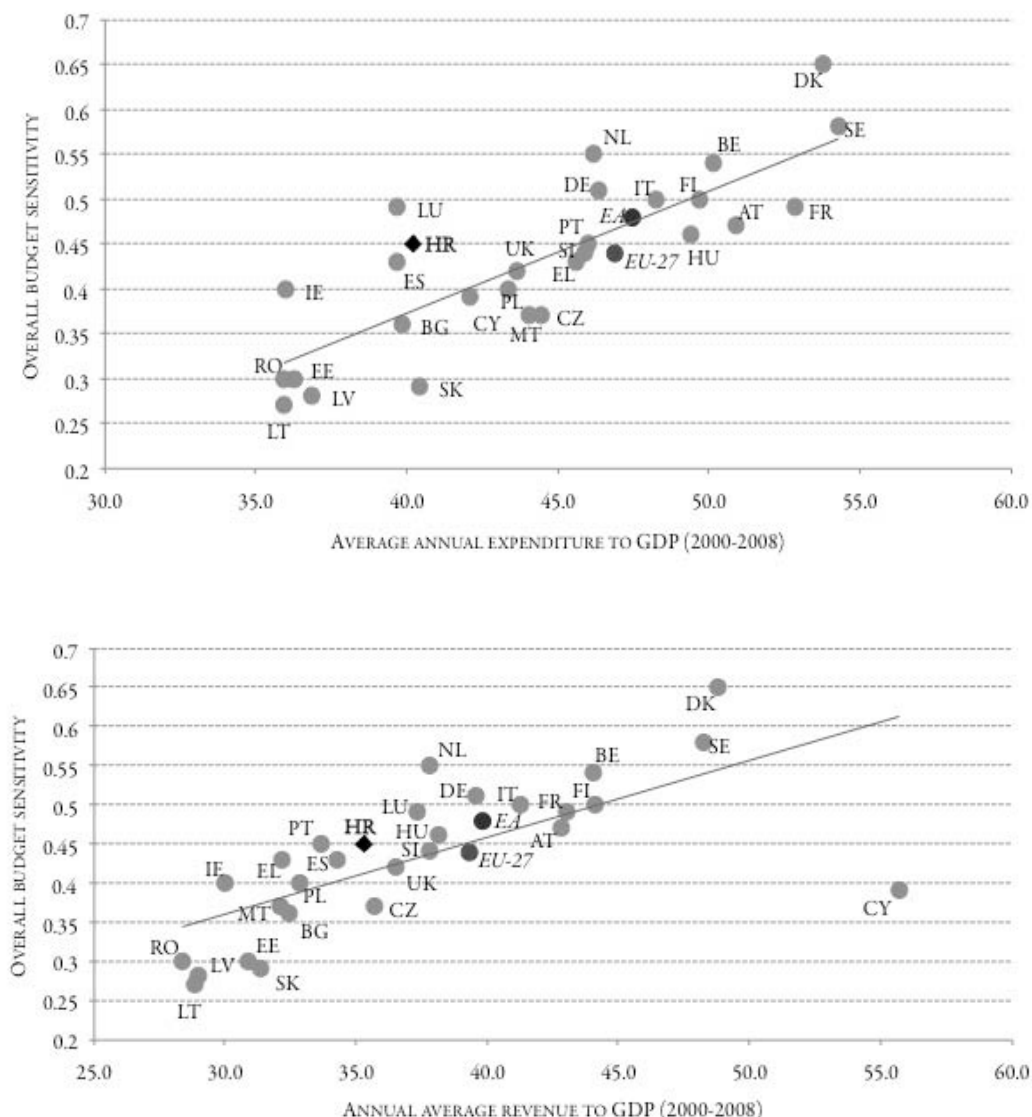
Note: The revenue category includes receipts from taxes and social security contributions.
      Both revenue and expenditure data account for the general government.
Source: Eurostat (2010), Eller (2009), Ministry of finance's Yearbook (several issues), Author's calculation

    With a correlation of 0.82 in case of annual expenditure (higher panel of Figure 4), and a correlation of 0.71 in case of annual revenue (lower panel of Figure 4), it may be concluded that government size is a good predictor for the amount of automatic stabilization.

    Figure 4 shows that automatic stabilizers (proxied by the government size) are very heterogeneous within EU member states. Lower automatic stabilizers are evidenced in NMS-12 and Croatia, although a lower average income (and wealth) registered in these countries should oppositely imply households to be more vulnerable to changes in aggregate demand. One reason of that could be that countries with lower per capita income tend to have smaller public sectors. From this perspective, weaker automatic stabilizers in Eastern and Southern European countries can potentially be an unintended side effect of the lower demand for government activity including redistribution. Another potential explanation could be the idea

that more open economies have weaker automatic stabilizers because domestic demand spills over to other countries.

Eller (2009) shows that the automatic stabilization function of tax and expenditure systems is not as strongly pronounced in the NMS-12 as in the euro area. He showed that a 1% drop in GDP reduces total government revenues by around 1%. As a consequence, the revenue (measured as percentages of GDP) remain almost constant over the business cycle in the euro area and in most of the developing European countries. The response of government expenditure to changes in output proved to be rather inelastic, because a 1% decline in GDP drives up government spending by 0.10% in the NMS-12 countries and 0.17% in the euro area. Auerbach (2002) shows that changes in the cyclical budget balance in the United States roughly offset one third of the output gap. The European Commission stresses that automatic stabilizers cushions changes in output between one tenth and one quarter depending on the degree of openness of countries and the structure of their public finance (European, Commission, 2008).

Oppositely to the automatic stabilizers, some countries decide to rely on discretionary actions when stabilizing the output or designing a more efficient fiscal system. As mentioned previously, changes in the cyclically adjusted budget balance can be (with caution) seen as discretionary fiscal policy. Positive changes in the cyclically adjusted balance are usually interpreted as indicator of restrictive fiscal policy, while negative changes are related to expansionary measures. So for instance, countercyclical (and stabilizing) fiscal policy is registered when during a negative output gap fiscal authorities implement expansionary discretionary measures (showed by a deterioration in the cyclically adjusted budget balance) or when, during a positive output gap restrictive measures are taken. Oppositely, pro-cyclicality is evidenced. If changes in the cyclically adjusted balance are considered then it is possible to say that in the observed period fiscal policy in Croatia was pro- and counter-cyclical (Figure 5).

Figure 5 *Changes in the cyclically adjusted budget balance (d_CABB) and output gap (OG) in Croatia for the period between 1995 and 2009, percent GDP*
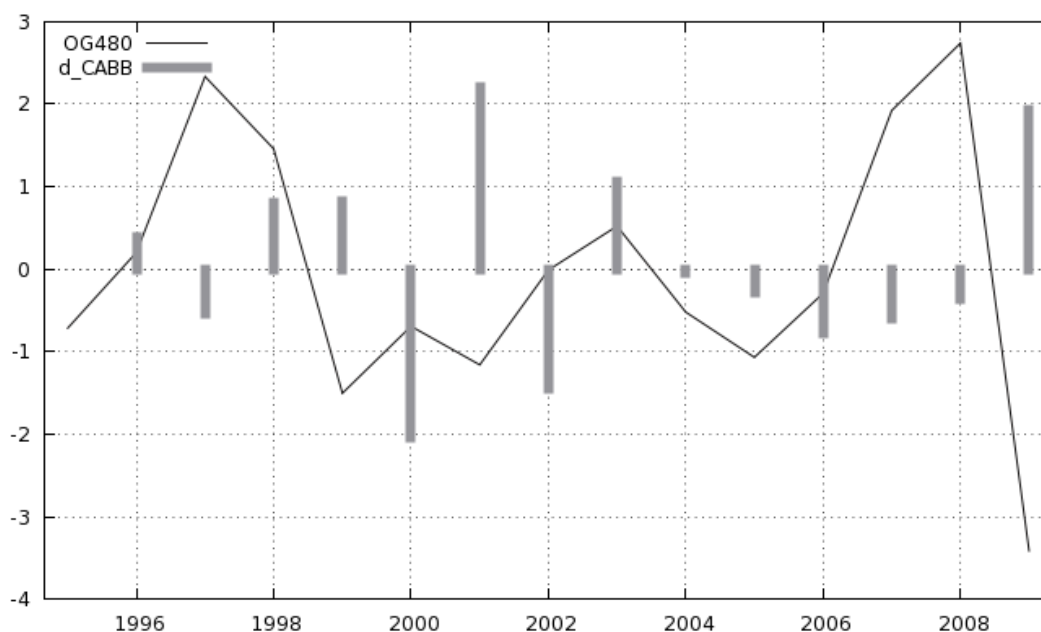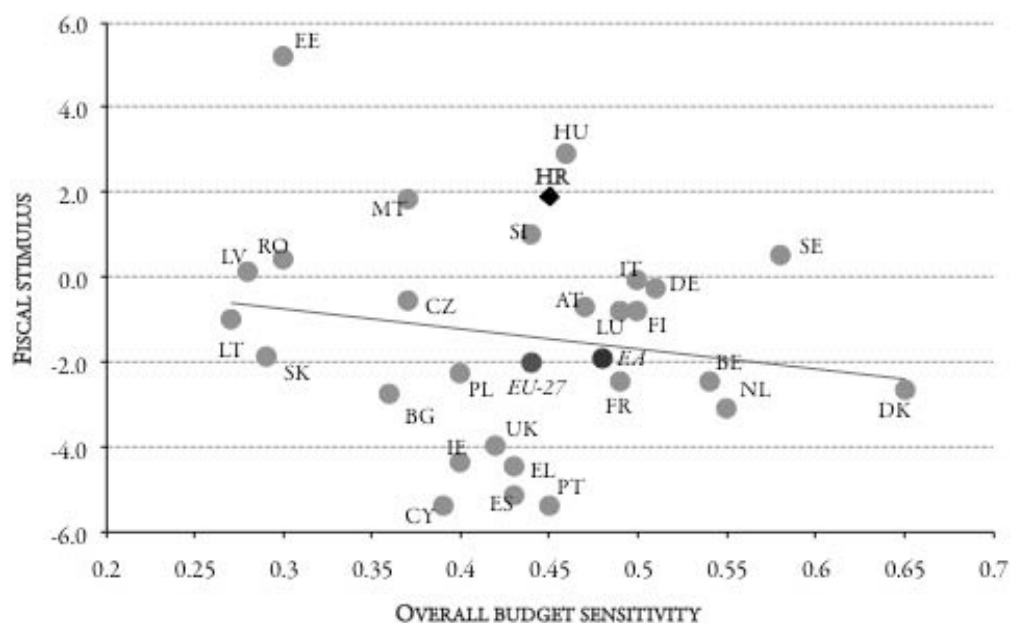

Source: Author's calculation

Figure 5 shows that until year 2000, fiscal authorities carried out alternating counter- and pro-cyclical discretionary policy[xviii]. Kaminsky et al (2004) emphasize that in emerging economies the often-registered pro-cyclicality of fiscal policy reflects a bias in discretionary fiscal policy, so enhancing automatic stabilizers would provide some counter-cyclical pushback. In the period between 2004 and 2008 Croatian fiscal policy was expansionary, but did not follow business cycle movements, i.e. until year 2006 expansionary fiscal policy was counter-cyclical (and thus stabilizing) due to contraction phase, but from 2006 onward the output gap results to be positive and thus expansionary fiscal policy becomes pro-cyclical. Although Švaljek, Vizek and Mervar (2009) using the ESCB approach show lower values of the cyclically adjusted budget balance as a consequence of higher values of budgetary revenue elasticity per tax category[xix], the estimated fiscal policy stance in their work reflects the same direction as in this research, except for year 1997.

Cimadomo (2005) estimated that the fiscal policy is neutral for small variations of the cyclically adjusted budget balance (between -0.2 and 0.2 percentage points). Being that the fact Figure 5 shows that Croatian fiscal policy may be considered neutral in 2004, when the change in cyclically adjusted budget balance respect to year 2003 amounted to -0.04% of GDP. In all other periods changes were above the threshold set by Cimadomo (2005).

Although international institutions point that fiscal stabilization should be mainly performed by the work of automatic stabilizers, the debate on discretionary measures arose during the latest crisis (from mid 2008 on). Some countries have even been criticized for being unwilling to enact fiscal stimulus programs in order to stabilize demand (in particular Germany). One reaction to this criticism was to point the fact that automatic stabilizers (in Germany) are more important than in other countries, so that less discretionary actions are required. This may rise the question whether countries with weaker automatic stabilizers did take more discretionary actions. In order to "put" some light on this issue, the size of fiscal stimulus (i.e. change in the cyclically adjusted budget balance in 2009 against 2008) is related to the sensitivity coefficient (Figure 6).

Figure 6 *Fiscal stimulus (as change in the structural budget balance in 2009 against 2008) and overall budget sensitivity in EU member states and Croatia, per cent GDP*

Source: European Commission (2009), Eller (2009) and Author's calculation

Figure 6 shows that the stabilization coefficients are largely uncorrelated with the size of fiscal stimulus (-0.17)[xx], meaning that countries with lower automatic stabilizers have not hired more discretionary measures.

Generally, in case of contraction a fiscal stimulus refers to tax cuts and spending increase, in order to raise the overall state of the economy. Although therefore negative values of changes in the cyclically adjusted budget balance are expected (as sign of expansionary measures), a number of countries exercised restrictive fiscal policy in the beginning of the current crisis in 2009, amid which Croatia registers the second highest positive value. In the Croatian case, the government consciously refused to aknowledge that the global economic crises embraced Croatia prior to the first quarter in 2009, although its effects were registered even before. Additionally, instead of tax cuts, some new taxes[xxi] were introduced and the VAT tax rate was raised by one percentage point, which obviously results more to be a fiscal "de-stimulus".

Moreover, if the crisis is observed as a negative extarnality, it is obvious that due to the openness of an economy it may show spill-over effects on any economy related to the one of origin. If fiscal stimulus is considered as a positive externality, then some countries may show a free-rider behaviour and profit from spill-over effects of discretionary measures taken by another country, because the potential positive effects of fiscal stimulus are not limited to the country of origin. Dolls et al (2010) support this hypothesis and find a negative correlation (-0.4) between discretionary measures and the openess coefficient (measured as the ratio of exports and imports to GDP) on the sample of 19 EU member states and the US. In this context it is important to notice that, being a small open economy, Croatia is exposed to sporadic and often unpredictable events that affect its economic performance. Historically, events outside of Croatia's control have affected the welfare of its citizens because the country and the government have had to adjust their level of consumption and investment in line with economic conditions.

4. PRACTICAL IMPLICATIONS AND POLICY RECOMMENDATIONS

The important task that arises is *to what extent the fluctuations in the budget balance should be automatic or discretionary*?, or *what is preferable: weak automatic stabilizers supplemented with discretionary fiscal policy or stronger automatic stabilizers?* The latter has the advantage that it is more predictable in the sense that fiscal policy follows well-defined rules. Another advantage of «automatic» fiscal policy is that it avoids decision and implementation lags. Nevertheless, strong automatic stabilizers may turn out to be problematic when economy faces significant, permanent and negative shocks.

According to the European Commission's SGP, excessive deficits must be prevented and rapidly corrected. The reference value for government deficit is 3.0% of GDP, as set by the Maastricht Treaty convergence criteria. A deficit exceeding this threshold is considered exceptional only if it the result from an unusual event outside the control of the member state, or if it the result of a severe economic downturn (negative annual output growth over a prolonged period of very low annual growth).

The main logic of the SGP provision is to ensure sound budgetary policies on a permanent basis. The SGP lays down the obligation for Member States' commitments to adhere to the their medium-term budgetary objectives for their budgetary positions of "close to balance or in surplus, as defined under country-specific considerations. Adjusting to such positions allows Member States to deal with normal cyclical fluctuations without breaching the 3% of GDP reference value for the government deficit.

In March 2003 the Ecofin Council amended the SGP with a norm that should have a clear effect of improving counter-cyclicality during upturns (Cimadomo, 2005). It was recommended that member states with a deficit exceeding the "close to balance or surplus" requirement should improve their cyclically adjusted budget position by 0.5% of GDP. Cimadomo (2005) shows that the hypothesis of counter-cyclicality holds in downturn but in upturns a pro-cyclical bias is registered.

If considering a "hypothetical" Croatian case embraced by the SGP requirements, it is noticeable that in 2000 and 2009 the budget deficit did exceed the convergence criteria. Year 2009 may also be considered as exceptional due to the global crises spill-over effects. Still in year 2000 there was no particular downturn that caused the deficit exceeding the threshold of 3% GDP, but parliamentarian elections and results in that year affected the openness of the economy. Therefore, that would be (*a posteriori*) the year when the Ecofin Council would implement the excessive deficit procedure and follow the given Ecofin measures. Important to stress is that in order to maintain sound fiscal positions provisions according to the SGP are made *a priori*, i.e. based on estimated movements of the budget balance. Additionally, if a member state exceeds the given deficit threshold in three consecutive years, the European Commission can impose a fine up to 0.5% of that country's GDP.

The Croatian fiscal system has been undergoing numerous structural changes from the beginning of the 1990s. Still, there are a lot of remaining "structural" goals to reach (as for instance social security reforms and fiscal decentralization) and discretion is probably going to remain dominant in the Croatian fiscal policy. Nevertheless, strengthening automatic stabilizers would pose a big challenge and ensure better fiscal performance[xxii].

One way automatic stabilizers could be enhanced is by rising the shares of taxes collected from income-based taxes and thus increase their respective elasticities. In Croatia for instance the PIT could be made more progressive (increase the real wage elasticity of income tax per worker). The obtained elasticity of 1.21% is below the EU-27 average and the personal income taxation was based up to just four tax brackets until 2009, while in 2010 the tax brackets have been reduced to three. However, empirical practice shows that it would lead to a small increase in automatic stabilizers. Baunsgaard and Symansky (2009) showed that a shift in the composition of tax revenue by 5 percentage points from indirect taxes to PIT across G-20 countries would increase the automatic stabilization average by 0.05 percentage of GDP.

Another way of enlarging the role of automatic stabilizers could be by designing appropriate fiscal policy rules. Because fiscal rules can require discretionary policy changes that offset the operation of automatic stabilizers, the impact of fiscal rules will differ depending on the type of a rule (debt rule, deficit/balance rule, cyclically adjusted balance rule, expenditure rule, combination of any of those).

Targeting the cyclically adjusted balance instead of the nominal figures of actual budget balance would lead to financial sustainability of public policies, permitting a better long-term planning of social programmes and enhancing fiscal debt sustainability. The structural balance is intrinsically counter-cyclical in that it permits fiscal deficits when the economy is performing significantly below potential and surpluses when the opposite is registered. In this way it serves to attenuate both the economy's highs and lows[xxiii].

In the Croatian case for instance, in the observed period the total public debt was on average 69.2 billions kunas large, in which external debt accounts for 32 billions kunas. On average the Croatian government interest payments per year amount to 3.2 billions kunas.

Figure 7 shows public debt and interest payment and cyclically adjusted budget balance in Croatia, all expressed as percentage of GDP.

Figure 7 *Public debt (left scale), interest payments and cyclically adjusted budget balance (both left scale) in Croatia in the period between 1995 and 2009, per cent GDP*
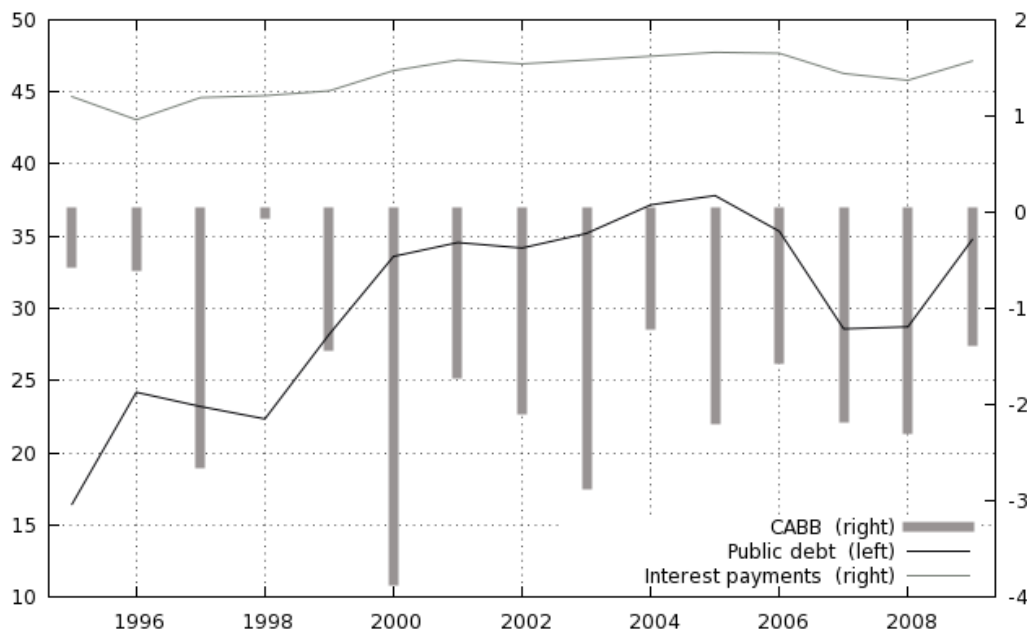
Source: Croatian National Bank (2010) and Author's calculations

In the observed period public debt accounts on average to 30.3% of GDP, while interest payments amount to 1.42% of GDP on average. If the cyclically adjusted balance is considered the Croatian fiscal income was through the whole period negative. It can be noticed that the increase (decrease) in public debt follows the increase (decrease) of the structural budget balance. Targeting the cyclically adjusted budget balance (instead of the actual budget balance) could improve fiscal position and fiscal surveillance in Croatia and would help reduce pro-cyclicality and provide protection from external crises. Doing all that it would ensure a more balanced budget and therefore less need for public debt, which can allow for reallocation of public resources previously devoted to debt servicing. Savings from debt servicing can be used to finance social programmes and investments that stimulate economic growth. Moreover, Marcel et al (2003) show that conducting fiscal policy based on a cyclically adjusted balance target contribute to reduce the amplitude of economic cycles and ensures an adequate dynamics in the accumulation of assets.

Fiscal rules based on fiscal balance work against the stabilizers. If cyclical balance deteriorates, a fiscal balance rule (involving a ceiling of the balance in nominal figures or per cent GDP) requires offsetting discretionary tightening. Likewise, revenue rules, including linking expenditure to some revenues will also typically involve pro-cyclicality. Avoiding pro-cyclicality in a balanced budget rule is important in a fiscal rule design.

Solutions essentially involve balance-over-the-cycle rules or rules on structural balances. Balancing budgets over the business cycle ensures countercyclical fiscal policy by allowing the automatic stabilizers to operate freely, while discretionary countercyclical actions are also allowed. Additionally, such rules allow for better public debt management,

servicing and sustainability, which lead to increase in public saving that can ensure financing social or other government programs.

5. CONCLUSION

The structure of the tax and expenditure system automatically stabilizes the business cycle in at least three ways (Eller, 2009). First, tax bases (such as income, profit or consumption) weaken/strengthen and thus the overall tax burden decreases/increases. Second, the public expenditure category with unemployment related benefits with the most pronounced countercyclical path, decreases as the number of unemployed go down. Third, many expenditure categories improve the stabilizing effects of fiscal policy as they show to be inactive in adjusting over the business cycle.

The overall responsiveness of the budget to cycle fluctuations in Croatia in the observed period is 0.47% and the cyclical budget balance was on average in deficit by 0.01% of GDP. Countercyclical (and stabilizing) periods in the Croatian economy are observed in the period between 1998 and 2000, and then in 2005, while fiscal authorities carried out pro-cyclical discretionary policy during an expansion phase in 1997 and 2007, which even amplified the actual budget deficit. When comparing results these results with those in other countries, automatic stabilization in Croatia seems to be in line with the same in NMS-12 or CESEE countries, but below the average of developed countries.

Results shows that there is a lot of discretion in Croatia and that automatic stabilizers are weak and comparable to those in other emerging economies. Nevertheless, there is a global tendency that fiscal stabilization should mainly be performed by the work of automatic stabilizers rather than discretionary fiscal policy. But, important to notice is that institutions traditionally seen as symbol of fiscal austerity (such as the IMF and EC) have endorsed large fiscal stimulus packages during the severe downturn occurred in 2008 and 2009, and thus opted discretionary fiscal policy. The broad agreement on the need of fiscal stimulus is undoubtedly linked to the fact that the current global crisis is not a simple cyclical downturn but a deep recession.

Discretionary fiscal stimulus in OECD and EU countries has focused on 2009, with the 2010 amounts generally representing phased implementation of spending programs initiated in 2009 and the carryover of tax measures. In 2009 fiscal stimulus amounted to 1.8% of GDP in G-20 and OECD countries, and 2.0% of GDP in EU member states. Fiscal stimulus packages in the same year in Croatia are not registered. Fiscal authorities increased tax rates and introduced new taxes in 2008 and 2009 mainly because of lower budgetary revenues without considering their side effects especially when considering that the economy faces a late contraction phase. Additionally, in 2010 the government retracted most of the tax discounts involving personal and corporate income taxation.

A key factor that can explain differences in fiscal stimulus and the need for the latter across countries is the size of automatic stabilizers. Countries in which the automatic stabilizers are larger have generally less need to rely on discretionary stimulus. Still, the recent crises proved to be a deep recession so discretionary actions were crucial in countries with both weak and strong automatic stabilizers. Although Croatia has a relatively weak automatic stabilization, there is room for enlarging the role of automatic stabilizers.

Anyhow, once again it is worth mentioning that all the obtained results should be taken with caution because, first of all, the statistical method for estimating business cycles would require a longer series, which is unavailable for transition economies as in the Croatian

case. Second, the cyclically adjusted budget balance highly depends on the quality of the government revenue and expenditure data; therefore an analysis based on general government data (reclassified according to GFSM 2001 for the period prior to 2004) would yield in more precise results. Third, the analysis assumes that the policy initiatives are undertaken as planned and not delayed. Still, pursuing some of the mentioned issues is intended in the future research.

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[i] For example, in boom times, governments collect more taxes and decrease the unemployment benefit support, which results in lowering private income to taxpayers and prevents the expansion in aggregate demand. Conversely, in recession times governments collect fewer taxes and increase unemployment benefit payments, which support private income and moderate the unfavourable movements in aggregate demand. For a deeper discussion on automatic stabilizers see van den Noord (2000) and Braconier and Holden (2001).

[ii] Amid the first to form and calculate an indicator, which would measure the level of the budget balance when the economy operates at a full employment level, was Brown in 1956 for the US economy and named it the *full employment surplus* (Brown, 1956). He showed that the assessment of fiscal policy in the US in the 1930s would have significantly changed if, instead of using the headline budget balance, it had been adjusted for the effect of unemployment.

[iii] The Stability and Growth Pact (SGP) is an agreement among EU member states that are part of the Euro zone to maintain the stability of the Economic and Monetary Union. The Pact was adopted in 1997 to maintain and enforce fiscal discipline in the Euro area. Member states adopting the euro have to meet the Maastricht convergence criteria and the Pact ensures the monitoring of the same criteria.

[iv] Although the IMF in its World Economic Outlook, the OECD in its Economic Outlook and, since recently, the EU in its European Economy regularly comment on fiscal positions in structural terms as measured by the cyclically adjusted balance, associating changes in structural deficit to discretionary policy interventions, in the early 2000s this practice gave rise to some disagreements in several EU member states when the cyclically adjusted budget balance was targeted for fiscal surveillance. Namely, observing a deterioration of the cyclically adjusted balance as expansionary fiscal stance, the European Commission blamed national fiscal authorities for deviations from budget plans on discretionary fiscal policy. In the same moment, national fiscal authorities maintained that the budget was implemented as firstly planned and that no increased discretionary spending was adopted. Such a disagreement pointed out one possible shortcoming of the cyclically adjusted balance because turned out to be related to two different points. On one side, *national governments often overestimated their medium-term growth*, while on the other side, the European Commission did not take into account that *the decline in potential economic growth affect the cyclically adjusted balance*.

[v] During the economic boom in the late 1990s the calculation of the cyclical component of the budget for some EU member states resulted to be overestimated, due to the assumption of constant elasticities. This fact misled national fiscal authorities to think that there was room for tax cuts and expenditure increase, which in the following years turned out to be unsustainable.

[vi] The European Commission showed first steps also toward considering the fact that it is necessary to analyze the behaviour of individual tax bases in order to perform a more precisely estimation of budgetary elasticities as according to the ESCB (ECB) approach (European Commission, 2008).

[vii] Same data limitation as well as consistency of the results using central government data for Croatia are also emphasized by Benazić (2006), Rukelj (2009) and Vučković (2010). Boije (2004) shows the breakdown of the cyclically adjusted budget balance for Sweden and stresses that "Fiscal policy decisions are usually referred to discretionary changes in revenues or expenditures that affect the central government budget" (p.10) while showing that discretionary fiscal policy in central government budget largely affected the structural budget balance. Moreover, there are other papers about cyclically adjusted budget balances in Finland, Sweden, all Scandinavian countries and Chile, in which the estimation is obtained using central government data (see for instance Brunila and Tujula (1998), Brunila, Hukkinen and Tujula (1999), Braconier and Holden (1999), Marcel et al (2001)).

[viii] As other methods for estimating potential output, so the Hodrick-Prescott filter has its shortcomings, which have to be noticed. A more detailed discussion on HP filtering and its *pro* and *cons* can be found in Guay and St-

Amant (1997), Ahamuda and Garegnani (1999), Ravn and Uhlig (2002) and Ivanov (2005), as well as the mentioned paper by Bouthevillain et al (2001).

[ix] Such choice follows empirical practice done by the European Commission and by the ESCB, which is based on the assumption that a business cycle in EU member states on average lasts 8 years. Therefore, the value of the smoothing parameter is set so that compression effects do not exceed 10 percent of the amplitude of cycles of up to 8 years (Bouthevillain et al., 2001, p. 30). As this analysis focuses on the Croatian case it is important to evidence that empirical practice of the HP filter on Croatian data show the use of $\lambda=300$ for quarterly data (see for instance Bačić et al., 2004; Cerovec, 2005 and Švaljek, 2003). This value is based on the assumption that a business cycle in Croatia lasts on average four years. Still, the mentioned researches for the Croatian case were based on the time series reaching the endpoint in year 2004 at most. During the period prior to 2004 business cycles were on average four year long due to high volatility of the economy, but when extending the series up to 2009 (as in this research) it can be noticed that the last business cycle is much longer and therefore increases the average business cycle length. The choice of not using $\lambda=300$ can be also validated by the fact that results obtained using such a smoothing parameter value were on average just 0.001 per cent (and at most 0.4 percent in year 2007) different from those when $\lambda=480$ was used. Being that the fact and in order for the results to be more comparable with those across European countries, $\lambda=480$ is chosen.

[x] From independence (year 1990) until 1994, Croatia was facing output declines above 7% GDP (evidenced real GDP growth rates were: -7.1% in 1990, -21.0% in 1991, -11.0% in 1992 and -8.0% in 1993).

[xi] In his analysis on the Croatian economic activity from 1999 till 2010, Krznar (2011) shows that the Croatian economy faced a recession in 1999 and 2008, which is same as in this paper. This is important because he used three different methodologies (the simple analysis of quarterly growth rates of GDP, the Bry-Boschanov algorithm and the Markov model) which all yield to same conclusions.

[xii] For a deeper discussion see Petrović (2007), Urban (2006a, 2009a, 2009b).

[xiii] New member states are those that joined the European Union during the 2004- and 2007-enlargement. These enlargements embrace Czech Republic, Cyprus, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia in 2004, and Bulgaria and Romania in 2007.

[xiv] According to the OECD approach the three categories of taxes plus social security contributions and unemployment related expenditure are weighted by their respective shares in GDP (Girouard and Andre, 2005), while according to the EC methodology weights are represented by their respective shares in total revenue.

[xv] It is important to point out that in the already mentioned research on cyclically adjusted budget balance in Croatia, done by Švaljek, Mervar and Vizek in 2009, the real wage elasticity of income tax per worker resulted to be higher and precisely 1.60, while in this paper it accounts for 1.21 (see Table A2:1) mainly due to the inclusion of the personal income surtax which is levied by local authorities on the basis of the calculated personal income tax liability. Inserting their value (1.60) in the personal income tax elasticity equation (see Appendix 2, equation 1) the output elasticity of income in Croatia would result higher and precisely 0.42 (instead of 0.36, as shown in Table 2 of this work). Still, there would be almost no change in the overall budget elasticity, because the latter is a result of weighted average, where the weight is the share of PIT in total revenues, which in Croatia is very small.

[xvi] According to van den Noord (2000) and showed in Appendix 2, the measure of progressivity of the personal income tax is proxied by the ratio between the marginal and average tax rates. Nevertheless, it is very important to notice that Urban (2006b) showed how the tax rates schedule in Croatia influence cause just 13% of the personal income tax progressivity, and that what actually makes it a lot more progressive are the personal allowances (91% of the progressivity is caused by the latter). In fact, in Croatia the basic personal allowance among tax payers highly differs upon two factors: (1) who and how many persons the tax payer is "sustaining", as for instance children, wife, mother, sister, etc., and (2) where does the tax payer live (different regions have different level of the basic personal allowance). Additionally Urban (2006b) stress that due to this fact, changing the personal income tax to a flat tax rate a very high level of progressivity would still hold.

[xvii] Although below the EU and OECD average it is important to stress that the estimated elasticities differ from those obtained by Švaljek, Mervar and Vizek (2009) using the ESCB approach. The differences lie in methodological divergence from the two methods used as well as in the smoothing parameter used in HP

filtering. Their elasticities are higher not only from those obtained in this paper but also from the EU and OECD average. Due to a particularly high elasticity obtained for personal income tax and social security contributions the authors performed also a so-called "non-econometric" approach which resulted in elasticities compared to those in this work.

[xviii] Counter-cyclical was in 1996, 1998 and 2000, while pro-cyclical in 1997 and 1999.

[xix] Differences in the estimation may be due to different methodological approaches, lower smoothing parameter for HP filter and shorter time series.

[xx] Dolls et al (2010) prove for the US and 19 EU member states same but lower (-0.10) un-correlation.

[xxi] On July 31st 2009 the so-called crisis tax was introduced (levied on net income above 3.000,00 HRK) along with some new fees that increased the cost of sending SMS and MMS in mobile communications.

[xxii] It is important to mention that from January 1st 2011 the Croatian government introduced the so-called Fiscal Responsibility Law (hrv. Zakon o fiskalnoj odgvornosti) which requests fiscal surveillance throughout monitoring the cyclically adjusted budget balance as well.

[xxiii] From the point of view of the central government's financial situation, a structural surplus can mean a drop in borrowing and in its costs, which makes possible to repay earlier borrowing, decrease new borrowing, leading to a sustained reduction in debt level.

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APPENDIX 1 GOVERNMENT FINANCE STATISTICS

The GFSM 2001 analytic framework differs considerably from the GFSM 1986 framework (see the Government Finance Statistics Manual 1986 and 2001; IMF (1986, 2001)). Figure A1:1 shows a broad overview of the relationship between GFSM 1986 and GFSM 2001 classification systems.

Figure A1:1 *Broad overview of reclassification between GFSM 1986 and GFSM 2001*
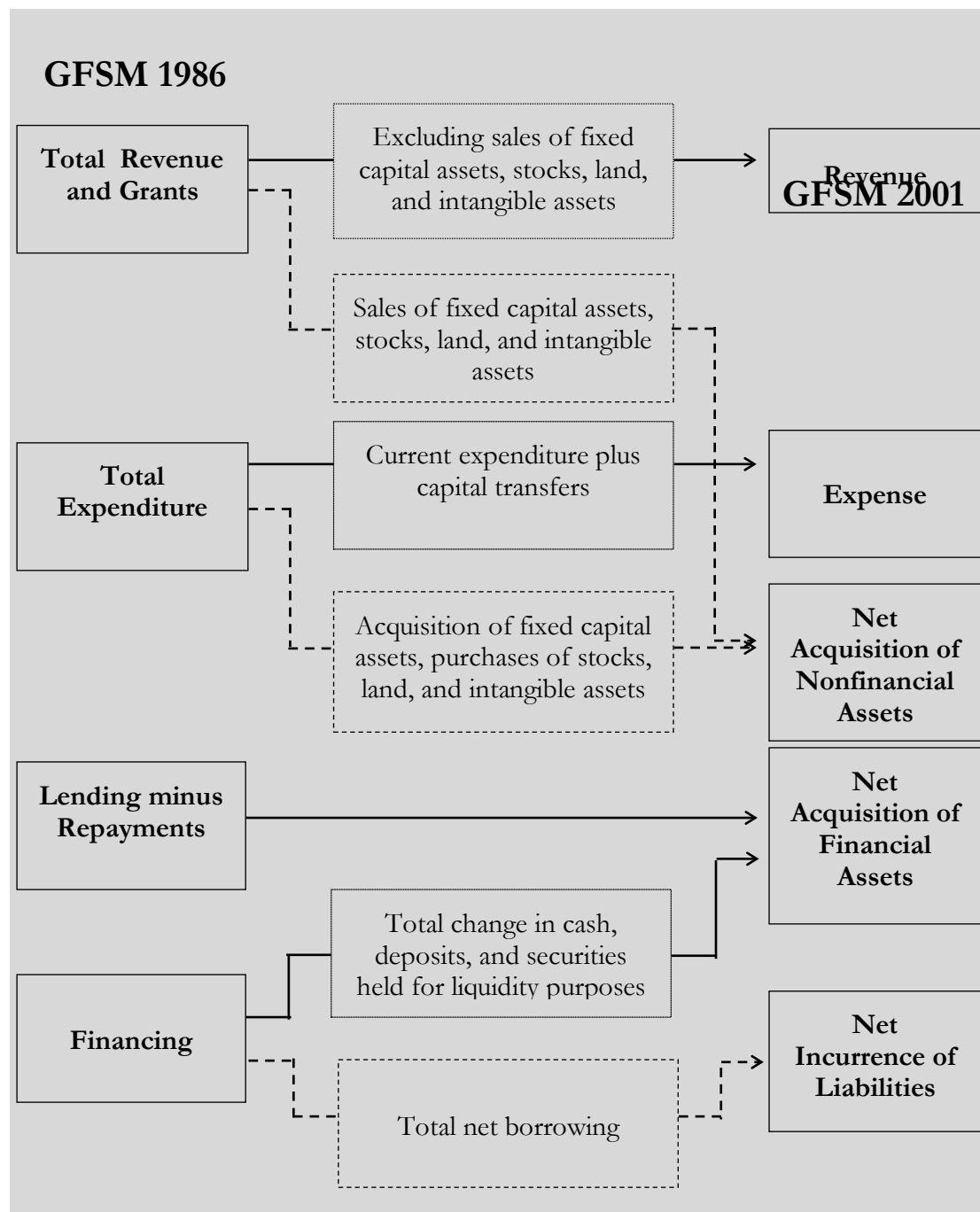
Source: Wickens (2002), IMF (1986), IMF (2001)

APPENDIX 2 BUDGETARY ITEM'S ELASTICITY - EUROPEAN COMMISSION APPROACH

All estimations use quarterly data that span the period from 1995:1 to 2009:4, except revenue from VAT which span from 1998:1 to 2009:4. In all cases the OLS estimator was applied to obtain the parameter values, as the chosen methodology suggests. Moreover, equations presented in this Appendix follow *van den Noord (2000)* and *Girourd and Andre (2005)*. Variables result to be stationary in logs and first differences, except in the case of indirect taxes and consumption, which are stationary in logs only. There is no autocorrelation at the 95% significance level. Due to the extension of the paper all diagnostic tests are available upon request.

The elasticity of the PIT α can be disaggregated as:

$$\alpha = \frac{\partial T}{\partial Y} \cdot \frac{Y}{T} = \frac{\partial[(T/L)\cdot L]}{\partial Y} \cdot \frac{Y}{T} =$$

$$= \underbrace{\left(\frac{\partial L}{\partial Y} \cdot \frac{Y}{L}\right)}_{(1a)} \cdot \left[1 + \underbrace{\left(\frac{\partial(T/L)}{\partial w} \cdot \frac{w}{T/L}\right)}_{(1b)} \cdot \underbrace{\left(\frac{\partial w}{\partial L} \cdot \frac{L}{w}\right)}_{(1c)}\right] \qquad (1)$$

where, *Y*, *T*, *L*, *w*, denote respectively output, tax proceeds, employment and wage rate.

The first term (1a) of equation (1) represent the *output elasticity of employment*. The term (1b) reflects the *wage elasticity of personal income tax yield per worker*. This elasticity is calculated as a ratio of the marginal and average tax rates for an average taxpayer (Giorno et al, 1995) and captures the progressivity of the tax system. The last term in the elasticity equation (1c) denotes the *employment elasticity of wages,* which should be interpreted as the Phillips' curve effect on wages.

Table A2:1 *Elasticity of PIT in Croatia*

Real wage elasticity of income tax per worker	Output elasticity of employment	Employment elasticity of wages	Output elasticity of personal income tax
A	B	C	D=B(1+AC)
1.21	0.16	1.03	0.36

Source: Author's calculation

The elasticity of the social security contributions follow the same equation (1), just the real wage elasticity of income tax per worker is substituted by the real wage elasticity of social security contributions per worker. This elasticity is set to 1%, in accordance with the proportional rate applied on the wage.

Table A2:2 *Elasticity of social security contributions in Croatia*

Real wage elasticity of social security contributions per worker	Output elasticity of employment	Employment elasticity of wages	Output elasticity of social security contributions
A	B	C	D=B(1+AC)
1.00	0.16	1.03	0.32

Source: Author's calculation

The elasticity for the CIT can be broken down in two sub-elasticity as:

$$\alpha = \frac{\partial T}{\partial Y} \cdot \frac{Y}{T} = \frac{\partial Z}{\partial Y} \cdot \frac{Y}{Z} = \frac{\partial (Y - wL)}{\partial Y} \cdot \frac{Y}{Z} =$$
$$= \left[1 - \left(1 - \frac{Z}{Y} \right) \cdot \left(\frac{\partial L}{\partial Y} \cdot \frac{Y}{L} \right) \cdot \left(1 + \frac{\partial w}{\partial L} \cdot \frac{L}{w} \right) \right] \cdot \frac{Y}{Z} \qquad (2)$$

$$\underset{(2a)}{} \quad \underset{(2c)}{}$$

where, *Y*, *T*, *L*, *Z*, *w*, denote respectively output, tax proceeds, employment, corporate income and wage rate.

Because the proportionality assumption implies that the tax elasticity is equal to the elasticity of the tax base (gross corporate profits) to output. The latter elasticity is the function of the elasticity of the wage bill with respect to output, which again, as in the case of PIT elasticity, can be decomposed in the output elasticity of employment (2a) and employment elasticity of wages (2c). For this reason equation (2) can be rewritten as:

$$\alpha = \left[1 - (1 - PS) \cdot \varepsilon_{wL,Y} \right] / PS \qquad (3)$$

where, PS is profit share in GDP and $\varepsilon_{wL,Y}$ the elasticity of the wage bill.

Table A2:3 *Elasticity of CIT in Croatia*

Gross corporate profits' share in GDP	Output elasticity of employment	Employment elasticity of wages	Output elasticity of corporate income tax
A	B	C	D=[1-(1-A)B(1+C)]/A
68%	0.16	1.03	1.31

Source: Author's calculation

The elasticity for indirect taxes is based on the assumption that the relevant tax base fluctuates in proportion with private consumption, so:

$$\alpha = \frac{\partial C}{\partial Y} \cdot \frac{Y}{C} \qquad (4)$$

where C is private consumption and Y output. Regression estimation showed this elasticity to be 0.5% of GDP.

Current budgetary expenditures are assumed to fluctuate in proportion to *unemployment related expenditures*. **The elasticity of expenditures** can be decomposed as follows:

$$\beta = \frac{\partial E}{\partial Y} \cdot \frac{Y}{E} = \left(\frac{UB}{E} \right) \cdot \left(\frac{\partial UB}{\partial Y} \cdot \frac{Y}{UB} \right) =$$
$$= \left(\frac{UB}{E} \right) \cdot \left(\frac{\partial U}{\partial Y} \cdot \frac{Y}{U} \right) = \left(\frac{UB}{G} \right) \cdot \left(\frac{\partial Ls - \partial L}{\partial L} \cdot \frac{\partial L}{\partial Y} \cdot \frac{Y}{U} \right) =$$
$$= -\left(\frac{UB}{E} \right) \cdot \left(\frac{\partial L}{\partial Y} \cdot \frac{Y}{L} \right) \cdot \left\{ \left[\frac{1 - \left(\frac{\partial Ls}{\partial L} \cdot \frac{L}{Ls} \right)}{\frac{U}{Ls}} \right] - 1 \right\} \qquad (5)$$

$$\underset{(5a)}{} \quad \underset{(5b)}{}$$

where, *U*, *UB*, *E*, L, *Ls*, denote respectively unemployment, unemployment related expenditure, total government expenditure, employment and łabour supply. It is assumed that unemployment related expenditure is strictly proportional to unemployment, whose variations are broken into (a) variations in employment (5a) and (b) variations in the labour force (5b).

Table A2:4 *Elasticity of current primary expenditure*

Output elasticity of employment	Employment elasticity of labour supply	Trend unemployment rate	Share of unemployment related expenditure in total expenditure	Output elasticity of unemployment related expenditure	Output elasticity of current primary expenditure
A	B	C	D	E=-A[(1-B)/C - 1]	F=DE
0.16	0.20	17.22%	0.85%	-0.58	-0.01

Source: Author's calculation

APPENDIX 3 DATA DEFINITION AND SOURCES

Variable symbol	Variable name and description	
Yr	**Real output**	
	Definition:	Real gross domestic products. The series spans from 1995-2009.
	Units:	1997 reference prices, HRK (national currency)
	Source:	For the period 1994-1997 Mikulić and Lovrinčević (2000); For the period 1998-2009 Croatian Bureau of Statistics' First Releases
L	**Employment**	
	Definition:	Total employment as the sum of persons employed in legal entities, persons employed in crafts and trades and free lances, and private farmers. The series spans from 1995-2009.
	Units:	Persons
	Source:	Croatian Bureau of Statistics' First Releases
Ls	**Labour supply**	
	Definition:	Total labour force. The series spans from 1995-2009.
	Units:	Persons
	Source:	Croatian Bureau of Statistics' First Releases
Lsp	**Potential labour supply**	
	Definition:	Total labour force. The series spans from 1995-2009.
	Units:	Persons (trend)
	Source:	Croatian Bureau of Statistics' First Releases

wL	**Real aggregated wage bill**

Definition: The aggregated wage bill is obtained by multiplicating the number of persons in employment by their respective gross wage. This series is built in the following way: (1) for persons employed in legal entities – the number of persons employed in sectors according to the National Classification of Activities is multiplied by the respective average gross wage per sector; (2) for persons employed in crafts and trades and free lances – up to year 1998 the number of persons employed in this group is multiplied by the average gross wage resulted from employment in legal entities because the unavailability of gross wage data for crafts and trades and free lances. For the period after 1998 the number of persons employed in crafts and trades and free lances classified according to the National Classification of Activities is multiplied by their respective gross wage according to the same Classification; (3) private farmers – the number of employed as private farmers is multiplied by the gross wage of those employed in legal entities in the agricultural sector.

The series is deflated by the GDP deflator.

The series spans from 1995-2009.

Units: Current price, HRK (national currency)

Source: Croatian Bureau of Statistics' First Releases

w	**Real wage**

Definition: Real gross wage per employee, i.e. the real aggregated wage bill divided by the employment.

The series spans from 1995-2009.

Units: Current price, HRK (national currency)

Source: Croatian Bureau of Statistics' First Releases

Z	**Gross corporate profits**

Definition: Gross corporate profits are obtained by substracting the real aggregated wage bill from the real gross added value.

The series spans from 1997-2009

Units: 1997 reference prices, HRK (national currency)

Source: Croatian Bureau of Statistics' First Releases

CIT	**Corporate income tax**

Definition: Budgetary revenue from corporate income taxation.

The series spans from 1995-2009.

Units: Current price, HRK (national currency)

Source: Ministry of Finance, Republic of Croatia

PIT	**Personal income tax**

Definition: Budgetary revenue from personal income taxation.

The series spans from 1995-2009.

Units: Current price, HRK (national currency)

Source: Ministry of Finance, Republic of Croatia

SSC	**Social security contributions**	
	Definition:	Budgetary revenue from social security contributions. The series spans from 1995-2009.
	Units:	Current price, HRK (national currency)
	Source:	Ministry of Finance, Republic of Croatia
C	**Personal consumption**	
	Definition:	Household final consumption. The series spans from 1995-2009.
	Units:	1997 reference prices, HRK (national currency)
	Source:	For the period 1994-1997 Mikulić and Lovrinčević (2000); For the period 1998-2009 Croatian Bureau of Statistics' First Releases
VAT	**Value-added tax**	
	Definition:	Budgetary revenue from consumption taxation using VAT. The series spans from 1998-2009.
	Units:	Current price, HRK (national currency)
	Source:	Ministry of Finance, Republic of Croatia
EX	**Excise duties**	
	Definition:	Budgetary revenues from consumption taxation using excises. The series spans from 1995-2009.
	Units:	Current price, HRK (national currency)
	Source:	Ministry of Finance, Republic of Croatia
UB	**Unemployment related benefits**	
	Definition:	Unemployment support payment. The series spans from 1995-2009.
	Units:	Current price, HRK (national currency)
	Source:	Ministry of Finance, Republic of Croatia
U	**Unemployment**	
	Definition:	Total unemployment. The series spans from 1995-2009.
	Units:	Persons
	Source:	Croatian Bureau of Statistics' First Releases
E	**Government expenditures**	
	Definition:	Total central government expenditure classified according to GFSM 1986. The series spans from 1995-2009.
	Units:	Current price, HRK (national currency)
	Source:	Statistical Reports of the Ministry of Finance, Republic of Croatia
R	**Government revenue**	
	Definition:	Total central government revenue classified according to GFSM 1986. The series spans from 1995-2009.
	Units:	Current price, HRK (national currency)
	Source:	Statistical Reports of the Ministry of Finance, Republic of Croatia

wL_PIT	**Wage elasticity of personal income tax**
Definition:	Wage elasticity of personal income tax is the ratio between the marginal personal income tax rate and the average personal income tax rate. The marginal and average tax rates are calculated for income that amounts from half of the average gross wage to the income that amounts to three average gross wages. Marginal and average tax rates are calculated for each quarter independently in order to incorporate the numerous changes in the personal income tax legislation (changes in personal allowance, tax brackets, tax rates). The series spans from 1995-2009.
Units:	Index
Source:	Author's calculation according to Croatian Bureau of Statistics' data on wages and Personal income tax Legislation.
wL_SSC	**Wage elasticity of social security contributions**
Definition:	Wage elasticity of social security contributions is the ratio between the marginal social contribution tax rate and the average social contribution tax rate. The marginal and average tax rates are calculated for income that amounts from half of the average gross wage to triple average gross wages. Marginal and average tax rates are calculated for each quarter independently in order to incorporate the changes in applied social security tax rates. The series spans from 1995-2009.
Units:	Index
Source:	Author's calculation according to Croatian Bureau of Statistics' data on wages and Social security contribution Legislation.

Note: Data in current prices where deflated using the GDP deflator according to the purpose and requests of estimation.

DISKRECIJSKE MJERE I AUTOMATSKI STABILIZATORI U HRVATSKOJ FISKALNOJ POLITICI

SAŽETAK

U posljednje vrijeme se u javnim raspravama često govori o fiskalnoj politici kao o alatu za stabilizaciju fluktuacija poslovnih ciklusa. Ako vlade tijekom pada tržišta dozvole puni zamah automatskih fiskalnih stabilizatora ali ne uspiju se othrvati izazovu da troše povećane cikličke prihode tijekom uspona, stabilizatori mogu dovesti do pristranosti prema proračunskim pozicijama. Ovaj rad istražuje u kojoj mjeri neke komponente proračuna hrvatske vlade doprinose uravnoteženju poslovnog ciklusa. Kako bi se automatski stabilizatori razdvojili od diskrecijskih mjera, ovo istraživanje se oslanja na metodologiju Europske Komisije. Rezultati pokazuju da je bilanca strukturnog proračuna u deficitu za 1,74% BDP-a u periodu od 1995 do 2009. Automatska stabilizacija je u Hrvatskoj relativno slaba i potpomognuta diskrecijskim mjerama, što je u Hrvatskoj dovelo do destabilizacije ekonomske aktivnosti u pro-cikličkom smjeru u više promatranih perioda.

Ključne riječi*: fiskalna politika, automatski stabilizatori, diskrecijske mjere, ciklički usklađena proračunska bilanca, Hrvatska*

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IMPACT OF EXCHANGE RATE AND CUSTOMS UNION ON TRADE BALANCE AT COMMODITY LEVEL OF TURKEY WITH EU (15)

ABSTRACT

This paper investigates the short-run and long-run impact of exchange rate and customs union on the trade balance at commodity-group level of Turkey with EU (15). Bounds testing approach is employed where a new strategy in the model selection phase is adopted ensuring that optimal model is selected from those models satisfying both diagnostics and cointegration. Results indicate that in the short-run exchange rate matters in determination of trade balance of 13 commodity groups out of 21 and customs union in 8 cases. Pattern of response of trade balance to exchange rate does not suggest a J-curve effect in any of cases. As for the long-run effect, neither exchange rate nor customs union has a statistically significant effect on trade balance of any of commodity groups, suggesting that those significant short-run effects don't last into long-run.

Key words: J-curve, Customs Union, Bounds Testing Approach, Exchange Rate, Trade Balance
JEL Classification: C13, C22, F14, F31

I. INTRODUCTION

A country can devalue its currency and thus, by making its goods cheaper for foreigners and foreign goods more expensive for itself, improve its trade balance. Because of lags in response of trade flows to currency devaluation or depreciation, however, the above-mentioned improvement in trade balance does not occur right away. It is therefore possible in the short-run that trade balance first deteriorates and then improves, resulting in j-curve pattern.

Numerous studies have investigated empirically the impact of the exchange rate changes on the trade balance. In terms of the type of trade data utilized, these studies can be grouped into two major categories. The first category includes those studies that use trade data between one country and rest of the world, i.e. aggregate level data. Bahmani-Oskooee (1985), Noland (1989) and Gupta-Kapoor and Ramakrishnan (1999) can be cited as examples of aggregate level studies. This type of studies is criticized on grounds that they could be suffering from aggregation bias problem (the favorable effect on trade balance of depreciation with one partner could be offset by the unfavorable effect with another partner, resulting in a conclusion at the aggregate level that depreciation is ineffective) and as a result, bilateral level study, the second category, has emerged. Rose and Yelen (1989) is the first paper that initiated the research in bilateral direction. Other examples of bilateral level studies include Marwah and Klein (1996), Arora *et al*. (2003) and Bahmani-Oskooee and Ratha (2004).

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The most recent trend now is to disaggregate the trade data further, with the aim of avoiding possible aggregation bias problem, by considering trade balance at commodity or industry level in bilateral trade with a trading partner. The number of studies is few and includes Ardalani and Bahmani-Okooee (2007) and Bahmani-Okooee and Wang (2008).

The effect of exchange rate changes on Turkish trade balance has also been considered in the literature in a few papers. Brada *et al*. (1997) and Akbostanci (2004) have explored the exchange rate effect on the aggregate trade balance of Turkey. Brada *et al*. (1997) examines the responsiveness of aggregate trade balance of Turkey under two-sub periods and finds that trade balance was responsive to the exchange rate only in the sub-period during which trade-liberalizing economic reforms occurred. Akbostanci (2004) investigates the J-curve effect in Turkish data and finds no worsening of the aggregate trade balance in the short run but finds long-run improvement. Two papers by Halicioglu (2007, 2008) have investigated the issue on the bilateral basis. Halicioglu (2007) has explored the exchange rate effect on bilateral trade balance of Turkey with nine trading partners using Vector Error Correction method, and he later has extended the set of partners to include four more partners in Halicioglu (2008) but used bounds testing approach. Yazici (2008) examines and compares the response to exchange rate changes of trade balances of three Turkish sectors; agriculture, manufacturing and mining. Yazici and Klasra (2010) investigates, in the context of two sectors of Turkish economy that use imported inputs at different rates, how the response of trade balance to currency devaluation is affected by usage of imported inputs in production of exports.

Our study differs from these studies in that the set of the trading partners considered is not the same, none of them considers the effect of customs union agreement on trade balance[1], we further disaggregate trade data by considering commodity level trade between Turkey and EU(15) and even though Halicioglu (2008) has used the same approach, i.e. bounds testing approach, as explained below, unlike the previous literature, we select the optimal model from the subset of models that satisfy both diagnostics and cointegration.

The purpose of this paper is to examine the impact of currency depreciation and customs union on the commodity level trade balance of Turkey with an important trading partner, EU (15) countries, using bounds testing approach with the new strategy in the model selection phase we propose incorporated. EU (15) countries together constitute 49.7 % of Turkey's total exports and 47.3 % of Turkey's total imports over 1982-2001 period. Selecting EU (15) as the trading partner gives us in this setting the opportunity to investigate the effect on industry level trade balance of customs union that Turkey joined in January of 1996 with EU (15) countries. In classifying the commodity groups we have used Harmonized System (HS) and because data were available in digit 1 level we have employed data for commodity groups at digit 1. There are 21 categories at this level and the list of name of corresponding commodity groups can be found in tables in this paper.

In the analysis in this paper we employ bounds testing approach developed by Peseran *et al*. (2001). The previous papers that have utilized this approach first select the optimum model using a certain model selection criterion such as Akaike Information Criterion (AIC) and then apply the cointegration and diagnostic tests to the selected model. Whatever results come up regarding the cointegration and diagnostics are reported in the end. We, however, first apply the cointegration and diagnostic tests to all possible combinations available given a maximum lag length and then determine those combinations that satisfy both the cointegration and the diagnostics. Finally, we apply model selection criterion to this set in order to come up with the optimal model for estimation. Unlike the previous work, our

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[1] Effect of Turkey's customs union agreement with EU countries is investigated in the context of the effect on export and import demand functions in some papers, however. For example, Neyapti *et al*. (2007) shows that the customs union agreement has positively impacted exports and imports of Turkey and led to changes in the responsiveness of both exports and imports to underlying variables.

approach ensures that the estimated optimum model is cointegrated and passes the diagnostics, thus enabling us to be sure that statistical inferences obtained from the estimated model using Ordinary Least Squares (OLS) are reliable.

The rest of the paper is organized as follows; in the following section the model employed in the estimation of the trade balance is set out, then the sources of data used in the estimation are described, the next section presents the empirical results obtained, and the last section contains the key findings and the concluding remarks.

II. MODEL

In modeling the trade balance, we closely follow the previous literature and specify it as a function of the real domestic income, the real foreign income, and the real exchange rate. The reduced form of trade balance equation for a given commodity group is expressed in a log-linear form in equation (1) as;

$$\ln TB_{i,t} = a + b \ln Y_{TR,t} + c \ln Y_{EU,t} + d \ln RER_t + e D_t + \varepsilon_t$$

(1)

Where $TB_{i,t}$ is the trade balance of the commodity group i defined as the ratio of exports of the commodity group i of Turkey to EU(15) countries over Turkey's imports of the commodity group i from EU(15) countries, Y_{TR} is Turkey's real income, Y_{EU} is the real income of EU(15) countries constructed as the weighted average of real income of these countries where weights are assigned based on each country's share in Turkey's trade, RER is the real effective exchange rate between Turkey and currencies of EU(15) countries where nominal exchange rate is defined as the amount of Turkish Lira per trading partner's currency and D is the dummy variable for customs union, which takes on value 0 for quarters prior to the first quarter of 1996 and value 1 afterwards, given the fact that Turkey joined the Customs Union with EU in January of 1996.

As far as the expected signs of the variable coefficients are concerned, given the fact that an increase in real domestic income will stimulate the imports from abroad, the domestic income is expected to affect the trade balance negatively and therefore to have a negative coefficient. If, on the other hand, the increase in the domestic income results from an increase in the production of import-substitutes, the impact on the trade balance of the domestic income will be positive. By similar reasoning, an increase in the trading partner's real income will increase the exports and therefore the trade balance will improve. As in the case of domestic income, however, if the rise in the partner's income is due to the increase in the production of its import-substitutes, the effect of the trading partner's income on the trade balance will be negative. As for the effect of real exchange rate, given the fact that exchange rate is defined as the amount of domestic currency per foreign currency, a rise in the real exchange rate (depreciation) will lead to an improvement in trade balance by making the exports cheaper for foreigners and imports more expensive for that country, thus yielding a positive coefficient.

Equation (1) represents the long-run relationship among the variables. We, however, are not only interested in long-run effect on the trade balance of exchange rate changes but also in the short run impact. Therefore, we need to incorporate the short-run dynamics into Equation (1). We do this, following Peseran *et al.* (2001), by employing Autoregressive Distributed Lag Method (ARDL). In this case, Equation (1) is expressed in error-correction modeling format as follows;

$$\Delta \ln TB_t = \alpha + \sum_{j=0}^{k} \beta_j \Delta \ln Y_{TR,t-j} + \sum_{j=0}^{l} \gamma_j \Delta \ln Y_{EU,t-j} + \sum_{j=0}^{m} \lambda_j \Delta \ln RER_{t-j} + \sum_{j=1}^{n} \theta_j \Delta \ln TB_{t-j}$$

$$+ \delta_1 \ln Y_{TR,t-1} + \delta_2 \ln Y_{EU,t-1} + \delta_3 \ln RER_{t-1} + \delta_4 \ln TB_{t-1} + \delta_5 D_t + u_t \qquad (2)$$

In the bounds testing approach cointegration among the model variables is established using F-test. The null hypothesis of no cointegration ($H_0 : \delta_1 = \delta_2 = \delta_3 = \delta_4 = 0$) is tested against the alternative of cointegration ($H_1 : \delta_1 \neq \delta_2 \neq \delta_3 \neq \delta_4 \neq 0$). Under the assumption of the null hypothesis, the distribution of F-statistic, however, is non-standard. Therefore, in testing the above hypothesis we use new critical values provided by Peseran *et al*. (2001).[2] If the calculated F-statistic exceeds the upper bound critical value, we reject the null hypothesis and conclude that variables are cointegrated.

III. DATA DESCRIPTION

The frequency of the data is quarterly and it covers the period from 1982:I to 2001:IV. All data are indexed using 2000 quarterly average as the base and also they all are seasonally adjusted. We have obtained them from four sources; IMF-IFS Country Tables, Eurostat, Central Bank of Turkey and Statistics Office of Turkey. Data for export and import values are taken from Statistics Office of Turkey. Data for Gross Domestic Product (GDP), Industrial Production Index, GDP Deflator and Consumer Price Index (CPI), except for Greek CPI, are compiled from IMF-IFS Country tables. Source for CPI of Greece is Eurostat. Data for the bilateral nominal exchange rate between Turkish Lira and the currency of each of the EU (15) countries except for Finland, Greece, Ireland, Portugal and Spain are obtained from Central Bank of Turkey. The source for bilateral nominal exchange rates between Turkish Lira and the currency of Finland, Greece, Ireland, Portugal and Spain is Eurostat. Bilateral exchange rates between Turkish Lira and the currency of each of these countries are not, however, directly available in Eurostat. We have calculated them using the exchange rate between the currency of each country and ECU, the exchange rate between US dollar and ECU and the exchange rate between Turkish Lira and US dollar.

IV. ESTIMATION RESULTS

In the present paper, we develop and follow a new strategy in selecting the model for the estimation. We believe that in order for inferences to be statistically reliable and therefore meaningful, the estimated model, from which test statistics for inferences are obtained, must well behave, i.e. it must satisfy basic assumptions of OLS. For this reason, given a maximum lag length, first those lag combinations that satisfy basic assumptions at a reasonably acceptable significance level (we set it at 10%) are detected. And then for each of these selected lag combinations, using the F-test, it is checked whether there exists a cointegration among model variables or not. If there is at least one combination for which there exists cointegration, it is concluded that there is a long run relationship among the model variables.

Once cointegration is established according to above procedure, the next step is to estimate the error correction model in (2). The question of which lag combination to use for estimation, i.e. optimal model, however, has to be settled. Here we employ AIC. The optimal

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[2] The upper bound critical value for the F-statistic at 10% significance level is 3.77, taken from Peseran *et al*. (2001) (Table CI, Case III, p.300).

model is selected by applying AIC to the set of those lag combinations that both satisfy diagnostics and indicate a cointegration.

An algorithm developed by the second author is used to settle the issues mentioned above. First, the maximum lag length on each first-differenced variable in equation (2) is set as 10. The model corresponding to each possible lag combination has been estimated and then those combinations that satisfy the diagnostic tests of normality, no serial correlation and no heterescodasticty at least at 10 % level have been selected. For each of these selected combinations, it is checked whether there exists a cointegration or not. In case no cointegration is established for a combination, that combination is discarded. Then, in order to determine the optimal model, AIC has been applied to the set of those lag combinations that satisfy diagnostic tests at least at 10 % level and at the same time indicate a cointegration. Having followed this procedure, we have come up with the optimal lag combinations reported in Table 1.[3]

Table 1: Optimal Lag Orders: Our Strategy vs. Previous Literature

Commodity Groups	Lag Order with Our Strategy	Lag order and Diagnostic Results with Previous Literature				
		Lag Order	N	S	H	C
Animals & Animal Products	8, 3, 7, 5	10, 6, 9, 6	√	×	√	√
Vegetable Products	4, 6, 0, 7	1, 6, 3, 7	√	×	×	√
Animal or Vegetable Fats	2, 10, 10, 3	10, 10, 10, 10	√	×	×	√
Prepared Food Stuffs	4, 1, 1, 0	4, 1, 1, 0	×	√	√	√
Mineral Products	4, 10, 9, 4	5, 10, 9, 4	√	×	√	√
Chemical Products	8, 4, 0, 0	7, 10, 10, 9	√	√	√	×
Plastic & Rubber	8, 4, 7, 7	8, 7, 5, 9	√	×	√	√
Hides & Skins	7, 10, 7, 2	8, 8, 10, 10	√	×	√	√
Wood & Wood Products	3, 0, 7, 1	4, 10, 9, 6	√	×	√	√
Wood Pulp Products	10, 5, 10, 10	10, 5, 10, 10	√	×	√	√
Textiles & Textile Articles	5, 3, 5, 6	5, 3, 5, 6	√	√	√	√
Footwear, Headgear	1, 1, 9, 4	8, 10, 10, 10	√	×	√	√
Articles of Stone, Plaster, Cement, Asbestos	10, 4, 3, 0	10, 10, 7, 10	√	×	√	√
Pearls, Precious or Semi-Precious Stones, Metals	8, 6, 9, 2	8, 6, 9, 2	√	√	√	×
Base Metals & Articles Thereof	4, 6, 8, 0	4, 6, 8, 0	√	√	√	√
Machinery & Mechanical Appliances	10, 0, 5, 0	10, 0, 5, 0	√	×	×	√
Transportation Equipments	1, 5, 0, 6	7, 9, 10, 6	√	×	√	√
Instruments – Measuring, Musical	9, 0, 3, 10	9, 0, 3, 10	×	×	×	√
Arms & Ammunition	2, 7, 3, 0	10, 10, 10, 10	×	×	√	√
Miscellaneous	9, 2, 9, 10	9, 2, 9, 10	√	√	×	×
Works of Art	1, 6, 1, 0	6, 7, 10, 9	√	×	√	√

Notes: The order of the optimal lags corresponds to the following order of the variables: $(\Delta \ln TB, \Delta \ln Y_{TR}, \Delta \ln Y_{EU}, \Delta \ln RER)$. N: normality, S: no serial correlation, H: no heteroscedasticity, C: cointegration, √ : passes the test, × : fails the test.

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[3] In Table 1 the lag combinations picked up when the strategy of previous literature is adopted are also reported. When compared with our strategy, in 8 cases out of 21 lag combinations selected coincide. Table 1 also contains diagnostic test results of strategy of previous literature. We observe that normality assumption fails in 3 cases, no serial correlation assumption in 15 cases, no heteroscedasticity assumption in 5 cases and cointegration in 3 cases.

Having determined the optimal combinations, we have then proceeded to estimate the model in Equation (2) corresponding to optimal lag combinations reported in Table 1 for the commodity groups included based on the quarterly data covering the period of 1982:I – 2001:IV. Short-run impact of the exchange rate on the commodity trade balance is inferred from the coefficients of the first-differenced exchange rate variable. To assess the short-run effect of the exchange rate, estimates of those coefficients are reported in Table 2.[4]

Note that in commodity groups of Animal or Vegetable Fats, Prepared Food Stuffs, Chemical Products, Footwear Headgear, Articles of Stone Plaster Cement Asbestos, Pearls Precious or Semi-Precious Stones Metals, Machinery & Mechanical Appliances and Arms & Ammunition, exchange rate variable has no significant coefficient. This implies that the real depreciation of Turkish Lira has no short-run significant effect in these commodities. In all other commodity groups at least one of the coefficients of the exchange rate variable is significant, meaning that the exchange rate matters in the short run in these 13 industries. As a short-run phenomenon, we are particularly interested whether or not J-curve effect exists in Turkey's commodity-level trade with EU (15) countries. Given the fact that the exchange rate is defined in such a way that a rise in the exchange rate represents the depreciation or devaluation of Turkish Lira, J-curve effect will be observed if the coefficient of the first-differenced exchange rate variable has first negative values and then positive ones. Looking at the Table 1 reveals that in none of 21 commodity groups such a pattern of signs of exchange rate coefficients is observed. Taking into account this fact, we can conclude that in Turkey's trade with EU (15) countries at industry level no evidence is found supporting the J-curve phenomenon.

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[4] Because the focus of paper is on impacts of exchange rate and customs union agreement, to conserve space, only coefficient estimates for these two variables are reported in Table 2.

Table 2: Short-Run Coefficient Estimates for Exchange Rate Variable and Customs Union Dummy

Commodity Group Name	λ_t	λ_{t-1}	λ_{t-2}	λ_{t-3}	λ_{t-4}	λ_{t-5}	λ_{t-6}	λ_{t-7}	λ_{t-8}	λ_{t-9}	λ_{t-10}	δ_t
Animals & Animal Products	-1.92* (-1.84)	2.31** (2.42)	-1.40 (-1.41)	-1.05 (-1.01)	0.53 (0.60)	-4.04*** (-4.60)						0.11 (0.16)
Vegetable Products	1.22 (0.80)	1.02 (0.63)	-0.19 (-0.11)	-0.78 (-0.49)	3.98** (2.43)	2.11 (1.25)	2.41 (1.54)	1.91 (1.42)				-0.71** (-0.27)
Animal or Vegetable Fats	-0.46 (-0.15)	2.97 (0.97)	-0.15 (-0.05)	2.80 (1.0)								-0.28 (-0.48)
Prepared Food Stuffs	-0.55 (-0.45)											-0.02 (-0.21)
Mineral Products	2.77*** (2.91)	1.54 (1.58)	-1.54* (-1.71)	0.58 (0.64)	-1.62* (-1.79)							0.06 (0.14)
Chemical Products	-0.31 (-0.55)											0.01 (0.11)
Plastic & Rubber	0.54 (0.81)	0.73 (0.99)	-1.03 (-1.39)	0.47 (0.66)	1.51** (2.16)	0.89 (1.37)	0.85 (1.35)	-0.82 (-1.38)				0.17 (0.12)
Hides & Skins	0.75 (0.77)	0.73 (0.79)	1.86* (1.87)									-0.35* (-0.17)
Wood & Wood Products	0.81 (0.41)	-3.20* (-1.80)										0.57* (0.31)
Wood Pulp Products	-0.96 (-0.46)	-0.30 (-0.13)	-1.19 (-0.26)	-0.64 (-0.26)	0.55 (0.22)	-5.63** (-2.39)	-2.58 (-1.28)	-3.00* (-1.85)	-4.23** (-2.57)	-0.31 (-0.18)	-5.01*** (-3.18)	-0.10 (-0.36)
Textiles & Textile Articles	-0.15 (-0.34)	0.16 (0.33)	0.32 (0.67)	-0.91* (-1.85)	1.33*** (3.12)	0.29 (0.69)	0.61 (1.47)					-0.24** (-0.36)
Footwear, Headgear	2.41 (1.32)	0.34 (0.19)	1.60 (1.02)	1.88 (1.27)	-0.59 (-0.41)							-1.4*** (-0.39)
Article of Stone, Plaster, Cement, Asbestos	-0.13 (-0.27)											-0.14 (-0.11)
Pearls, Precious or Semi-Precious Stones, Metals	4.19 (1.09)	-4.09 (-1.02)	4.68 (1.17)									-1.2 (-0.72)
Base Metals & Articles Thereof	-1.52* (-1.70)											0.58*** (0.18)
Machinery & Mechanical Appliances	-0.88 (-0.79)											0.15 (0.18)
Transportation Equipments	2.77** (2.40)	-0.64 (-0.54)	-3.47*** (-2.95)	-0.08 (-0.07)	-2.83** (-2.23)	1.02 (0.82)	3.42*** (3.17)					0.52** (0.20)
Instruments – Measuring, Musical	0.33 (0.18)	5.78*** (2.79)	4.06** (2.19)	4.98** (2.60)	6.40*** (3.21)	4.93*** (2.74)	4.69** (2.56)	3.67** (2.32)	1.50 (0.95)	1.51 (0.99)	4.16** (2.64)	0.98*** (0.31)
Arms & Ammunition	-0.37 (-0.18)											-0.74 (-0.48)
Miscellaneous	1.59 (1.12)	-1.07 (-0.67)	-2.04 (-1.24)	2.71 (1.69)	-0.72 (-0.48)	1.84 (1.35)	-0.68 (-0.55)	-0.63 (-0.51)	-1.05 (-0.77)	-2.72** (-2.17)	-1.41 (-1.14)	0.22 (0.27)
Works of Art	-9.57* (-1.76)											-1.66 (1.09)

Notes: *, **, *** indicate significance levels at 10%, 5%, and 1% respectively. Figures in parentheses below each coefficient indicate the value of the t-statistic.

Also reported in Table 2 are short-run coefficient estimates for customs union dummy. We observe that customs union agreement of Turkey with EU (15) countries has significant effect in the short run in industries of Vegetable Products, Hides & Skins, Wood & Wood Products, Textiles & Textile Articles, Footwear Headgear, Base Metals & Articles Thereof, Transportation Equipments and Instruments – Measuring Musical. The commodity groups whose trade balances have been affected positively by customs union are Wood & Wood Products, Base Metals & Articles Thereof, Transportation Equipments and Instruments – Measuring Musical. Customs union agreement has negatively affected in the short-run the trade balances of Vegetable Products, Hides & Skins, Textiles & Textile Articles and Footwear Headgear.

As for the long-run effect, long-run estimates are fully reported in Table 3. We observe that real exchange rate variable does not have any statistically significant coefficient in any of 21 industries. This finding implies that changes in the real exchange rate do not affect Turkey's commodity trade balance in the long run with EU (15) countries. In other words exchange rate variable is not a significant determinant in Turkey's commodity trade balance with EU (15). This suggests that the exchange rate policy can't be used to influence trade balance in a favorable way. As far as the effect of customs union is concerned, this agreement doesn't have a long-run significant effect on trade balances of any of industries, either. This implies that Turkey's participation in the customs union has not significantly affected its commodity trade balance, at least during the study period. This result isn't surprising and can be explained in light of two facts. First, in 1970 with a protocol to the Treaty of Ankara signed in 1963, Turkish goods were allowed to enter European Union free of any restrictions, long time before customs union agreement in 1996. For this reason Turkish exports should not be expected to respond significantly to the joining of customs union in 1996.

Table 3: Long-Run Coefficient Estimates

Commodity Group Name	Constant	$\ln Y_{TR}$	$\ln Y_{EU(15)}$	$\ln RER$	D
Animals & Animal Products	-0.35	-1.64***	-0.02	-0.40	0.11
	(-1.32)	(-5.27)	(-0.02)	(-0.19)	(0.19)
Vegetable Products	2.90***	-2.49***	7.63**	-0.21	-0.89
	(3.51)	(-2.93)	(2.27)	(-0.05)	(-0.90)
Animal or Vegetable Fats	0.27	-5.49*	18.32	0.83	-0.33
	(0.34)	(-1.72)	(1.54)	(0.08)	(-0.18)
Prepared Food Stuffs	0.99***	-0.24	-2.69	-0.12	-0.03
	(3.80)	(-1.04)	(-1.58)	(-0.05)	(-0.05)
Mineral Products	-0.45	-3.83***	1.61	1.24	0.07
	(-1.50)	(-5.38)	(0.85)	(0.41)	(0.12)
Chemical Products	-2.57***	1.07**	-3.93*	-0.26	0.01
	(-2.73)	(2.14)	(-1.82)	(-0.09)	(0.01)
Plastic & Rubber	-1.91*	0.38	-3.50	-0.60	0.52
	(-2.01)	(0.65)	(-1.16)	(-0.13)	(0.41)
Hides & Skins	0.26	2.02***	-10.4***	-2.37	-0.36
	(1.45)	(3.43)	(-5.11)	(-0.80)	(-0.52)
Wood & Wood Products	-2.07	-7.80**	9.82**	0.60	0.68
	(-1.57)	(-2.63)	(2.64)	(0.15)	(0.61)
Wood Pulp Products	-2.13	-9.55**	17.03**	1.61	-0.01
	(-1.19)	(-2.64)	(2.58)	(0.36)	(-0.01)
Textiles & Textile Articles	1.75***	0.17	-2.36***	-0.46	-0.34
	(5.75)	(0.57)	(-2.78)	(-0.36)	(-0.80)
Footwear, Headgear	-0.06	-1.80***	2.67	0.49	-1.44
	(-0.13)	(-3.25)	(1.40)	(0.16)	(-1.37)
Articles of Stone, Plaster, Cement, Asbestos	0.75***	-2.54***	4.82***	-0.78	-0.19
	(4.36)	(-9.48)	(4.61)	(-0.47)	(-0.56)
Pearls, Precious or Semi-Precious Stones, Metals	2.02**	-4.74	24.65	3.89	-1.43
	(2.12	(-1.26)	(1.12)	(0.27)	(-0.34)
Base Metals & Articles Thereof	-1.76	-0.79	-2.93	-0.61	1.38
	(-1.20)	(-1.32)	(-1.14)	(-0.14)	(1.27)
Machinery & Mechanical Appliances	-1.51**	-2.99**	5.71**	-0.20	0.17
	(-2.30)	(-5.13)	(4.21)	(-0.11)	(0.32)
Transportation Equipments	-1.88**	-5.60***	10.45***	1.44	0.60
	(-2.35)	(-4.21)	(4.14)	(0.43)	(0.74)
Instruments – Measuring, Musical	-3.36**	2.88***	-5.02**	-2.37	0.86
	(-2.22)	(3.86)	(-2.03)	(-0.80)	(0.73)
Arms & Ammunition	-1.99	-8.17*	10.09*	0.11	-0.80
	(-1.29)	(-1.95)	(1.74)	(0.02)	(-0.70)
Miscellaneous	-1.42	-2.48***	1.65	0.32	0.33
	(-1.41)	(-2.96)	(0.48)	(0.06)	(0.25)
Works of Art	-2.57	-14.17	32.90	5.74	-1.84
	(-0.63)	(-0.83)	(0.84)	(0.43)	(-0.56)

Notes: *, **, *** indicate significance levels at 10%, 5%, and 1% respectively. Figures in parentheses below each coefficient indicate the value of the t-statistic.

Second, Turkey's imports consist mainly inputs.[5] To continue to grow, Turkey has to import those inputs. This nature of Turkey's import structure implies that Turkey has to continue importing regardless of a customs union agreement. Therefore, imports should not be expected to respond significantly to the customs union, either. As a result of these two reasons, customs union should not significantly affect Turkey's trade balance.

Even though real exchange rate is not a significant determinant for trade balance of any of commodity groups in the long run, other determinants, namely Turkish real income and EU(15) real income, are significant. Real domestic income is a significant long-run

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[5] According to data from Statistics Office of Turkey (www.tuik.gov.tr), in 2008 imports of raw materials, intermediate goods and investment goods (179.8 billion dollars) constituted 89% of total imports of Turkey (201.9 billion dollars).

determinant of trade balances of 15 industries. EU(15) real income is a significant determinant in the long-run of trade balances of 8 industries. Overall we can say that Turkish real income and EU(15) real income are driving forces behind trade balances of Turkish industries. In other words, growths of Turkish economy and EU(15) economies are main factors that determine how trade balances of Turkish industries behave in the long-run.

V. CONCLUSION

This paper has examined the effect of exchange rate and customs union in the short run as well as in the long run on commodity-level trade balance of Turkey with EU (15) countries based on the quarterly data over 1982:I-2001-IV period. Previous studies have investigated the impact of exchange rate on trade balance either at the aggregate level or bilateral level. Results obtained from both types of studies are mixed and such a result is attributed to aggregation bias problem. Realizing this problem, with the hope of reducing the bias a new body of research has emerged, namely the bilateral analysis at the commodity level. One exception is the case of Turkey. The present paper fills in this vacuum in the literature by considering the bilateral trade of Turkey with EU (15) at commodity level. Given the fact that the trading partner selected is EU (15) and that Turkey joined the customs union with these countries in 1996, this paper has also explored the effect on the trade balance of the customs union agreement. Another contribution of this paper, as explained in detail earlier, is that a new strategy in model selection phase is adopted and unlike the previous literature optimal model for the estimation is selected, from the set of those combinations that satisfy both diagnostic requirements and the cointegration, ensuring that inferences obtained from the estimation are statistically reliable.

As far as the short-run impacts of the exchange rate and customs union are concerned, exchange rate changes and customs union have significantly affected certain commodity groups in the short-run. No J-curve effect is observed in any of industries. As for the long-run effect, our results indicate that real depreciation of Turkish Lira and customs union have not significantly affected trade balance of any of industries. This finding suggests that exchange rate policy can't be used as a policy tool to improve the trade balance. Factors that are significant determinants of trade balances of Turkish industries in the long-run are found to be Turkish and EU (15) real incomes.

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UČINAK TEČAJA I CARINSKE UNIJE NA TRGOVINSKU BILANCU SIROVINA TURSKE S EU (15)

SAŽETAK

Ovaj rad proučava kratkoročni i dugoročni učinak tečaja i carinske unije na trgovinsku bilancu sirovina Turske s EU (15). Koristi se pristup graničnog testa gdje se u fazi odabira modela koristi nova strategija koja osigurava odabir optimalnog modela između onih koji udovoljavaju kako dijagnostici tako i kointegraciji. Rezultati ukazuju da, kratkoročno gledano, tečaj ima utjecaja na određivanje trgovinske bilance 13 grupa sirovina od 21, dok carinska unija utječe u 8 slučajeva. Uzorak odgovora trgovinske bilance na tečaj ne ukazuje na efekt J-krivulje ni u jednom slučaju. Što se tiče dugoročnog učinka, niti tečaj niti carinska unija nemaju statistički značajan učinak na trgovinsku bilancu bilo koje grupe sirovina, ukazujući na to da viđeni kratkoročni učinci ne prelaze u dugoročne.

Ključne riječi: *J-krivulja, carinska unija, granični test, tečaj, trgovinska bilanca*
JEL klasifikacija: *C13, C22, F14, F31*

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DOES LABOUR TAXATION AFFECT UNEMPLOYMENT? CROATIAN WORKER IN INTERNATIONAL PERSPECTIVE

ABSTRACT

The paper examines the issue of labour taxation of Croatian worker in comparison to workers in OECD and EU Member States. By using hierarchical cluster analysis it studies the relations between tax wedge and labour market outcomes, whereas with panel regression analysis, performed on data for 39 countries during 2000–2008 period, estimates the impact of tax wedge on unemployment rate. The empirical estimates show that Croatia classifies among countries with higher unemployment and lower employment rate, characterized with higher tax wedge. Furthermore, the estimates of the regression analysis showed that the tax wedge at all three wage levels (i.e. 67 %, 100 % and 167 % of average wage) has a significant positive impact on unemployment rate. This signifies that Croatia, as other studied countries, should continue with reduction of tax wedge, as this would alleviate unemployment problems and stimulate job creation.

Key words: *tax wedge, labour costs, unemployment, economic policy, Croatia, OECD, EU.*
JEL classification: *J30, J38, H24.*

1 INTRODUCTION

The issue of labour taxation and its possible effects on labour market outcomes has been a subject of range of studies in recent years. Several studies find that a decline in tax wedge may alleviate unemployment, stimulate job creation and by this affect employment and improve general economic performance. Namely, by creating a wedge between labour costs and real consumption net wage, taxes on labour in imperfectly flexible labour markets reduce demand for labour (if demand for labour is imperfectly inelastic) and employment and therefore increase unemployment (Vodopivec, 2005).

The main objective of this paper is to study the labour taxation and labour market outcomes (in terms of employment and unemployment rate) in Croatia from an international comparative perspective. Moreover, the paper deals with the relation between tax wedge and labour market performance in member countries of Organisation for Economic Co-operation and Development (OECD), European Union (EU) and Croatia, giving the latter a special attention. Most importantly, the paper tests the hypothesis whether and how taxes on labour influence unemployment rates in studied countries.

In order to explain the characteristics of taxes levied on labour and indicators of labour market performance we apply basic descriptive statistics. To identify groups of countries that are similar to each other with regard to employment and unemployment rate we use

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hierarchical cluster analysis (based on Ward's method and squared Euclidean distance). To study the impact of tax wedge on unemployment rate we employ panel regression analysis on the sample of 39 countries (i.e. OECD and EU Member States plus Croatia) for the period 2000–2008. We expect a positive association between labour taxation and unemployment rate.

The added value of this paper in comparison to previous studies on labour taxation in Croatia[4] is twofold. Firstly, we analyse the issue of taxation of Croatian worker in broader international comparative perspective, taking into account different levels of average wage and the latest available data. Secondly, we investigate the impact of labour taxation on unemployment, showing on the importance of reducing labour taxation for solving unemployment problems in Croatia.

The rest of the paper is organized in the following way. Section 2 gives a brief overview of previous empirical studies on the impact of labour taxation on labour market performance, followed by the presentation of data and methodology in Section 3. Section 4 presents basic statistics and trends in labour taxation in Croatia in comparative international perspective. Section 5 is devoted to classification of chosen countries into clusters using hierarchical cluster analysis. Section 6 tests causalities between labour taxation and unemployment using panel regression analysis. Section 7 concludes and gives relevant policy recommendations.

2 THEORETICAL BACKGROUND

A simple theoretical framework of labour supply and demand presumes that an increase of tax wedge can be represented by a downward shift in the labour demand curve. The extent to which the tax wedge affects employment is highly dependent on the elasticities of the labour supply and demand curve, implying that the more elastic is the labour supply curve (and/or demand curve), the higher is the negative effect of tax wedge on employment (see Góra *et al.*, 2006).

Tax wedge-employment/unemployment relationship has been a subject of several macroeconomic empirical studies, mostly based on different panel datasets of countries. Despite differences in the structure of econometric models, the majority of studies pointed on the existence of a negative relationship between tax wedge and employment. The brief structure and results of these studies are summarized in de Haan *et al.* (2003), Nickell (2003) and OECD (2006). Yet, the extent to which an increase in tax wedge results in lower employment and/or higher unemployment appears to be affected by institutional features of the individual labour markets such as labour market flexibility, collective bargaining, regulations in the field of minimum wages and unemployment benefits, skill level of the labour force (Bertoncelj, 2010), tax incidence share and progressivity, wage formation structure, active and other labour market policies and institutions.

In one of the most cited studies, Nickell and Layard (1999) showed by using the panel analysis on 20 OECD countries between 1983–1994 that a decrease in average tax wedge (that includes payroll, income and consumption taxes) for 5 percentage points would reduce the unemployment rate by 13 %. Likewise in one of the following studies, Nickell (2003) reported that an increase in tax wedge by 10 percentage point would result in the reduction of labour input of the working age population by somewhere between 1 and 3 %. By comparing the big three countries of continental Europe (France, Germany and Italy) with the United States, Nickell (2003) also showed that the difference in tax wedge (around 16 percentage points) explains around one quarter of the overall difference in the employment rate. The

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[4] Some of the studies performed on the issue of labour taxation in Croatia are presented in Section 2.

remained difference could be explained by substantial differences in the social security system and in other labour market institutions.

Alesina and Perotti (1997) on the sample of 14 OECD countries empirically confirmed the theoretical model which showed that an increase in redistribution financed by an increase in labour taxes leads to an increase in the unit labour cost and therefore induces a loss of competitiveness causing a reduction in the demand for exports and a fall in employment (see Kavčič and Bertoncelj (2010) for a review some of these issues in Slovenian organizations).

On the other hand, Daveri and Tabellini (2000) showed that the negative effect of labour taxation on employment and growth is a European phenomenon (correlation is strong and evident in highly unionized countries of continental Europe and much less so in OECD countries with competitive labour markets and in the Scandinavian countries with highly centralized trade unions). Their empirical research on the sample of 14 OECD industrial countries during the 1965–1991 period has pointed that the rise of 10 percentage points in the rate of effective labour taxes can account for a 4 percentage points increase in European unemployment.

In the empirical study of Bassanini and Duval (2006) performed on the sample of 21 OECD countries during 1983 and 2003 it is shown that in the "average" OECD country, high and long-lasting unemployment benefits and high tax wedge increase aggregate unemployment and lower employment prospects. Namely, a 10 percentage points reduction of tax wedge would reduce equilibrium unemployment by 2.8 percentage points and increase the employment rate by a larger 3.7 percentage points (due to positive impact on participation). By contrast, highly centralized and/or coordinated wage bargaining systems are estimated to reduce unemployment.

Similar estimates of the impact of tax wedge on labour market performance were obtained in the studies based on the samples of EU Member States. For example, Góra *et al.* (2006) showed a negative effect of tax wedge on employment growth in eight New Member States (NMS) and provided evidence that tax wedge more strongly affects employment rates among low-skilled workers, but high-skilled are rather immune from this effect. A significant negative impact of higher tax wedge on labour force participation and employment rate (especially for elderly) in NMS-8 has been suggested also by Võrk *et al.* (2007). Their estimates obtained in the panel data analysis of eight NMS between 1996 and 2004 showed that a reduction of the tax wedge by 1 percentage point could increase employment rate by about 0.2–0.7 percentage points. A detrimental effect of high tax wedges and/or inappropriate benefits systems on the generation of desirable labour market outcomes (employment, unemployment and inactivity) on the sample of ten Central and Eastern EU Member States (CEE-10) was also shown in the study of Behar (2009).

Results are not much different for Croatia. For example, Grdović Gnip and Tomić (2010) and Šeparović (2009) with hierarchical cluster analysis showed that Croatia places itself among countries with high tax wedge, which are characterised with higher unemployment and lower employment rates. Also Urban (2009) concluded that Croatian tax wedge is very high in comparison to some of the OECD countries and that the long-term development of Croatia will depend on reducing the tax wedge and on other vital reforms. Similarly Nestić (1998) suggested that Croatia should lower the taxation of labour, however not to lower unemployment, but primarily to increase the competitiveness of Croatian economy and to reduce informal sector employment.

A brief review of the literature suggests that tax wedge has been one of the significant reasons for unemployment among countries. However, even the estimates of a negative impact of tax wedge on labour market outcomes may be relatively strong; they are subjected to criticism due to robustness of data and empirical model (see for example Blanchard, 2006).

3 METHODOLOGY AND DATA

In order to be comparable among countries, we base our analysis of labour taxation on the average tax wedge indicator calculated on the basis of OECD methodology (see OECD, 2008). The tax wedge is the ratio of total labour taxes to total labour costs as paid by an employer:

$$ATW = \frac{PIT + SSC_e + SSC_f + PT - CB}{w + PIT + SSC_e + SSC_f + PT}, \tag{1}$$

where *ATW* stands for average tax wedge, *PIT* is personal income tax, SSC_e social security contributions paid by employees, SSC_f social security contributions paid by firms/employer, *PT* payroll tax paid by employers, *CB* cash benefits and *w* net wage.

In the analysis we observe the tax wedge for an average worker, single, without children and employed in industry Sectors C-K,[5] at different wage levels (i.e. 67 %, 100 % and 167 % of average wage).

The methodological scope of this paper is threefold. Firstly, we examine the size of tax wedge, employment rate and unemployment rate in Croatia and in OECD and EU Member States in 2008[6] by using basic descriptive statistics.

Because of heterogeneity in the analysed data, we further apply hierarchical cluster analysis (based on Ward's method and squared Euclidean distance) to identify whether there are more homogenous groups of countries. Cluster analysis is performed on 39 countries (OECD and EU Member States plus Croatia) and includes employment and unemployment rate as dependent characteristics.

In the last part of our empirical analysis, we study the impact of tax wedge on unemployment rate. Following the macroeconomic empirical studies on this issue (see for example Nickell and Layard, 1999; Daveri and Tabellini, 2000; Belot and van Ours, 2004; Võrk *et al.*, 2007; Žižmond and Novak, 2006) we employ panel regression analysis, performed on the sample of 39 countries (OECD and EU Member States plus Croatia) between 2000 and 2008. The regression analysis includes random effects and control for heteroskedacity[7]. We formed a regression model (2) with the following specifications:

$$UR_{i,t} = \alpha + \beta_1 \cdot TW_{i,t} + \beta_2 \cdot D_{i,t} + \beta_3 \cdot DTW_{i,t} + \Pi \cdot \begin{bmatrix} EPL_{i,t} \\ GDPpc_{i,t} \\ IR_{i,t} \\ LP_{i,t} \end{bmatrix} + e_{i,t}, \tag{2}$$

where *UR* denotes unemployment rate in country *i* at time *t*, *TW* stands for tax wedge, *EPL* for employment protection legislation index, *GDPpc* denotes gross domestic product (GDP) per capita, *IR* is inflation rate and *LP* is labour productivity. Parameter *e* stands for stochastic disturbances. Moreover, we also introduce dummy variable *D* in the interactive and multiplicative form *DTW* (*D* multiplied by *TW*) in order to control for differences between high tax wedge countries (dummy variable takes the value 1) and low tax wedge countries (dummy variable takes the value 0). All variables were logarithmised. In parallel, we repeat the panel regression analysis by using employment rate as a dependent variable.

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[5] According to NACE Rev. 2, sectors C-K were replaced by sectors B-N.

[6] We focus on data for 2008 in order to perform an analysis comparable among all countries included. Namely, data on tax wedge for 2009 are not yet available for all EU Member States.

[7] The decision to use panel regression model with random effects instead of fixed effects was based on the estimates of Hausman test. The use of random effects model was confirmed by the Breusch and Pagan Langragian multiplier test. The presence of heteroskedacity was confirmed by likelihood-ratio test, whereas Wooldrige test showed that data do not have first-order autocorrelation.

Data on unemployment and employment were collected on the basis of Labour Force Surveys and refer to the age group 15 to 64. Explanatory variable tax wedge refers to labour taxation of a single production worker without children. We performed three separate regression analyses differing only in the level of tax wedge, by which each referred to one wage level. We therefore obtained estimates for tax wedge at 67 %, 100 % and 167 % of average earnings. The other explanatory variables represent control variables. EPL index[8] presents a measure of labour market flexibility and covers three different aspects of employment protection: (i) individual dismissal of workers with regular contracts; (ii) additional costs for collective dismissals; and (iii) regulation of temporary contracts. As a measure of control for macroeconomic effects that may influence labour market developments we included inflation rate (in order to take into consideration effects in monetary or fiscal policy) and GDP per capita (expressed in Purchasing Power Standards (PPS)). Labour productivity is measured as GDP in PPS per hour worked. The data on labour productivity were obtained from The Conference Board (2010) statistical database.

The data needed for empirical analysis were obtained from three main sources:

- for OECD countries: OECD official databases (OECD.Stat, 2010) and official reports (OECD, 2008 and 2009a, b, c);
- for EU Member States: Eurostat (2010) and official reports of the European Commission (European Commission, 2009a, b and c);
- for Croatia: official databases and reports of Central Bureau of Statistics of the Republic of Croatia (2010).

The analysis focuses on the size of the tax wedge-unemployment relationship on the labour demand side and does not study in detail the effects of factors at the labour supply side and other labour market institutions.

## 4 TAXATION OF LABOUR IN CROATIA IN INTERNATIONAL COMPARATIVE PERSPECTIVE

Croatian legislation referring to income taxation and social security contribution system underwent several changes through the last 20 years (see Grdović Gnip and Tomić, 2010). According to Nestić (1998), these changes could create an atmosphere of instability, which discouraged both employers and employees from quickly and optimally responding to market signals. Such instability may decrease companies' business expectations which may reduce the companies' willingness to employ (Stubelj, 2010). Nevertheless, the legislation changes, in general, resulted in a decline of tax wedge. Namely, from 2000 to 2008 the tax wedge at the 67 % of average earnings in Croatia declined by approximately 6 % or 2.3 percentage points. Decline in tax wedge was higher at average wage level and 167 % of average wage, as it decreased by approximately 8 % (see Figure 1; data for EU-27 are inserted for comparison).[9] A high decline of tax wedge in 2000 and 2001 can be reasoned with an increase of personal allowance, changes in the marginal tax rates and reduction of employer's contributions. In the following year, the tax wedge slightly increased due to increase of employer's contributions. In 2003 personal allowance increased and employee's contributions decreased, so the tax wedge recorded a pin drop (it fell under the average of EU). From 2003

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[8] Until today OECD presented three versions of EPL index calculations. In this analysis we included the second version of the EPL index (see OECD, 2010).

[9] Between 2000 and 2008, the tax wedge in the EU-27 decreased, on average, by approximately 6 % at all three wage levels. A stronger decline was noticed in CEE countries together with three Nordic countries, in which the tax wedge, on average, decreased by 3.2 percentage points (or 0.36 percentage point/year). To a large extent, the reduction in tax wedge is almost entirely driven by the reduction in personal income taxation and in social security contributions of employers.

to 2008, despite the further increase in personal allowances (in 2005, 2006 and 2008), the tax wedge was slightly increasing due to the growth in gross wages. In 2009 Croatia introduced a special "crisis tax" levied on the net wage in order to mitigate the impacts of the financial crisis. According to Grdović Gnip and Tomić (2010), the introduction of the "crisis tax" would increase the tax wedge at 100 % average earnings for additional 1.2 percentage points (from 40.1 % (without "crisis tax") to 41.3 %) in 2009.

Figure 1: Tax wedge at different wage levels from 2000 to 2008 in Croatia and EU-27, in %
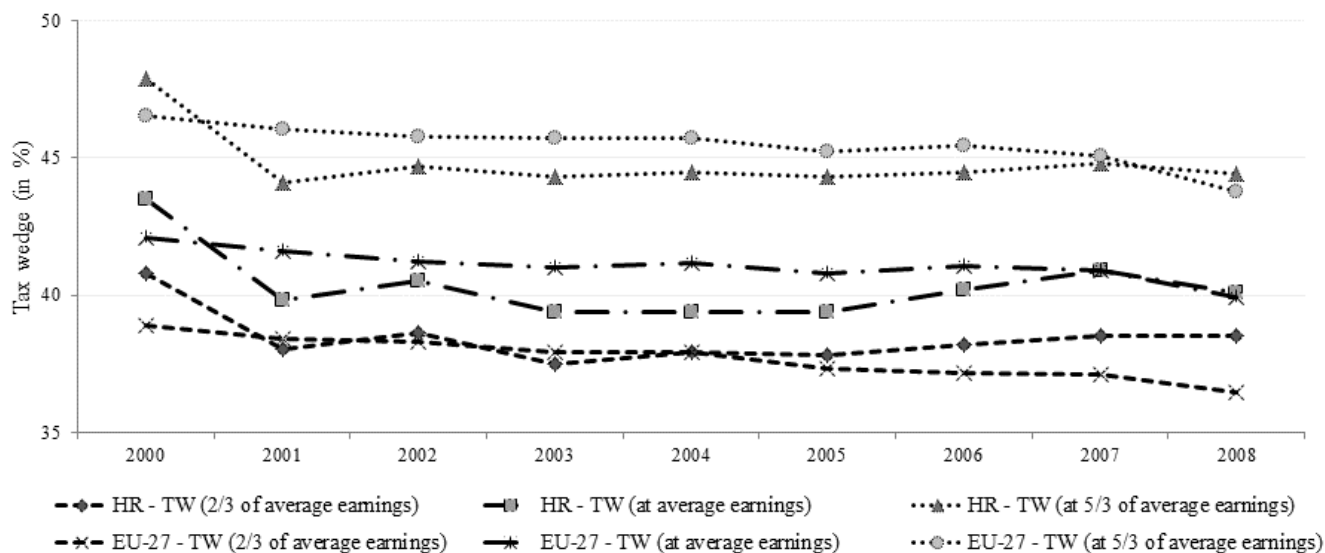
Sources: Eurostat, 2010; Central Bureau of Statistics, 2010; authors' calculations.

The dynamics of tax wedge between 2000 and 2008 presented in the previous figure shows that Croatian worker, receiving average or 167 % of average wage, was less taxed than the average EU worker until 2007. Situation changed in 2008 due to higher decrease of average labour taxation in EU-27, mostly due to larger decrease in Cyprus, Poland, Bulgaria and in some other EU countries comparing to 2007. As can be seen from Table 1, in 2008, the low wage worker bore a higher tax burden than the average worker in EU-15, however lower than in CEE countries. Similar is true for high-wage workers. For worker with average wage, the taxation is, on average, much higher among old EU Member States and also CEE countries than in Croatia.[10] Nevertheless, the Croatian workers are exposed to considerably higher taxation if compared to OECD countries that are not members of the EU.

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[10] Among EU Member States (ranked according to tax wedge level from highest to lowest), Croatia places on the 16th position at the 67 % average wage level, 18th position at the 100 % average wage level and on the 15th position at the 167 % average wage level. Among OECD countries (ranked according to tax wedge level from highest to lowest), it places on the 12th position at the 67 % of average wage level and on the 13th position at the 100 % and 167 % of average wage.

Table 1: International comparison of tax wedge at different wage levels, employment and unemployment rates, 2008 (in %)

Group/country[1]	Tax wedge at			Employment rate	Unemployment rate
	67 % of average wage	100 % of average wage	167 % of average wage		
OECD	33.5	37.4	41.9	68.3	5.8
non-EU OECD	24.8	28.1	32.3	70.3	4.7
EU OECD	38.6	42.8	47.5	67.1	6.4
EU-27	36.5	39.9	43.8	66.4	6.3
EU-15	38.1	42.4	47.0	68.4	6.4
CEE-10	39.5	41.9	44.0	63.9	6.5
Croatia	38.5	40.1	44.4	57.8	8.6

Note:[1] OECD stands for 30 OECD member countries. Non-EU OECD includes 11 OECD member countries that are not members of the EU, whereas EU OECD includes 19 OECD member countries that are also members of the EU. EU-15 refers to EU Member States that become members of the EU prior to 2004. CEE-10 includes 10 Central and Eastern EU Member States that joined EU after 2004.
Sources: Eurostat, 2010; OECD.Stat, 2010; Central Bureau of Statistics, 2010; authors' calculations.

Croatia, as all other OECD and EU Member States (except for Bulgaria, which records equal tax wedge at different wage levels), has a progressive tax wedge, implying that tax wedge increases with an increase of wage level (see Figure 2). The progressivity of tax wedge stems from the progressive income tax rates, which, on the other hand, result in a redistributive effect, since they reduce the inequality of income distribution. Comparing to chosen groups, Croatia exhibits lower tax progressivity. This was confirmed also by Kosi and Bojnec (2010), who by calculating the measure of elasticity of after-tax wage to total labour costs (also known as CRIP) showed that, except for single parents with two children, taxation of wages in Croatia exhibits low tax progressivity.

Figure 2: Progressivity of tax wedge in selected groups of countries and in Croatia, 2008 (%)
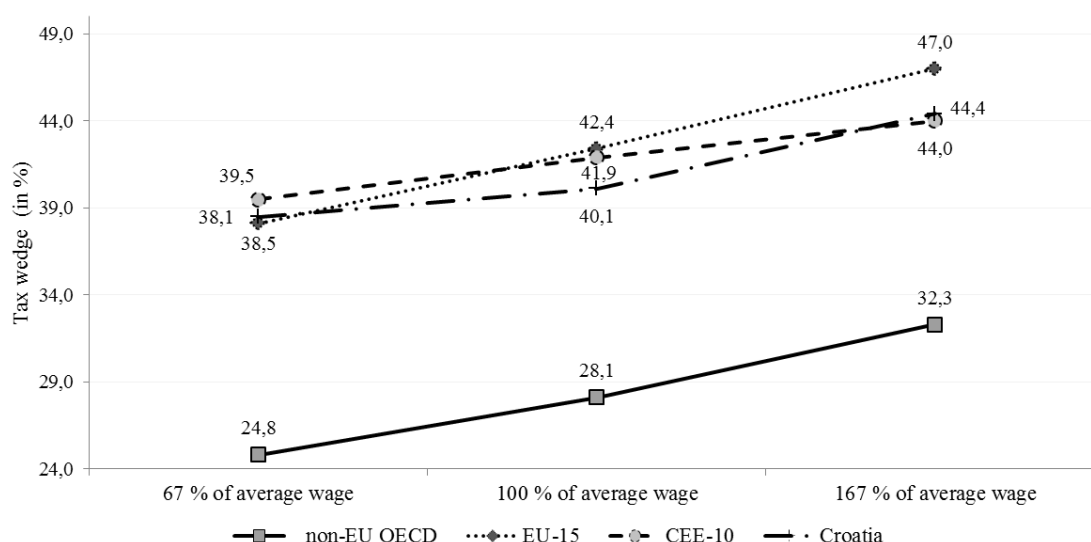
Sources: Eurostat, 2010; OECD.Stat, 2010; Central Bureau of Statistics, 2010; authors' calculations.

Table 2 presents the structure of tax wedge at different wage levels in Croatia and selected groups of countries.

Table 2: Decomposition of tax wage at different wage levels in selected groups of countries and Croatia, 2008, in %

	non-EU OECD	EU OECD	EU-15	CEE-10	Croatia
Components of tax edge/average wage[1]	*67 % of average earnings*				
PIT	44.9	29.4	27.1	20.9	17.6
Employee SSC	25.6	33.9	26.5	26.3	44.3
Employer SSC plus payroll tax	29.5	36.7	46.4	52.8	38.1
Total[2]	*100*	*100*	*100*	*100*	*100*
	100 % of average earnings				
PIT	52.6	38.7	34.6	25.4	19.3
Employee SSC	22.7	30.0	23.2	24.9	42.5
Employer SSC plus payroll tax	24.7	31.2	42.3	49.7	33.2
Total[2]	*100*	*100*	*100*	*100*	*100*
	167 % of average earnings				
PIT	62.5	50.3	45.6	29.0	28.5
Employee SSC	18.4	24.6	18.3	23.6	38.4
Employer SSC plus payroll tax	19.0	25.1	36.1	47.4	33.1
Total[2]	*100*	*100*	*100*	*100*	*100*

Notes:

[1] Abbreviation PIT refers to personal income tax, SSC to social security contributions.

[2] Due to rounding total may differ one tenth of percentage point from aggregate of income tax, social security contributions and payroll tax.

Sources: Eurostat, 2010; OECD.Stat, 2010; Central Bureau of Statistics, 2010; authors' calculations.

In most of the EU Member States and also in Croatia social security contributions represent a major part of the tax wedge. Social security contributions and personal income tax are more evenly represented in tax wedge in OECD member countries that are not members of the EU. What's more, by increasing the wage level, the share of personal income tax in the structure of tax wedge in these countries increases profoundly. For example, in non-EU OECD countries personal income tax presents 62.5 % of the overall tax wedge at the 167 % wage level, whereas in EU-15 45.6 %, in CEE-10 yet only 29.0 %. Croatia exhibits similar share of personal income tax in overall tax wedge as CEE countries at the 167 % wage level, however at the other two wage levels the share is a lot lower (see Table 2). As regards the distribution of tax burden between the employers and employees, in most the countries, also in Croatia, the greater part of the tax burden is transferred to employees. An exception to this may present the CEE countries, as the employers bear 52 % of tax wedge at the 67 % of average earnings, however this share declines with an increase of wage level.

5 RELATIONS BETWEEN TAX WEDGE, EMPLOYMENT AND UNEMPLOYMENT

A close look at the data in Table 1 suggests that countries not only differ in tax wedge but also in employment and unemployment rate, respectively. The bivariate analysis performed on 39 countries (all member countries of OECD and EU and Croatia) pointed on the existence of statistically significant positive correlation between tax wedge (at all wage levels) and unemployment rate.[11] On the contrary, the correlation between tax wedge and employment rate was negative, however not statistically significant.

To identify groups of countries that are similar to each other according to unemployment and employment rate, a hierarchical cluster analysis using Ward's method and Euclidean distance as a measure function has been applied.[12] As can be seen from Figure 3, countries grouped into two main clusters depending on the size of unemployment and employment rate. The first cluster includes 27 countries (i.e. 69 % of the whole sample), which recorded higher employment rate and lower unemployment rate. The second cluster is a group of 12 countries, which exhibit the opposite characteristics, i.e. lower employment rate and higher unemployment rate. When comparing these two clusters of countries according to the level of tax wedge, it is noticeable that low tax wedge at all studied wage levels corresponds to lower unemployment and higher employment rate, and vice versa (see Table 3). The Mann-Whitney U test[13] confirmed that the differences between clusters in employment and unemployment rate and in tax wedge (at 67 % and 100 % average wage) are statistically significant at significance level of 5 %. The obtained results are comparable with the results of various empirical studies on the sample of OECD and EU countries (for example Nickell and Layard, 1999; Nickel, 2003; Daveri and Tabellini, 2000, Dolenc and Vodopivec, 2005; Bassanini and Duval, 2006; Šeparović, 2009; Dolenc and Laporšek, 2010; Grdović Gnip and Tomić, 2010; Jerman *et al.*, 2010; etc.).

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[11] Pearson coefficient between unemployment rate and tax wedge at 67 %, 100 % and 167 % of average earnings amounted 0.380, 0.357 and 0.333, respectively, at significance level of 5 %.

[12] The variables used were standardized in order to avoid the influence of different averages on the relative importance of the variable.

[13] The Mann-Whitney U non-parametric test was used due to small number of studied countries.

Figure 3: Dendogram using hierarchical clustering (Ward's method and squared Euclidean distance)
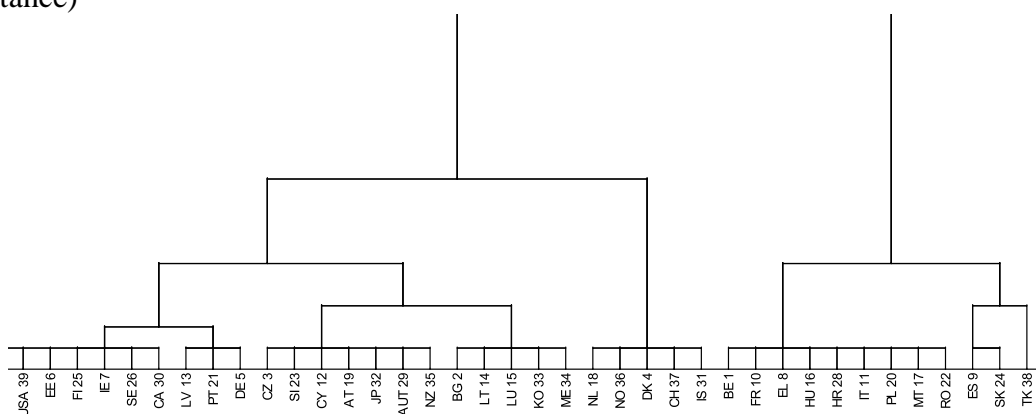
Note:

AT - Austria, AUT - Australia, BE - Belgium, BG - Bulgaria, CA - Canada, CH - Switzerland, CY - Cyprus, CZ - Czech Republic, DE - Germany, DK - Denmark, EE - Estonia, EL - Greece, ES - Spain, FI - Finland, FR - France, HR - Croatia, HU - Hungary, IE - Ireland, IS - Iceland, IT - Italy, JP - Japan, KO - Korea, LT - Lithuania, LU - Luxemburg, LV - Latvia, ME - Mexico, MT - Malta, NL - Netherlands, NO - Norway, NZ - New Zealand, PL - Poland, PT - Portugal, RO - Romania, SE - Sweden, SI - Slovenia, SK - Slovak Republic, TK - Turkey, UK - United Kingdom, USA - United States of America.

Source: Eurostat, 2010; OECD.Stat, 2010; Central Bureau of Statistics, 2010; authors' calculations.

Table 3: Characteristics of clusters obtained by the hierarchical clustering using Ward's method and squared Euclidean distance

Group		Tax wedge at			Employment rate	Unemployment rate	Countries
		67 % average wage	*100 % average wage*	*167 % average wage*			
Cluster 1 (n=27)	Mean	30.8	35.3	39.6	71.0	4.9	*UK, USA, EE, FI, IE, SE, CA, LV, PT, DE, CZ, SI, CY, AT, JP, AUT, NZ, BG, LT, LU, KO, ME, NL, NO, DK, CH, IS*
	Median	32.9	36.8	41.7	70.9	4.5	
	Std. dev.	11.4	9.4	9.0	5.6	1.6	
Cluster 2 (n=12)	Mean	38.8	42.5	46.1	59.0	8.1	*BE, FR, EL, HU, HR, IT, PL, MT, RO, ES, SK, TK*
	Median	38.6	41.2	44.0	59.1	7.6	
	Std. dev.	8.2	8.7	9.3	5.3	1.8	
Mann-Whitney U test (p)		97.0 (0.048)	92.0 (0.044)	100.0 (0.079)	12.5 (0.000)	27.0 (0.000)	

Note:
AT - Austria, AUT - Australia, BE - Belgium, BG - Bulgaria, CA - Canada, CH - Switzerland, CY - Cyprus, CZ - Czech Republic, DE - Germany, DK - Denmark, EE - Estonia, EL - Greece, ES - Spain, FI - Finland, FR - France, HR - Croatia, HU - Hungary, IE - Ireland, IS - Iceland, IT - Italy, JP - Japan, KO - Korea, LT - Lithuania, LU - Luxemburg, LV - Latvia, ME - Mexico, MT - Malta, NL - Netherlands, NO - Norway, NZ - New Zealand, PL - Poland, PT - Portugal, RO - Romania, SE - Sweden, SI - Slovenia, SK - Slovak Republic, TK - Turkey, UK - United Kingdom, USA - United States of America.
Sources: Eurostat, 2010; OECD.Stat, 2010; Central Bureau of Statistics, 2010; authors' calculations.

Croatia was grouped among countries with lower employment rate and higher unemployment rate which exhibit high tax wedge. Namely, Croatia recorded one of the highest unemployment rate and lowest employment rates among chosen groups in 2008.[14] However, there are eight low tax wedge countries that exhibit higher tax wedge at 67 % and 100 % wage level (and nine countries at the tax wedge at 100 % wage level) than Croatia.[15]

Using the classification obtained by cluster analysis, we further performed a discriminant analysis for each of the studied wage levels. The following functions of discriminant analysis were obtained:

Discriminant function 1: $\hat{Z} = 6.378 + 0.028 \cdot TW_{67\%} - 0.132 \cdot ER + 0.268 \cdot UR$

(3)

Discriminant function 2: $\hat{Z} = 5.988 + 0.038 \cdot TW_{100\%} - 0.133 \cdot ER + 0.254 \cdot UR$

(4)

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[14] Among chosen countries (ranked according to unemployment rate from highest to lowest), Croatia with 8.6 % unemployment rate places on the 4th position (after Spain (11.4 %), Turkey (11.2 %) and Slovak republic (9.5 %)). With regard to employment rate (ranked from lowest to highest), Croatia (57.8 %) also places on the 4th position, after Turkey (44.9 %), Malta (55.3 %) and Hungary (56.7 %).

[15] Lower tax wedge countries with higher tax wedge than Croatia are Scandinavian countries (Denmark, Sweden and Finland), Germany, Austria, Netherlands, Czech Republic, Latvia and Slovenia.

Discriminant function 3: $\hat{Z} = 5.920 + 0.040 \cdot TW_{167\%} - 0.135 \cdot ER + 0.254 \cdot UR$

(5)

Legend: $TW_{67\%}$ – tax wedge at 67 % average wage; $TW_{100\%}$ – tax wedge at 100 % average wage; $TW_{167\%}$ – tax wedge at 167 % average wage; UR – unemployment rate, ER – employment rate.

Note: Cut-off value for is 0. Countries with positive Z have high tax wedge, high unemployment rate and low employment rate, and vice versa.

The low tax wedge countries with high employment and low unemployment rate demonstrated a negative discriminant score, whereas the high tax wedge group of countries with low employment and high unemployment rate demonstrate a positive discriminant score. The analysis showed that the discriminant function divided chosen countries in the same groups as cluster analysis with the exception of Germany and Lithuania.[16] This implies that probability of a country to be classified as a high tax wedge country with low employment and high unemployment rate increases if tax wedge increases (which, according to theoretical and empirical expectations, causes the decrease of employment and increase of unemployment rate, pushing up the probability even higher). However, the causality is not a clear cut.

6 THE IMPACT OF TAX WEDGE ON UNEMPLOYMENT

A bivariate correlation analysis pointed on the existence of statistically significant correlation between tax wedge (at all wage levels) and unemployment rate (see Section 5). To check the relation between tax wedge and unemployment rate in more detail we conducted panel regression analysis on the data for chosen 39 countries during 2000–2008 period.

As seen in Table 4, the estimates of the panel regression analysis, allowing for random effects, confirmed a significant positive impact of tax wedge on unemployment rate at studied wage levels. Assuming that a worker with 67 % of average wage is the most representative,[17] the results suggest that a 10 % increase in labour taxation implies a 4 % increase in unemployment rate, *ceteris paribus*. The impact of increasing tax wedge on unemployment is higher for high-wage workers, confirming that the elasticities between tax wedge and unemployment rate are increasing in wage.

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[16] Both Lithuania and Germany were classified among low tax wedge countries due to relatively high unemployment rates (7.6 % in Germany and 5.9 % in Lithuania). However, both countries record negative discriminant scores (0.586 for Lithuania in discriminant function 1; 0.493 for Germany and 0.521 for Lithuania in discriminant function 2), as both countries exhibit tax wedge that is above average of high tax wedge group of countries.

[17] The real picture of wage distribution in the economy could be given by the median values of incomes. As the data on median of wages are in most countries not available for the studied period, we believe that the indicator of 67% of average wage is more closely to the actual distribution of wages. For example, in Slovenia the median of annual gross earnings amounted about 79 % in 2006 (Statistical Office of the Republic of Slovenia, 2009).

Table 4: Estimates of the panel regression analysis with random effects

Dependent variable: *logUR*	Single person without children		
% of average earnings	67 %	100 %	167 %
logTW	0.418*	0.603**	0.781**
logEPL	0.018	-0.012	-0.024
logGDP$_{pc}$	-0.489*	-0.489*	-0.459*
logIR	-0.085**	-0.086**	-0.088**
logLP	0.057	-0.030	-0.085
D	0.272*	0.908	0.934
DTW	0.003	-0.014	-0.013
Constant	5.094**	4.752**	3.918
R^2:	0.590	0.638	0.627

Significance level: *5 %, **1 %.
Notes: All variables were logarithmised. Explanation of abbreviations is available in Section 3.
Sources: authors' calculations.

In parallel to the above analysis, we employed the second panel regression analysis using an employment rate as a dependent variable and leaving other explanatory variables the same. The estimates have showed an existence of a minor negative, however statistically insignificant impact of tax wedge of representative workers with 100 % and 167 % of average earnings on employment rate.

7 CONCLUSION

The paper examines the issue of labour taxation of Croatian worker in comparison to workers in OECD and EU Member States, studies the relations between tax wedge and labour market outcomes (employment and unemployment rate) and analyses the impact of tax wedge on unemployment in chosen countries.

The estimates of the empirical analysis showed that the level of labour taxation in Croatia is comparable to that in most of the OECD and EU Member States. Namely, Croatia recorded a lower tax wedge for a worker with 100 % of average earnings than EU-15 or CEE countries. The taxation of labour was also higher in CEE countries than in Croatia when observing low- and high-wage workers. On the other hand, the Croatian workers are exposed to considerably higher taxation if compared to non-EU OECD countries. The tax wedge is expected to increase in 2009 and 2010 due to the introduction of special "crisis" tax. Cluster analysis performed on the OECD and EU Member States plus Croatia showed that a high unemployment rate and low employment rate is associated with higher tax wedge and vice versa. Croatia was placed among countries with higher tax wedge. As hierarchical cluster analysis gave us only an indication on relation between labour taxation and labour market outcomes and does not present a general rule, a further panel regression analysis was performed. The estimates of the regression analysis showed that the tax wedge at all three wage levels (i.e. 67 %, 100 % and 167 % of average wage) has a significant positive impact on unemployment rate in chosen countries. This signifies that lowering the level of labour taxation should result in a decline of unemployment rate. The findings also pointed on possible negative impact of tax wedge on employment rate, yet it was statistically insignificant.

As Croatia is in its way to become a member of the EU, it should follow the policy recommendations of the EU on the reduction of tax wedge. Moreover, weak employment and elevated unemployment rate remain a particular concern in Croatia. Namely, the employment rate in 2008 amounts 57.8 % and is one of the lowest rates among OECD countries and EU Member States. On the other hand, the unemployment rate in 2008 amounted 8.6 % and is therefore 2.8 percentage points higher than the average of OECD countries and 2.4 points higher than the average in EU-27. Besides high unemployment rate, which additionally increased due to the global economic recession, a problem presents also a high inactivity among the working-age population that amounted to 37 % in 2008. The reduction in tax wedge may therefore decrease rather high unemployment rate in Croatia. Moreover, it could also contribute to the improvement of its economic situation by increasing productivity and competitiveness. Special emphasis in tax wedge reduction should be put on the lowering of the social security contributions, especially those paid by employees, what would require reforms in health and pension insurance system. However, we should keep in mind that the tax wedge is not sufficient measure to increase employment, as the high unemployment rate is also the consequence of high unemployment benefits, wage negation system, employment protection legislation, pension system, economic performance, etc. Moreover, the labour taxation, especially social security contributions, presents important budget revenue. As the Croatian budget is, according to Grdović Gnip and Tomić (2010) socially oriented and social security contributions present an important component of the budget, it is unlikely that in near future Croatia would lower its tax burden.

To conclude, the findings of this paper are, in general, in line with previous empirical research, as the empirical estimates confirm the detrimental effect of tax wedge on unemployment. Howsoever, one has to remember of the limitations of these findings deriving from the availability of good time series information on tax wedge, its composition, and other labour market outcomes. The analysis also does not take into the account the effect of global economic and financial crisis, as its impact on real economy were not evident in year 2008. Therefore, a further analysis on a country by country basis and analysis considering the effects of economic and financial crisis are needed. Yet the data that will reflect the latter will be available in 2011.

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UTJEČE LI OPOREZIVANJE RADA NA NEZAPOSLENOST? HRVATSKI RADNIK U MEĐUNARODNOJ PERSPEKTIVI

SAŽETAK

Rad istražuje pitanje oporezivanja rada hrvatskih radnika u usporedbi s radnicima zemalja OECD i EU. Koristeći hijerarhijsku klaster analizu proučava se odnos između poreznog klina i ishoda tržišta rada, dok se panelnom regresijskom analizom, primijenjenom na podacima za 39 zemalja u periodu od 2000-2008, procjenjuje učinak poreznog klina na stopu nezaposlenosti. Empirijske procjene pokazuju da se Hrvatska svrstava među zemlje s višom nezaposlenosti i nižom stopom zaposlenosti, koju karakterizira viši porezni klin. Nadalje, procjene regresijske analize pokazale su da porezni klin na sve tri razine plaća (odnosno, 67%, 100% i 167% prosječne plaće) ima značajan pozitivni učinak na stopu nezaposlenosti. To znači da Hrvatska, kao i druge proučavane zemlje, treba nastaviti sa smanjivanjem poreznog klina jer će to umanjiti probleme nezaposlenosti i potaknuti stvaranje radnih mjesta.

Ključne riječi*: porezni klin, troškovi rada, nezaposlenost, ekonomska politika, Hrvatska, OECD, EU*
JEL klasifikacija*: J30, J38, H24.*

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THE INFORMATION CONTENT OF EARNINGS AND OPERATING CASH FLOWS FROM ANNUAL REPORT – ANALYSIS FOR CROATIAN LISTED COMPANIES

ABSTRACT

The main purpose of this research was to test the content of accounting information (earnings and operating cash flow) in the context of investors' decisions at capital markets. The research is based on event study approach where return volatility index RVI_{it} is used as measure of market reaction in the period of 10 days before and after publishing the accounting information. The research was done on the sample of companies from CROBEX 10, i.e. on the sample of 10 most traded companies from the Zagreb Stock Exchange in the period 2005-2009. As a general conclusion we can point out that accounting information (earnings and operating cash flow) from annual report has information content since the market reacts to published information with abnormal returns.

Key words: earnings, operating cash flows, information content, stock returns

1. INTRODUCTION

According to the modern accounting frameworks of FASB & IASB (IASB, 2008; Lewis, Pendrill, 2004) accounting information should be useful for capital market investors (among other users). After the early studies in 1960-ies many researchers from different countries have tested the information content of accounting information on the capital markets. Since this kind of research is almost nonexistent in Croatia we decided to test the information content of two basic accounting performance measures from annual report (earnings and operating cash-flows). Although this kind of research is pretty "classical" in free market economies with developed capital markets it still represents a very interesting research topic for an emerging market country like Croatia. Namely, Croatia is still developing institutions of free market economy by implementing reforms and accepting modern standards in different areas. One of the areas of such reform is the area of financial reporting where Croatian listed companies since 1993 implement IASB standards (IAS/IFRS). Although the implementation of IFRSs should result with high quality accounting information the practical implementation of IFRSs in Croatia is still rather problematic. Namely, recent research (Pervan, 2009) has shown that Croatian regulatory framework for the listed companies for a long period (1993-2009) did not require publication of the following important annual report elements: notes, accounting policies, segment information, related parties transaction, auditor report, etc. Another research (Pervan, 2006) that addressed the issue of Croatian listed companies' voluntary disclosure has also

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discovered that Croatian listed companies on average are not very transparent in terms of voluntary Internet reporting.

Taken together findings from the previous research on financial reporting of listed companies in Croatia here we must observe that capital market investors in Croatia are faced with limited scope annual financial reports. Such financial reporting environment might put into question the trust of investors in quality of published information and limit the practical use of accounting information in investment decisions. Furthermore, according to financial reporting clusters Croatia belongs to European continental model since accounting information is primarily provided for the tax authorities. Vast majority of companies (even publicly traded) finance operations and investments trough the bank loans. IPOs are still very rare and during the last twenty years only a few private companies went public trough IPO. Capital market is mainly secondary market where investors trade the stocks of previously privatized state owned companies.

From the daily media, specialized financial journals and analyst interviews we can often hear that Croatian capital market is undeveloped since it is shallow, pretty volatile and incorporates a significant role of insider trading. The limited content of annual reports, taken together with undeveloped capital market might put into question the information content of annual accounting information. Such business environment in Croatia was a main stimulus for this study. The study follows the classical approach defined by the early papers, but as a methodological contribution of the study we could point out the usage of daily variance instead of constant variance when calculating abnormal returns. As period of analysis we decided to use the period from 2005 to 2009. During the period of analysis the Croatian economy and capital market were facing years of strong growth, fall and stagnation. Longer data series have allowed us to analyze capital markets reaction on accounting information announcements in different stages of economy cycle and general economic expectations.

The paper is organized in the way that after introduction we have presented early and recent research on the issue of information content of accounting information announcement. After that in the third part of the paper we have described the research methodology, including data sources and equations. Research findings are presented in the fourth chapter, which is followed by the concluding remarks.

2. REVIEW OF LITERATURE

Since the early work of Ball & Brown and Beaver in 1968 the analysis of relationship between accounting earnings announcement and reaction of capital markets has attracted considerable attention. The interest for this issue is legitimate, given the generally accepted modern financial reporting conceptual frameworks which point out that accounting figures are aimed at providing investors with relevant information for their investment decisions. Regarding the capital markets accounting information is used in order to facilitate the prediction of firms' future cash flows, risk and returns. The main aim of early researches was testing the usefulness of accounting information for the investors. This kind of research starts from the assumption which states that if capital markets are efficient, stock prices should reflect quickly and fully any newly publicly released information (including published accounting information).

Beaver (1968) made one of the first empirical studies examining the information content of annual earnings. His study empirically examined the extent to which common stock investors perceive annual earnings to possess informational content. Beaver defined information as a change in expectations about the outcome of an event. Within the context of his study, a firm's earnings and operating cash flow announcement is said to have information content if its announcement leads to a change in investors' assessments of the probability

distribution of future returns (or prices), such that there is a change in equilibrium value of the current market price. His research showed that the stock prices are on average 67% higher in the announcement week than the average price for all other weeks. Research showed that the stock market reacts significantly on financial statements announcements, which leads to conclusion that financial results of the firm's have significant information content.

The main aim of Ball and Brown's (1968) study was to show the existence of the association between the abnormal returns of a firm's securities and the announcement of annual accounting earnings. Based on the firm's reported earnings, a company was classified as reporting good (bad) news if reported earnings were above (below) predicted earnings. Through their study they managed to show that good (bad) news firms enjoyed, on average, abnormally positive (negative) returns. Furthermore, the study showed that 80% to 85% of the abnormal market return occurred prior to the publication of the annual report.

After the pioneering work of Beaver and Ball & Brown later studies use different accounting variables, different financial statements, different forecast models for earnings, different market variables in order to test information content of accounting information (White et. al. 1997). Later studies, with usage of more sophisticated methodologies and more detailed market data, mainly confirmed the findings from early studies that accounting number have information content for investors. Thus for example, Morse (1981) used daily data on abnormal returns and discovered that significant price reaction exists one day before and one day after earnings announcement in the Wall Street Journal. Patell and Wolfson (1984) due to information technology advances put research focus on intraday reaction. Namely, Dow-Jones newswire releases earnings information even before it is published in the Wall Street Journal. Intraday analysis has revealed that major portion of market reaction happened within the first two hours after earnings announcement trough Dow-Jones newswire.

Research for the Cyprus Stock Market on publication of earnings and cash flows was done by Vafeas et al. (1998). The Cyprus Stock Market at that time was characterized by low liquidity and no financial newspapers or special financial web pages. Researches took into consideration all stocks in period of 10 years and they managed to prove that operating cash flow had the same information content as earnings. Also they discovered that earnings had more content when they were positive, for bigger companies, and in the later years of the analyzed 10 years period.

Gajewski and Quere (2001) analyzed the data from the Paris Stock Exchange and they wanted to prove the existence of information content of earnings for different financial statements (annually, semi-annually and quarterly). Empirical findings indicated that semi-annual earnings announcements had less information value than yearly earnings announcements. Authors also proved that second and forth quarterly report caused bigger reaction than reports for first and third quarter.

A cross-country analysis was made by DeFond et al. (2007) using data from over 50,000 annual earnings announcements in 26 countries. The study found that annual earnings announcements are more informative in countries with higher quality earnings or better enforced insider trading laws, and that annual earnings announcements were less informative in countries with more frequent interim financial reporting. They also found that, on average, earnings announcements were more informative in countries with strong investor protection institutions.

Another research in France was done by Wael (2008) who analyzed intraday stock price changes on the Paris Stock Exchange. He managed to prove that investors reacted positively on positive earnings announcements and negatively on negative earnings announcements. He also pointed out that most of abnormal return disappeared within 15 minutes from the announcement and that the reaction was quicker for positive then for

negative earnings announcements. Like Beaver he proved that trade volume also reacted on earning announcements.

The review of the existing literature has shown that most of the researches have been successful in proving their hypothesis that accounting variables announcement has information content and that the relationship between the earnings announcements and market variables really exists.

3. RESEARCH DESIGN

The Croatian stock exchange market called Zagrebačka burza (hereinafter ZSE) today has two stock indexes – CROBEX[1] and CROBEX10[2]. For the purpose of our research we have chosen the 10 stocks (Table 1) that are within CROBEX10 index as best representative for the CROBEX index and the whole capital market in Croatia.

Table 1 - Composition of CROBEX10

Ticker	Issuer	Free float factor	Number of shares in CROBEX10
ADRS-P-A	Adris grupa d. d.	95%	6.444.895
ATPL-R-A	Atlantska plovidba d.d.	80%	1.116.416
DLKV-R-A	Dalekovod d.d.	85%	1.949.740
ERNT-R-A	Ericsson Nikola Tesla d.d.	45%	599.243
HT-R-A	HT d.d.	50%	6.098.137
IGH-R-A	Institut IGH d.d.	90%	142.722
INA-R-A	Ina d.d.	8%	800.000
INGR-R-A	Ingra d.d.	80%	6.000.000
KOEI-R-A	Končar - elektroindustrija d.d.	40%	1.028.848
PODR-R-A	Podravka d.d.	45%	2.439.001

For the purpose of analysis we have decided to use the five years period from 2005 to 2009 due to data availability and since selected period covers years with strong growth, strong fall and stagnation of stock prices and trading volume. Since not all of the selected stocks were on the market during this period and some data were not available there were totally 46 stock/years observations included into the research sample. The data on stock prices and quantity of stocks traded and daily market index were collected from the website of ZSE[3]. Market data for each stock were collected from the May 15th of the year for which the announcement was made until June 15th of the year in which the annual earnings announcement was published. The data on the day of the announcements were also collected from ZSE. The analysis of capital markets reaction on published accounting information was done for the reporting period of 21 working days (10 days prior and 10 days after the announcement day).

Financial statements data required for the calculation of positive or negative change in earnings and operating cash flow was gathered from Reuter's database and from ZSE web site. The data for all the five years are shown in Table 2. To distinguish good (bad)

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[1] ZSE share index comprised of 25 top ranked stocks by the market share
[2] ZSE share index comprised of 10 top securities included into CROBEX index, with the largest free-float market capitalization and liquidity
[3] www.zse.hr

announcement news we have decided to use naive model, where previous year published earnings/operating cash flows is forecast for next year earnings/operating cash flows. The announcement of accounting information represents good news if reported number is higher than in the previous year. Otherwise, if announced number is lower than in the previous year news is classified as bad.

Stock returns were calculated for all the stocks in all the years. Stock returns were calculated on the basis of the following equation: $R_{i,t} = ln\left[\frac{P_{i,t}}{P_{i,t-1}}\right]$, where $P_{i,t}$ is the price of stock i in a day t. Dividends paid were not included in the calculation of returns because of several reasons but the most important one was that including dividends would influence significantly on the calculation of the abnormal stock returns. Namely, dividends are usually paid on only few days in a year and including them in the calculation of returns would significantly change the data for those few days and consequently the normal average returns during the non-reporting period.

If the earnings announcements convey information that is useful for investors then the magnitude of the price change should be larger on the accounting information announcement day in comparison with magnitude of the price change during the other days in the reporting period. The next step was calculating the market wide effect on each of the daily stock price returns. The model that we used to identify the market wide effects was CAPM, firstly used by Sharpe in 1963. The model for calculation of the expected daily stock price returns is based on the following equation: $\hat{R}_{i,t} = a_i + b_i R_{M,t} + u_{i,t}$, where $R_{i,t}$ is a measure of the price change of stock i on day t, and $R_{M,t}$ is stock index change on day t. All estimated CAPM models are shown in Table 3.

All the b_i coefficients are significant at 5% level, while most of the a_i coefficients are not significant. It is not recommended to eliminate insignificant a_i coefficients from the models because that could cause biased estimates or the overpriced value of the coefficients b_i. Surprisingly all of the D-W tests show a normal value (around 2), which means that there is no significant autocorrelation of residuals.

Table 2 – Data for the period 2005-2009

	2005				2006				2007				2008				2009			
	Announcement date	Reporting period	Net earnings change (%)	Operating cash flow change (%)	Announcement date	Reporting period	Net earnings change (%)	Operating cash flow change (%)	Announcement date	Reporting period	Net earnings change (%)	Operating cash flow change (%)	Announcement date	Reporting period	Net earnings change (%)	Operating cash flow change (%)	Announcement date	Reporting period	Net earnings change (%)	Operating cash flow change (%)
ADRS-P-A	22.3.06	8.3.-5.4.-	-38.03	-0.22	30.3.07	16.3.-17.4.-	23.57	-35.80	31.3.08	14.3.-15.4.-	11,30	28.23	31.3.09	17.3.-16.4.-	-25.25	73.57	30.4.10	16.4.-14.5.-	-35.05	-53,45
ATPL-R-A	31.3.06	17.3.-18.4.-	290.48	201.46	29.3.07	15.3.-16.4.-	-77.98	-76.88	27.3.08	11.3.-10.4.-	158.01	216.61	30.3.09	16.3.-15.4.-	178.82	93.45	6.5.10	22.4.-20.5.-	107.64	-59,91
DLKV-R-A**	27.3.06	13.3.-10.4.	2,31	331,95	N/A	N/A	3,41	423,41	27.3.08	23.4.-26.5.	12,15	1676,97	30.4.09	16.4.-15.5.	4,19	206,06	30.4.10	16.4.-14.5.	7,78	160,23
ERNT-R-A	9.3.06	23.2.-23.3.	8,42	-66,80	5.3.07	19.2.-19.3.	-0,81	365,12	18.3.08	4.3.-3.4.-	-14,53	-28,35	12.3.09	26.2.-26.3.	2,29	119,62	25.5.10	11.5.-4.6.	-37,15	-17,05
HT-R-A *	*	*	*	*	*	*	*	*	28.2.08	14.2.-13.3.	11,70	-18,58	27.2.09	13.2.-13.3.	-6,59	-1,36	16.2.10	2.2.-2.3.	-12,38	-12,08
IGH-R-A	29.3.06	15.3.-12.4.	91,73	-181,13	26.3.07	12.3.-11.4.	-2,24	-84,08	26.3.08	10.3.-9.4.	67,79	168,41	1.4.09	18.3.-17.4.	8,63	133,17	29.4.10	15.4.-13.5.	-81,61	-110,61
INA-R-A *	*	*	*	*	22.3.07	8.3.-5.4.-	11	14	31.3.08	13.3.-14.4.	44,57	69,07	27.2.09	13.2.-13.3.	-72,46	8,82	15.2.10	1.2.-1.3.	75,28	12,59
INGR-R-A	12.4.06	29.3.-28.4.	283,72	1057,53	2.4.07	19.3.-18.4.	51,60	-84,33	27.3.08	11.3.-10.4.	146,18	1704,59	17.4.09	1.4.-4.5.	100,48	186,68	30.4.10	16.4.-14.5.	99,47	187,66
KOEI-R-A	30.3.06	16.3.-13.4.	66,22	2866,36	23.3.07	9.3.-10.4.	298,75	1,76	26.3.08	10.3.-9.4.	69,66	3,21	31.3.09	17.3.-16.4.	23,76	58,99	1.4.10	18.3.-19.4.	12,00	-3,97
PODR-R-A	29.3.06	15.3.-12.4.	-15,39	7,72	29.3.07	15.3.	-3,62	-13,81	31.3.08	14.4.-	-69,62	2,51	30.3.09	16.3.	143,99	179,03	6.4.10	20.4.	706,55	2542,62

* Not traded
** Data unavailable for 2006.

Table 3 - CAPM models

	2005				2006				2007				2008				2009			
	ai	bi	S.E. Of regression	DW test	ai	bi	S.E. Of regression	DW test	ai	bi	S.E. Of regression	DW test	ai	bi	S.E. Of regression	DW test	ai	bi	S.E. Of regression	DW test
ADRS-P-A	0.001514	0.849260	0.000143	2.037774	0.001524	0.449544	0.034962	1.790382	0.001037	0.826671	0.012270	2.311604	0.001751	0.479873	0.045347	2.348783	0.000516	1.056623	0.011818	2.468797
ATPL-R-A	0.000064	0.710746	0.019013	2.021367	0.000018	1.056110	0.016589	2.337477	0.003058	1.442295	0.021495	1.999178	0.001845	1.697907	0.022938	1.567529	0.000593	1.451790	0.015217	1.455635
DLKV-R-A**	0.001650	0.801504	0.018262	2.288521	N/A	N/A	N/A	N/A	0.001130	1.588531	0.018944	1.869987	0.000870	1.576455	0.021725	2.176580	0.001139	1.292327	0.014026	2.317551
ERNT-R-A	0.000377	0.423658	0.044886	2.166058	0.000723	0.665551	0.016820	2.407066	0.001791	0.917238	0.015937	2.401151	0.001307	0.786608	0.017857	2.215659	0.000029	0.645172	0.013447	2.274670
HT-R-A*	*	*	*	*	*	*	*	*	0.001652	0.516246	0.015497	2.123450	0.000423	0.564622	0.011627	1.901087	0.000571	0.329201	0.010919	1.914387
IGH-R-A	0.001143	0.779033	0.016240	2.460347	0.002022	1.100083	0.030157	1.959167	0.002277	1.760109	0.027770	2.170236	0.001367	1.461585	0.024648	2.152937	0.002359	1.291579	0.022820	2.047160
INA-R-A*	*	*	*	*	0.000538	1.141790	0.019962	1.921933	0.000477	0.830904	0.014630	2.101755	0.000230	0.772064	0.023949	1.858373	0.000438	0.917780	0.015259	2.185761
INGR-R-A	0.003233	0.539230	0.028023	2.397154	0.005762	0.428058	0.037252	1.762504	0.001855	1.442985	0.023369	1.940638	0.001181	1.575145	0.027570	2.161540	0.002748	1.337421	0.020885	1.893707
KOEI-R-A	0.001873	0.368182	0.014502	1.973517	0.001628	1.057154	0.017041	1.831673	0.000091	1.235826	0.015962	2.304490	0.000891	1.111443	0.021417	2.220659	0.000202	1.044215	0.015891	2.504210
PODR-R-A	0.000721	0.436995	0.013081	2.298923	0.000400	0.539917	0.014185	2.324726	0.001065	0.526402	0.014482	2.466069	0.000927	0.371467	0.021554	2.209819	0.000755	0.774094	0.026924	2.508868

* Not traded
** Data unavailable for 2006.

After forming all the CAPM models the abnormal returns for the reporting periods were calculated by using the following equation: $u_{i,t} = R_{i,t} - a_i - b_i R_{M,t}$. Since abnormal returns can be both positive and negative to avoid their mutual elimination all abnormal returns were squared ($u_{i,t}^2$). Average value of $u_{i,t}^2$ in non-reporting period is in fact a variance of variable $u_{i,t}$ (s_i^2). Relation between residual $u_{i,t}^2$ for reporting period and s_i^2 for non-reporting period can be shown by ratio $U_{i,t} = \frac{u_{i,t}^2}{s_i^2}$. If the ratio is greater than 1 it means that there is return greater than usual, i.e. abnormal return.

Since using the constant variance s_i^2 for non-reporting period can cause overestimating of the results we have decided to use GARCH (1,1) models to calculate the daily variance for the whole period of observation. Unexpected price changes can be overestimated when constant variance for non-reported period is assumed. In other words, the abnormal price activity is overestimated when the squared residual error is increasing within dynamic structure in comparison to the same variance of the fixed period. Therefore, GARCH (1,1) models[4] are used to estimate the conditional variance, i.e. time varying variance for each trading day according to the daily returns of the entire sample.

GARCH model uses the following estimation equation: $v_{i,t}^2 = \alpha_i + \beta_{i,1} R_{i,t-1}^2 + \beta_{i,2} v_{i,t-1}^2$, where $R_{i,t-1}^2$ is the squared return on the stock i for the previous day (*t-1*), and $v_{i,t-1}^2$ is volatility of returns for stock i in for the previous day (*t-1*). High values of parameters $\beta_{i,1}$ and $\beta_{i,2}$ indicate high persistence of volatility. Alternatively, if $\beta_{i,1} + \beta_{i,2}$ is close to 1 it means that long time is needed for volatility shocks to vanish. Based on the gathered variances the volatility of return was calculated by ratio RVI$_{i,t}$ – return volatility index where $u_{i,t}^2$ is numerator and $v_{i,t}^2$ denominator. It is expected, if the initial assumptions on information content of accounting information from annual report (earnings and operating cash-flows) are correct, that the return volatility index - RVI$_{i,t}$ will be significantly different from 1 in the period around the announcement.

4. RESEARCH RESULTS

The empirical analysis for 2005 has shown results as expected, since positive earnings and operating cash flows are followed by positive market reaction, while negative earnings and negative operating cash flows are followed by negative market reaction.

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[4] GARCH models are mostly applied and developed in the field of finance, but can help to get closer insight whenever volatility is not constant over time (heteroskedasticity).

**Table 4: Return volatility index - RVI$_{it}$ - 2005**

Reporting period day	Positive earnings	Positive cash flow	Negative earnings	Negative cash flow
-10	0.198	0.164	-0.640	-0.548
-9	**2.174**	**1.877**	-0.360	**-1.460**
-8	**1.961**	**1.091**	**-1.298**	**-2.970**
-7	**1.051**	0.834	-0.363	-0.953
-6	0.433	0.240	-0.327	-0.683
-5	0.752	0.254	-0.192	**-1.210**
-4	0.770	0.890	**-1.341**	-0.949
-3	0.153	0.181	**-2.284**	**-1.527**
-2	0.257	0.334	**-4.441**	**-2.917**
-1	0.729	0.624	-0.170	-0.533
0	0.502	0.537	**-1.311**	-0.983
1	**3.072**	**2.302**	**-2.700**	**-4.107**
2	**2.380**	0.081	-0.086	**-4.681**
3	0.845	**1.115**	-0.378	-0.084
4	**1.392**	**1.475**	-0.184	-0.447
5	0.788	0.876	-0.114	-0.191
6	0.307	0.499	**-1.096**	-0.514
7	**1.620**	0.570	-0.020	**-2.303**
8	0.567	0.816	-0.856	-0.346
9	0.487	0.318	-0.511	-0.785
10	0.181	0.191	-0.287	-0.235

RVI$_{i,t}$ indicates (Table 4 and Graph 2) that market has significant reaction (-1.311) for negative news on earnings on the day of announcement. One day after the announcement market reaction is observable for both accounting variables (earnings and operating cash flow) and both type of news (good and bad). Market reaction for both good and bad news can be followed even up to 7th day after accounting information is published. This finding can lead to the conclusion that Croatian capital market in 2005 shows delayed reaction on published accounting information. But at the same time, we can also observe that positive and negative abnormal returns exist before the accounting information announcement, which might be the result of insider trading or other price sensitive information.
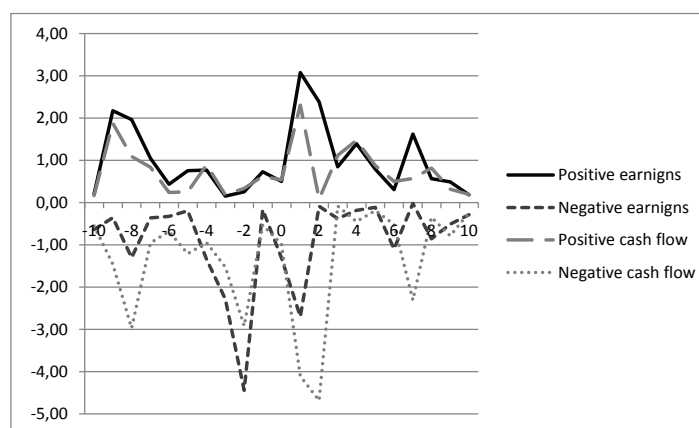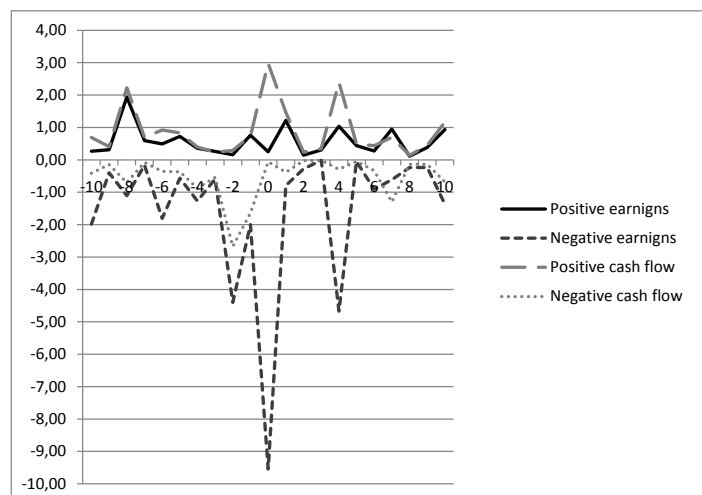

Graph 2 - RVI$_{i,t}$ for 2005

Research results for all other years included in the analysis are shown on Graphs 3 to 6[5]. Graph 3 reveals that in 2006 market reacted on earnings and operating cash flows, that represented good and bad news on the day of information announcement. But it is also noticeable that market reaction can be observable for positive news until the seventh day after announcement, while for the bad news reaction ends after the ninth day. Movement of return volatility index in 2007 reveals strong market reaction on the announcement day for positive operating cash flow (2.979) and negative earnings (-9.542). Market reaction for positive earnings (1.220) is observable one day after the announcement while reaction for negative cash flow (-2,672) is observed two days prior to the announcement.
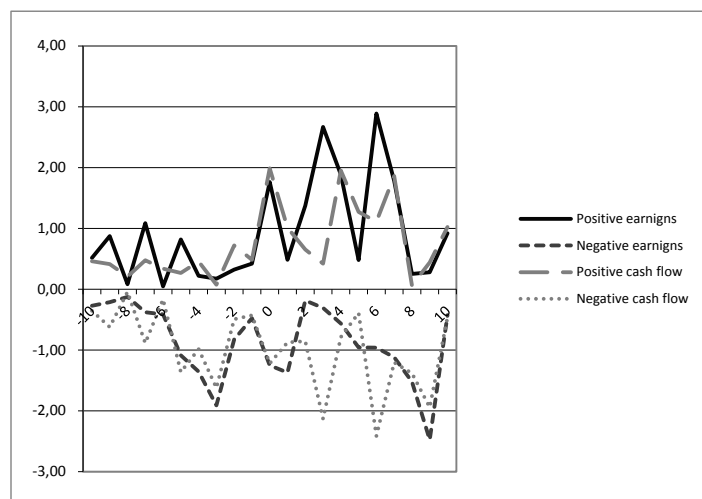
Graph 3 - $RVI_{i,t}$ for 2006

Graph 4 - $RVI_{i,t}$ for 2007

Year 2008 at ZSE was characterized by a strong fall of trade volume and stock prices due to the world financial crisis and pessimistic expectations about future results. Here we can notice that on the announcement day strong reaction exists for negative news, earnings (-3.679) and operating cash flow (-3.542). Reaction for positive earnings is delayed and happens on the third day after announcement, while there is no reaction on negative operating cash flow after the announcement. However, here we must also notice that positive market

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[5] Tables with detailed data on RVI_{it} change in years 2006-2009 due to article space limitation are not presented but it can be obtained upon request.

reactions for good news are observable three days before accounting information announcement.
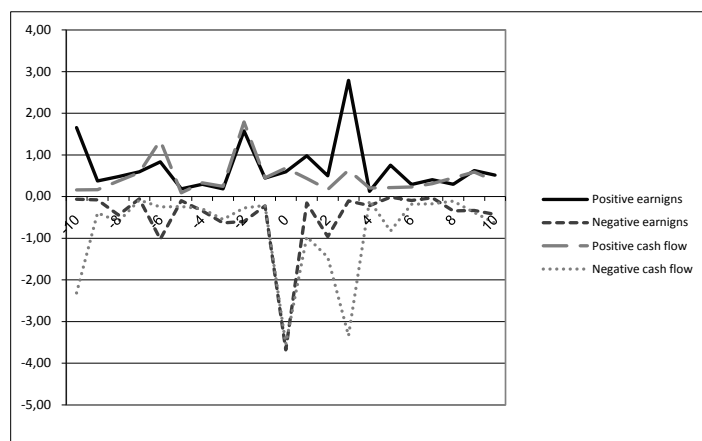
Graph 5 - RVI$_{i,t}$ t for 2008
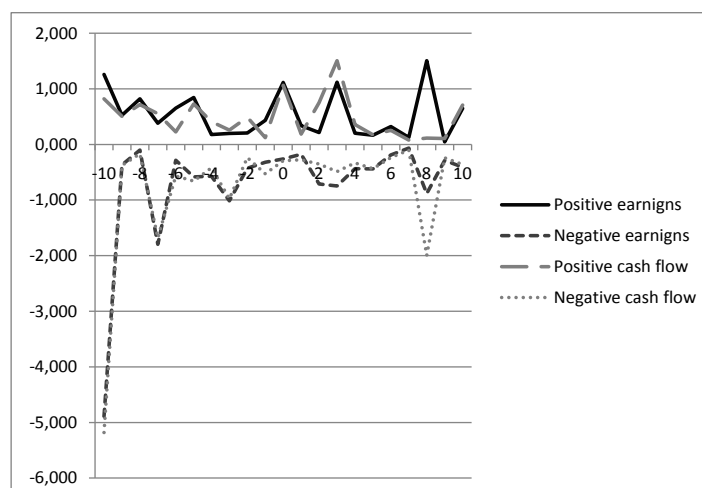
Graph 6 - RVI$_{i,t}$ for 2009

The final year included into analysis 2009 is characterized by certain recovery of share prices while trade volume at ZSE was modest. On the announcement day the market reacts only for good news, earnings (1.114) and operating cash flow (1.065), while there is no reaction to the bad news. Negative market reactions for bad news can be traced up to ten days before accounting information announcement. Findings for 2008 and 2009, years of strong fall and recovery, might indicate that capital market investors in years of bad economy put focus on bad news, while in years of economy recovery focus is on the good news.

5. CONCLUDING REMARKS

This research aimed to test the information content of accounting information (earnings and operating cash flow) from annual report in the context of investors' decisions at Zagreb Stock Exchange. We wanted to find out whether investors in Croatian emerging market environment use published accounting information from annual report, which is analyzed trough abnormal price changes around date of announcement. Therefore, the event study approach was adopted and we constructed the return volatility index RVI$_{it}$ in order to measure market reaction in period of 10 days before and after the announcement of accounting information. The constructed return volatility index has some advantages over similar indexes

from previous studies since RVI_{it} uses daily variance instead of constant variance when calculating abnormal returns in the nonreporting period.

As a general conclusion of research we can point out that both accounting performance measures from annual report, earnings and operating cash flow, have information content since the market reacts on published information with abnormal returns. Abnormal returns reaction exists both for good and bad news, where good news are followed by positive abnormal returns, while the bad news are followed by negative abnormal returns. Market reaction on the announcement day and one day after announcement is observed in almost all years included into analysis. Also, RVI_{it} movement indicates that Croatian capital market might have delayed reaction on published information since abnormal returns can be traced even up to 10 days after the annual report announcement at ZSE.

As limitation of the study we could point out a relatively small sample and some future studies could try to explore the same issue on a larger sample. Also, empirical findings indicate that significant abnormal returns exist before and after the day of annual report announcement, which can be explained by market inefficiency or insider trading. But, since we did not have a very detailed data-base on other price sensitive information (take-over announcement, new contract, new product, entering the new market, R&D success or failure, etc.) any conclusion about causes of abnormal returns before and after the announcement day is not completely reliable.

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INFORMACIJSKI SADRŽAJ DOBITI I OPERATIVNOG NOVČANOG TIJEKA IZ GODIŠNJIH IZVJEŠTAJA -ANALIZA ZA HRVATSKA LISTANA DRUŠTVA

SAŽETAK

Osnovni cilj ovog istraživanja je testiranje informacijskog sadržaja računovodstvenih informacija (dobiti i operativnog novčanog toka) u kontekstu ulagačkih odluka na tržištu kapitala. Istraživanje je bazirano na pristupu "studije događaja", gdje je indeks volatilnosti povrata dionica RVI_{it} korišten za mjerenje reakcije tržišta u razdoblju od 10 dana prije i nakon na objave računovodstvenih informacija. Istraživanje je provedeno na uzorku kompanija iz indeksa CROBEX 10, tj. na uzorku 10 najtrgovanijih kompanija sa Zagrebačke burze u razdoblju od 2005 do 2009 godine. Kao opći zaključak istraživanja može se navesti da računovodstvene informacije iz godišnjih izvještaja (dobit i operativni novčani tok) imaju informacijski sadržaj jer tržište reagira na objavu informacija kroz abnormalne povrate.

Ključne riječi: dobit, operativni novčani tok, informacijski sadržaj, povrat dionica

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Prethodno priopćenje

RELATIONSHIP BETWEEN KNOWLEDGE WORKERS' PARTICIPATION AND ORGANIZATIONAL PERFORMANCE

ABSTRACT

The aim of this paper is to prove the connection between the participation of knowledge workers in an organization and its performance, as well as to define how the change of the participation of knowledge workers influences organizational performance. The empirical research was conducted on a sample of 40 companies. Using a specially designed questionnaire, the research data, which includes data about the participation of knowledge workers in each company and indicators of companies' financial performances, was collected. The empirical results discovered a statistically significant positive correlation between knowledge workers' participation and organizational performance and also showed how each financial indicator of a company's performance will change if the knowledge workers' participation changes. Furthermore, the results show that the growth of knowledge workers' participation in companies is not adequately followed by increased awards and other expenditures related to these workers, which could be a significant factor of the low productivity of these workers, which has also been proved by this research.

Key words: knowledge workers, organizational performance, productivity

1. INTRODUCTION

Since P. Drucker introduced the term of knowledge workers for the first time, this concept has come into the focus of theory and scientists as well as of practice and managers. Knowledge workers could be defined as workers whose work is based on the knowledge gained through their formal education or work experience; in their work they are looking for challenges and respond to them by creating new solutions or upgrades. In this way, they contribute to the development of their profession and the company in which they are employed. Some authors define these workers by their education. Bentley (1990) defines knowledge workers as those with high education, while Janz et al. (1997) identify knowledge workers as the ones who implement their theoretical and analytical knowledge gained during the educational process through which they have passed.

The contribution of knowledge workers to the organizational performance was the subject of many researches. Harris and Vining (1987) in their research emphasize the role of knowledge workers in added value creation. Harrigan and Dalmia (1991) highlight their importance as enterprises' intangible assets. Many authors have dealt with the motivation, productivity and rewards of knowledge workers (Despres and Haltrop, 1996; Baron and

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Hannan, 2002; Roell, 2004; Davenport, 2003; May et al., 2002; Karr-Wisniewski and Lu, 2010) as crucial determinants of organizational performance.

This paper tries to clarify the relationship between knowledge workers' participation and organizational performance by answering two questions:

(1) What is the relationship between knowledge workers' participation and organizational performance?

(2) How will organizational performance change if the knowledge workers' participation changes?

In order to answer these questions, an empirical research was conducted. To investigate the contribution of knowledge workers to organizational performance, it was important to distinguish knowledge workers from other employees. For this purpose, Bentley's (1990) definition of knowledge workers was followed. As it is already stated, he defines knowledge workers as those who have high education. Although this definition is not precise because knowledge workers are not all employees with a university degree, it represents the clearest way to determine the number of knowledge workers in some company. Organizational performance, as the other research variable, was explored by the financial indicators of organizational performance. The financial indicators, as a determinant of organizational performance, are commonly used by many authors in different researches (Snow and Hrebiniak, 1980; Barry and Milkovic, 1990; Huselid, 1995; Rechner and Dalton, 1991; Flamholtz and Hua, 2002; Schulte et al., 2009; Xing, 2009; Choi et al., 2010; O'Boyle et al. 2010; Munoz-Bullon and Sanchez-Bueno, 2010).

The research results of this paper confirm the importance of knowledge workers for companies' performance and clarify their contribution in achieving a specific level of organizational performance.

This paper starts with a theoretical background of knowledge workers and organizational performance (Section 2) which is needed for the proper understanding of the research topics. The research methodology is presented in Section 3, which is followed by the research results in Section 4. Concluding remarks are in Section 5, and the research limitations and guidelines for future research are presented in Section 6.

2. LITERATURE OVERVIEW

2.1. Knowledge workers and their role in contemporary companies

Knowledge workers are the generators of a company's growth and development. Their importance in modern companies is tremendous and it is defined by their knowledge possession, by their competences and abilities to solve the most complex problems and to develop new advanced and better solutions which will provide competitive advantage to the companies in which they are employed. Knowledge workers arise as a result of demands in the creation of new workplaces which are an essential form of modern companies. These types of workplaces require a considerable formal education and an ability to acquire and apply knowledge. Thus, the tasks which the knowledge workers have to complete require a different working approach and the need for permanent learning.

The definitions of knowledge workers refer to the context in which these workers perform their everyday jobs. Drucker (1959) defines knowledge workers as those who create new information which could be used in the decision-making process and for problem solving. Vogt (1995) defines knowledge workers as individuals who have the capacity and motivation to create new views, who have developed communication skills, who are able to transfer knowledge and create possibilities for using new ideas. Knowledge workers are workers who have individual and personal knowledge, and organizations are increasingly seeking ways of transforming this into shared social knowledge deployed for organizational goals (Frost,

2002). These workers consider that the sharing and transfer of their knowledge and expertise is their personal and professional responsibility (Redpath et al., 2009, pp. 86). Frost et al. (2010) define knowledge workers as a critical resource to the firm because their abilities must contain firm-specific knowledge to gain a sustainable competitive advantage (Frost et al., 2010, pp 127). Knowledge workers are also defined through different professions such as scientists, engineers, professors, psychologists, lawyers, bankers, accountants, etc.

The analysis of the importance of knowledge workers, their place and their role in modern companies should start from a broader range which contains general characteristics and elements of present-day society. Namely, the dominant characteristic of today's society is a strong competition. Access to information is free; the knowledge is available to everybody, so there is no excuse for poor performances. The competition becomes considerably strong on the individual level as well as on the organizational and general social level. In these circumstances, the importance of knowledge workers becomes clearly evident. These workers have to convert their knowledge into outstanding performances.

The majority of knowledge workers spend all their working life like other employees. They have their workplace; they get a salary, and could be fired. However, contrary to other employees, knowledge workers possess the most important resource, knowledge. Industrial workers leaving a company leave behind the machines and equipment, but when knowledge workers leave a company, they take away the most valuable company's resource and that is their knowledge. Therefore, the key investment of modern companies is not the investment in facilities, buildings and equipment but in knowledge and knowledge workers. Without knowledge workers, no matter how sophisticated and advanced the company's technology is, it will not be effective and efficient.

Knowledge workers and the organization in which they work are interdependent. Specifically, the organization provides knowledge workers the resources (Alverson, 2000). Only knowledge without organizational support and resources is worthless. On the other hand, companies depend on knowledge workers and their ability to synthesize theoretical and empirical knowledge in order to apply it to design appropriate solutions. In this sense, companies must meet the aspirations and expectations of knowledge workers which will cause their dedicated efforts in achieving companies' goals. The companies in which they are employed should provide them with the adequate resources necessary for their knowledge application and building satisfactory solutions. Furthermore, the companies should also offer them the resources for their sustained development as a precondition for exceptional performances, both individual and organizational ones.

According to these thoughts and the growing interest in understanding the importance and meaning of knowledge workers in today's companies as well as their contribution to the whole society, this term comes into the focus of scientists and managers. In literature, there are many papers which analyze knowledge workers from different aspects such as characteristics and expectations of knowledge workers; learning organizations as a new organizational form; knowledge management; etc. (Horwitz et al., 2003). Arthur et al. (2008) in their article address the special circumstances that confront the contemporary knowledge worker in the unfolding knowledge economy. Wang et al. (2009) in their paper analyze the knowledge workers' turnover rate and discover the importance of their intrinsic characters as determinant of their turnover. Similarly, Wu (2009) in his paper suggests that because of knowledge workers' different characteristics from common workers, the effective management for them should be based on their unique characteristics.

2.2. Organizational performance measurement

The identification of organizational performance fundamentally represents the determination of organizational success, which in present circumstances becomes extremely

important because of many reasons such as: growing competition, business reengineering, national and international quality rewards, organizational changes, regulation and deregulation, development of IT, etc. (Neely, 1999). Performance measurement is a crucial requirement of the performance management as a tool for achieving better individual, team and organizational results (Armstrong, 2006, pp. 184). The organizational performance essentially could be determined by either financial indicators or contemporary performance measurement systems.

The financial indicators of organizational performance represent the dominant category in a group of traditional measurements of organizational performance. These indicators are oriented towards the determination of a company's market efficiency and they include indicators which are assigned by market demand, competition, etc. The calculation of these indicators is based on financial statement analysis. The financial indicators include: activity analysis (which usually involves the calculation of the total asset turnover ratio, current asset turnover ratio, days sales outstanding); calculation of the economy ratio or revenues over expenses ratio; liquidity analysis (which usually involves the current ratio and quick or acid test ratio); debt analysis (which includes the calculation of the debt ratio, times-interest-earned (TIE) ratio, EBITA coverage ratio); profitability analysis (which includes the calculation of the profit margin on sales, basic earning power ratio, return on total assets, return on equity); and market value ratios such as the price/earnings ratio, price/cash flow ratio, and market/book ratio (Žager and Žager, 1999; Brigham and Daves, 2001). The selection of these indicators depends on the research topic (Škerlavaj et al., 2007; Gursoy and Swanger, 2007; Jing and Li, 2008; Dotson and Allenby, 2010). In that context, besides the mentioned indicators, one could calculate some other financial indicators which could be important in the explanation of the interdependence between research variables. For example, the labor cost per worker could be an indicator of companies' investment in their workers (salaries, training, development, etc.), thus it could be a determinant of organizational performance. However, today, many authors question the exclusive reliance on financial indicators as the only criterion of organizational performance determination, emphasizing that these indicators are mainly used for reporting, rather than to analyze the successful implementation of the strategy and determining the future direction of company development (Ghalayini and Noble, 1996; Neely, 1999; Wade and Recardo, 2001; Niven, 2007).

The organizational performance could also be determined by modern performance measurement approaches or models which are developed in order to include and balance the multidimensional aspects of a company's performance, no matter whether they are quantitative or qualitative ones (Keegan et al., 1989; Cross and Lynch, 1989; Fitzgerald et al., 1991; Kaplan and Norton, 1992; Brown, 1996). However, there are no clear instructions which modern performance measurement approach or model should be used in order to compare different companies, which are mainly of different size and belong to different industries. From the perspective of scientific research, significant shortcomings of new modern performance measurement models regard the lack of a clear definition of organizational performance measurement models, which very often do not provide the possibility of comparing companies. As a result, many scientists give priority to financial indicators that give opportunity to compare different companies. Financial indicators have the same way of calculation regardless of the company size or industry in which they belong, so they facilitate the research realization, analysis of the results and generation of the conclusions.

3. RESEARCH METHODOLOGY

This research into the relationship between knowledge workers' participation and organizational performance is a part of a large investigation of job satisfaction and organizational performance which is being conducted on a sample of 40 large and medium-sized Croatian companies which employ 5,806 workers; out of that, 736 are knowledge workers. At first sight, the research sample of 40 companies seems a small one, but regarding the research topic which connects two very sensitive dimensions that are job satisfaction and organizational performance, it could be stated that the sample size is adequate. Many other relevant researches of job satisfaction or some other aspect of organizational behavioral is conducted on a much smaller sample (Herzberg et al., 1959; Sy et al., 2006; O'Connor, 2007; Sharma and Jyoti, 2010; Santhapparaj and Alam, 2005; Bender et al., 2005; Bender and Heywood, 2006). Additionally, it is important to state that this research sample adequately represents the Croatian economic structure regarding the companies' size, their industry belongings, and their organizational performances.

In the context of the representativeness of the research sample, regarding the participation of knowledge workers, it could be stated that the research sample is a representative one. A greater number of companies, i.e. 33.3% of them, has from 10 to 20% of knowledge workers. Then follow the companies which employ up to 10% of knowledge workers (30.8% of companies in the sample). Concerning that the participation of highly educated employees in the total number of employees in Croatian companies in 2009 is about 17.7%[3], it could be concluded that the majority of companies from the sample confirm this average which suggests its representativeness. Regarding organizational performance, it could be also stated that the research sample is a representative one because it includes the companies of different levels of organizational performance. Namely, regarding the composite BEX index as an indicator of the total business performance, 51.3% of companies from the sample are "good companies" (BEX>1), 38.5% of companies need some improvements (0 < BEX < 1), while 10.2% of them has a threatened existence (BEX<0).

The empirical research was conducted in 2008. A research questionnaire was used with two groups of questions. The first group contains two questions; a question about the total number of employees, and a question about the number of knowledge workers - which are defined as workers with a university degree (Bentley, 1990). The second group of questions was about the financial organizational performance of each company (for example, the total assets, total revenue, interest costs, equity, current assets, long-term debt, etc.) The questionnaire was fulfilled by the chief accountant of each company.

On the base of collected data, the participation of knowledge workers in each company is calculated, as well as 15 financial indicators of organizational performance. These indicators are: total asset turnover[4], current asset turnover[5], revenues over expenses ratio[6], return on assets[7], return on equity[8], ROCE[9], revenue per employee, earnings before taxes per employee, labor costs per employee, revenue per knowledge worker, earnings before taxes per knowledge worker, labor costs per knowledge worker, approximation of value added[10],

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[3] According to data from the Statistical Yearbook of the Croatian Republic in 2010.
[4] Total asset turnover = Total revenues/Total assets
[5] Current asset turnover = Total revenues/Current asset
[6] Revenues over expenses ratio = Total revenues/Total expenses
[7] Return on assets = (Earnings before taxes + Interest expenses)/Total assets
[8] Return on equity = Net income/Shareholder Equity
[9] ROCE = (Net income/Total assets) – Short term liabilities
[10] Approximation of value added = Labor costs + Earnings before taxes

approximation of value added per knowledge worker and the BEX[11] index. These indicators were selected because they provide the relevant information about the overall organizational performance regarding the nature of research variables. The collected data was processed by defined statistical methods using the program SPSS.

4. RESEARCH RESULTS

The empirical results of this paper provide the analysis of the correlation between knowledge workers' participation and organizational performance and show how the knowledge workers' participation changes the influence on specific financial indicators of organizational performance. The statistical analysis shows the existence of statistically significant correlations between knowledge workers' participation and some financial indicators of organizational performance which are presented in Table 1, while other correlations (statistically not significant) are presented in Table 2.

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[11] BEX = 0,388ex1 + 0,579ex2 + 0,153ex3 + 0,316ex4; where: ex1 = (Earnings before taxes + Interest expenses)/Total assets; ex2 = Earnings before taxes/Equity*Cost of capital (interest rate); ex3 = (Current assets - Short term liabilities)/Total assets; ex4 = 5*(Earnings before taxes + Amortization)/Total liabilities

Table 1. Statistically significant correlations between knowledge workers' participation and financial indicators of organizational performance

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Knowledge workers' participation	Pearson Correlation	1								
	Sig. (2-tailed)									
	N	36								
(2) Revenue per employee	Pearson Correlation	.665**	1							
	Sig. (2-tailed)	.000								
	N	36	36							
(3) Revenue per knowledge worker	Pearson Correlation	.363*	.824**	1						
	Sig. (2-tailed)	.029	.000							
	N	36	36	36						
(4) Labor costs per employee	Pearson Correlation	.829**	.373*	.157	1					
	Sig. (2-tailed)	.000	.025	.360						
	N	36	36	36	36					
(5) Labor costs per knowledge worker	Pearson Correlation	-.569**	-.271	-.011	-.242	1				
	Sig. (2-tailed)	.000	.110	.951	.155					
	N	36	36	36	36	36				
(6) Earnings before taxes per employee	Pearson Correlation	.501**	.050	-.067	.483**	-.265	1			
	Sig. (2-tailed)	.002	.770	.700	.003	.119				
	N	36	36	36	36	36	36			
(7) Revenues over expenses ratio	Pearson Correlation	.454**	-.051	-.172	.458**	.319	.885**	1		
	Sig. (2-tailed)	.005	.767	.315	.005	.058	.000			
	N	36	36	36	36	36	36	36		
(8) Return of equity	Pearson Correlation	.605**	.663**	.521**	.350*	-.380*	.131	.261	1	
	Sig. (2-tailed)	.000	.000	.001	.036	.022	.446	.124		
	N	36	36	36	36	36	36	36	36	
(9) BEX	Pearson Correlation	.468**	.579**	.524**	.275	-.181	.339*	.413*	.888**	1
	Sig. (2-tailed)	.005	.000	.001	.109	.297	.046	.014	.000	
	N	35	35	35	35	35	35	35	35	35

Source: Authors' calculations

Table 2. Other correlations between knowledge workers' participation and financial indicators of organizational performance

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Knowledge workers' participation	Pearson Correlation	1							
	Sig. (2-tailed)								
	N	36							
(2) Total assets turnover	Pearson Correlation	-.157	1						
	Sig. (2-tailed)	.360							
	N	36	36						
(3) Current asset turnover	Pearson Correlation	-.168	.994**	1					
	Sig. (2-tailed)	.335	.000						
	N	35	35	36					
(4) Return on assets	Pearson Correlation	-.095	.984**	.981**	1				
	Sig. (2-tailed)	.586	.000	.000					
	N	35	35	35	36				
(5) ROCE	Pearson Correlation	-.145	.993**	.997**	.989*	1			
	Sig. (2-tailed)	.405	.000	.000	.000				
	N	35	35	35	35	36			
(6) Earnings before taxes per knowledge worker	Pearson Correlation	.311	.244	.509*	.611**	.534**	1		
	Sig. (2-tailed)	.065	.151	.002	.000	.001			
	N	36	36	35	35	35	36		
(7) Approximation of value added	Pearson Correlation	.171	-.049	-.048	.023	-.060	.118	1	
	Sig. (2-tailed)	.318	.775	.785	.895	.733	.492		
	N	36	36	35	36	35	36	36	
(8) Approximation of value added per knowledge worker	Pearson Correlation	-.120	.486**	.666**	-.091	.646**	.597**	-.001	1
	Sig. (2-tailed)	.484	.003	.000	.596	.000	.000	.996	
	N	36	36	35	36	35	36	36	36

Source: Authors' calculations

A statistically significant positive correlation between knowledge workers' participation and financial indicators of organizational performance is apparent in the case of seven financial indicators among 15 of them. A strong positive correlation ($r > 0.80$) exists between the knowledge workers' participation and labor costs per employee. A correlation of medium intensity ($0.50 < r \leq 0.80$) is found between the knowledge workers' participation and revenue per employee; earnings before taxes per employee and return on equity. A positive correlation of weak intensity ($0 < r \leq 0.50$) is manifested in the case of the knowledge workers' participation and revenue per knowledge worker; revenues over expenses ratio and the BEX index. A statistically significant negative correlation is defined between the knowledge workers' participation and labor costs per knowledge worker.

The above presented correlations could indicate the existence of the relationship between the knowledge workers' participation and some financial indicators of organizational performance. It should be pointed out, however, that the determined correlations are not strong ones, which is expected because of many different factors, internal and external, which influence and determine the organizational performance. For that reason, in order to generate some conclusions, it is necessary to explore and analyze the defined correlations.

It is interesting to note the existence of a statistically significant negative correlation of medium intensity between the knowledge workers' participation and labor costs per knowledge worker. This correlation suggests that when the number of knowledge workers increase, the costs related to these workers fall. Thus, the increase of the number of knowledge workers is not followed by increased rewards and other expenses which are related to these workers such as salaries, training costs, specializations, benefits, etc. A statistically significant positive correlation of strong intensity is defined between knowledge workers' participation and labor costs per employee. The existence of this kind of correlation is very logical because the growing number of knowledge workers should increase labor costs related to all employees. Regarding these two correlations, it should be noticed that if the number of knowledge workers grows, the total labor costs also increases. However, if the number of knowledge workers grows, the labor costs related to them decrease. Thus, this suggests that the growing number of knowledge workers is not followed by the increasing expenditure related to these workers which should be the companies' practice. This affects organizational performance in a way that the contribution of knowledge workers could be diminishing because of the low companies' investment which regards their salaries, bonuses, training and other factors which could motivate them on better performances.

Furthermore, a statistically significant positive correlation of medium and low intensity should be closely observed. A statistically significant positive correlation of medium intensity is detected between the knowledge workers' participation and profitability ratios (earnings before taxes per employee and return on equity), as well as between the knowledge workers' participation and revenue per employee, which indicate a significant importance of knowledge workers for companies' performance because these financial indicators show the companies' efficiency.

A statistically significant correlation of low intensity implies a weak connection between the knowledge workers' participation and revenue per knowledge worker; revenues over expenses ratio and the BEX index. All these financial indicators are related to revenue (revenue is the crucial element in their calculations), and knowing that revenue is a measure of productivity, these correlations open some important questions about the knowledge workers' productivity. It could be therefore stated that these workers are not more productive than other employees. This is not a surprise. More than 10 years ago, P. Drucker pointed out that the productivity of knowledge workers is on a low level and that the improvement of their productivity is one of the most important challenges of modern companies (Drucker, 1999). In this context, he does not refer to the productivity which is individually defined but to the productivity which is organizationally determined. This means that the low knowledge workers' productivity is not mainly the result of their individual effort and engagement but rather the result of poor organizational conditions and an organization's disability to use the potential of knowledge workers. The change of this situation could not be based only on knowledge workers' motivation but on the development of integral organizational conditions as requirements for creative and efficient knowledge implementation.

Regardless of these open questions about knowledge workers' productivity, the above presented results show the existence of a statistically significant correlation between the knowledge workers' participation and certain indicators of organizational performance.

Among these financial indicators, the BEX index should be mentioned as a reliable indicator of the companies' overall business excellence.

In order to conduct additional analysis, in the following section, the impact of knowledge workers' participation change on financial indicators of organizational performance will be calculated, which means that further analysis will give the answer to the question of how much each indicator of organizational performance will change (rise or decline) if the knowledge workers' participation changes by 1%.

The linear regression is used for this analysis. The model of this regression is:

$$Y_i = a + b\,X$$

where:

Y_i – each financial indicator of organizational performance,

X – knowledge workers' participation in the total number of employees.

The coefficient *b* in the above presented model shows how much each financial indicator of organizational performance will change (rise or decline) if the knowledge workers' participation changes by 1 percent?

Regression parameters which are relevant for explaining the impact of knowledge workers' participation change on each observed financial indicator of organizational performance are presented in Table 3.

Table 3. Regression parameters

	Sig.	***b***	**R^2**
Total assets turnover	0.359	-0.049	0.025
Current assets turnover	0.335	-0.257	0.028
Revenues over expenses ratio	0.005*	0.002*	0.206
Return on assets	0.586	-0.002	0.009
Return on equity	0.000*	0.012*	0.366
ROCE	0.405	-0.014	0.021
Revenue per employee	0.000*	214,681.60 *	0.442
Earnings before taxes per employee	0.002*	7,041.18*	0.250
Labor costs per employee	0.000*	2,991.97*	0.687**
Revenue per knowledge worker	0.029*	191,068.70 *	0.132
Earnings before taxes per knowledge worker	0.065	12,432.58	0.097
Labor costs per knowledge worker	0.000*	- 17,931.40*	0.324
BEX	0.005*	0.042*	0.219
Approximation on value added	0.318	1,602,805. 21	0.029
Approximation on value added per knowledge worker	0.484	-5,501.47	0.015

*Regression parameter b is statistically significant (Sig. $\leq$ 0.05).

** Regression model is statistically significant ($R^2 \geq 0.60$).

Source: Authors' calculations

It is important to point out that the models presented in Table 3 are models of linear regression. They explore the change of each financial indicator caused by the change of the same independent variable and that is the knowledge workers' participation. Out of 15 financial indicators, in the case of eight of them, it was found that the regression parameter *b* is statistically significant (Sig $\leq$ 0.05). Co ncerning the value of R^2, the regression model is

statistically significant ($R^2 \geq 0.60$) only in the case of one financial indicator and that is the labor costs per employee, which means that 68.7% of the dependent variable (labor cost per employee) is explained by the independent variable (knowledge workers' participation). In the case of other financial indicators, R^2 is not statistically significant. However, concerning that the topic of this research is the relationship between knowledge workers' participation and financial indicators, the value of R^2 in the case of all eight financial indicators, where parameter b of the regression model is statistically significant, could be perceived as satisfactory. This means that, for example, in the case of the revenues over expenses ratio, 20.6% of this indicator is explained by knowledge workers' participation, which is significant knowing that this is a linear regression model and that the revenues over expenses ratio could be determined by many other influences than knowledge workers' participation.

Thus, regarding the nature of the analyzed variables (financial indicators are influenced by many different variables besides the knowledge workers' participation), the fact that these models are models of linear regression (the change of each financial indicator is explained by the change of knowledge workers' participation) and that in the case of eight financial indicators, parameter b is statistically significant, the change of eight financial indicators could be explained by the change of knowledge workers' participation. Therefore, based on the value of parameter b, it can be determined as follows:

- if the knowledge workers' participation increases by one percentage point, the revenues over expenses will increase by 0.002 units; and vice versa, if the knowledge workers' participation decreases by one percentage point, the revenues over expenses will decrease by 0.002 units;
- if the knowledge workers' participation increases by one percentage point, the return on equity will increase by 0.012 units or by a 1.2 percentage point, and vice versa;
- if the knowledge workers' participation increases by one percentage point, the revenue per employee will increase by 214,681.60 kunas, and vice versa;
- if the knowledge workers' participation increases by one percentage point, the earnings before taxes per employee will increase by 7,041.18 kunas, and vice versa;
- if the knowledge workers' participation increases by one percentage point, the labor cost per employee will increase by 2,991.97 kunas, and vice versa;
- if the knowledge workers' participation increases by one percentage point, the revenue per knowledge worker will increase by 191,068.70 kunas, and vice versa;
- if the knowledge workers' participation increases by one percentage point, the labor cost per knowledge worker will decrease by 17,931.40 kunas, and vice versa;
- if the knowledge workers' participation increases by one percentage point, the BEX index will increase by 0.042 units, and vice versa.

According to this analysis, again, it was found out that the increase of the knowledge workers' participation is not sufficiently covered by additional expenses related to these workers. The presented results show that if the participation of knowledge workers increases, the labor costs per employee slightly grow, while the labor costs per knowledge workers decrease. Therefore, it could be assumed that additional investment in knowledge workers will lead to higher knowledge workers' contribution to organizational performance, which could be realized by enhancing their compensation program or by additionally investing in their education, training and professional development.

5. CONCLUDING REMARKS

Knowledge workers have appeared as a result of new demands that are placed in front of modern companies, and they became a significant factor of the company's success. Based on their appearance and existence, the modern society is called the knowledge society in which

the knowledge workers play a major role. In the present circumstances, in all companies, the major challenge is to attract knowledge workers and put them in positions where they will be able to make the largest contribution to the company. Namely, the success of today's companies depends on management skills and efficiency to attract, retain and motivate knowledge workers (Drucker, 2005).

The empirical results of this paper go in this direction. They suggest the existence of the statistically significant positive correlation between knowledge workers' participation and some financial indicators of organizational performance, implying a significant importance of knowledge workers for companies' performance. However, it should be pointed out that the determined correlations are not strong ones, which is expected because of many different factors which influence and determine the organizational performance, so the generalization of this conclusion should be restrained. The exploration of these correlations, as well as regression parameters defined by the statistical analysis in this paper, imply some further conclusions which regard some particular dimensions of organizational performance. The growing number of knowledge workers increases the total labor costs which include salaries and other costs related to all employees, but at the same time, the increase of knowledge workers' participation is not adequately followed by increased rewards and other expenses which are related to these workers. The discovered low knowledge workers' productivity is not mainly the result of their individual effort and engagement but rather the result of poor organizational conditions and the organization's disability to use the potential of knowledge workers. The productivity of knowledge workers could be improved by increasing financial allocations and companies' expenditure related to these workers, which could be realized through salaries, bonuses, benefits, supplemental insurance, training, specializations, etc. By this practice, their contribution to organizational performance could be enhanced.

6. RESEARCH LIMITATIONS AND GUIDELINES FOR FUTURE RESEARCH

Understanding research limitations and their possible impact on the results and conclusions is necessary for adequate understanding of the problem investigated. The first limitation of this study relates to the definition of knowledge workers. For the purpose of the empirical research of this paper, the knowledge workers are defined by the level of their education acquired, namely as workers who have a high education. This kind of definition is used because it provides the most measurable way of determining knowledge workers, although it has certain limitations. It disregards workers who are basically knowledge workers because in their work they use and create new knowledge, innovations, improvements, etc., but they are not highly educated. On the other hand, it cannot be stated that all workers with a high education are essentially knowledge workers.

The following limitation is related to the research sample. The research results take into account 40 companies that have decided to participate in the empirical research. Considering that the research problem of this study is very specific because it examines a very sensitive dimension of a company's operations, i.e. its efficiency and success, it was difficult to recruit a larger number of companies into the research. Therefore, it is necessary to point out some reservations about the representativeness of the research sample, especially when it comes to some general conclusions.

The next limitation is related to the other variables than knowledge workers' participation, which could have a significant impact on organizational performance, but which, because of the limited research scope, could not be included in this research.

The further limitation refers to the analysis of organizational performance, in which only traditional (quantitative or finance) indicators of organizational performance were used.

However, qualitative measures of organizational performance could not be included because they do not provide the adequate possibility of comparing companies.

The foundation for the future research could be based on these limitations. Thus, in the future empirical researches, a different, more precise definition of knowledge workers should be used. That definition could be based on the number of innovations or improvements which knowledge workers have obtained through their work. Furthermore, other more advanced statistical methods should be applied in order to generate comprehensive conclusions. Finally, it would be interesting to analyze the organizational performance by some qualitative indicators of companies' performance and to compare it with the results obtained through the empirical research of this paper.

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VEZA IZMEĐU UDJELA RADNIKA ZNANJA I ORGANIZACIJSKIH PERFORMANSI

SAŽETAK

Cilj ovoga rada je empirijski dokazati vezu između udjela radnika znanja zaposlenih u određenom poduzeću i njegove uspješnosti, te pokazati na koji način promjena udjela radnika znanja utječe na promjenu organizacijskih performansi. Empirijsko istraživanje provedeno je na uzorku od 40 poduzeća, pri čemu su analizirani podaci o udjelu radnika znanja u ukupnom broju radnika te podaci o financijskim performansama poduzeća. Rezultati empirijskog istraživanja ukazuju na vezu između udjela radnika znanja i organizacijskih performansi. Nadalje, rezultati pokazuju da rast udjela radnika znanja nije adekvatno praćen rastom nagrada i drugih troškova vezanih uz ove radnike koji mogu biti značajan faktor niske proizvodnosti ovih radnika koja je ovim istraživanjem također dokazana.

Ključne riječi: *radnici znanja, uspješnost, poduzeće, proizvodnost*

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MODEL OF TRUST IN E-TRANSACTIONS

ABSTRACT

Besides significant benefits, the trend of e-commerce development gives rise to a lot of challenges in terms of developing trust between the company and the consumer. A lack of trust leads to withdrawal from e-transactions. The paper is thus aimed at identifying and explaining the most important factors that affect the increase in users' trust in e-transactions. Besides an analysis of available papers in this area, a field research was conducted on a sample of 512 respondents in Bosnia and Herzegovina in order to develop a structural model of users' trust in e-transactions. Research findings confirm that the basic factors of an online trust model are: website usability, privacy, security, expected product performance, loyalty, and electronic management of customer relations (e-CRM).

Key words: *e-transactions, e-commerce, trust*

1. INTRODUCTION

In recent years, we have witnessed the growth in popularity and importance of e-commerce. E-commerce stands for any financial transaction that has been carried out electronically. It has become an important factor in international business and includes purchase and sale of all types of goods or services over the internet. E-commerce has enabled customers and producers around the world to meet in virtual marketplaces and complete transactions more efficiently. The internet and related technologies erase boundaries in terms of time and space and provide organizations with enormous business opportunities, and on the other hand – consumers have more choice.

Besides all the benefits that it brings to consumers, e-commerce also brings many complex problems which are closely related to ethical and legal issues. The exposure to multiple merchants and many options from around the world, together with new infrastructure for e-commerce leads to an increased risk. In the dynamic environment of e-commerce, many consumers are indeed faced with information overload and uncertainty. Lack of trust in online payment, privacy issues and adequate services created a psychological barrier when it comes to e-commerce. A key of success is not just a presence on the internet, or low price, but also the quality of the entire service, including interaction before, during and after the transaction.

Evidence suggests that consumers often hesitate to transact with web-based vendors because of uncertainty about vendor behavior or the perceived risk of having personal information stolen by hackers. Trust plays a central role in helping consumers overcome perceptions of risk and insecurity (McKnight, Choudhury & Kacmar, 2002).

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2. E-TRANSACTIONS AND TRUST

E- transaction is an electronic exchange of values. All transactions have a degree of uncertainty about their outcome, and buyers cannot accurately predict whether a transaction will be fulfilled successfully. Successful fulfillment typically suggests that a seller delivers a product identical to the one promised, does so in a timely manner, and honors refund and product guarantees. In contrast, there are numerous possibilities that a transaction may not be fulfilled successfully due to seller or product quality uncertainty. For example, sellers can collect payment but not deliver a product (fraud), deliver a product that differs from the one advertised (lower quality, expired, or counterfeit products), refuse to accept payment and send a product (contract default), prolong product delivery, fail to acknowledge return, refund, and product guarantee policies, sell the buyer's private information or not protect the buyer's monetary information, among others. Due to these numerous adverse possibilities, buyers are rightfully concerned about the "downsides" of an online transaction (Pavlou, Liang & Xue, 2007).

In the context of internet shopping, risk is a relevant situational parameter in that (1) there is uncertainty about the outcome of an internet shopping transaction, (2) the outcome depends on the behavior of the internet merchant, which is not within the consumer's purview and control, and (3) the harm of an undesirable outcome may be greater than the benefits of a successful outcome (Lee & Turban, 2001).

Given that e-transactions include already mentioned uncertainty for the consumer, trust is the main condition for exchange (Ribbink et al, 2004). Feeling safe while performing transactions over the internet requires a high level of trust in e-merchant. Therefore, building trust in e-transactions is very important and represents a major challenge.

There are many definitions of online trust. Online trust is when a consumer has confidence in an e-merchant's reliability and integrity to perform online transactions successfully (Angriawan & Thakur, 2008). This definition implies that the e-merchant has the ability to conduct business activities online, that he will not abuse sensitive information, and that he will deliver products or services as promised. Trust is defined as a buyer's intentions to accept vulnerability based on his beliefs that transactions with a seller will meet his confident transaction expectations due to the seller's competence, integrity, and benevolence (Pavlou, Liang & Xue, 2007). Trust is discussed in the literature as a trait embedded in the person that touches on one's ability to tolerate a certain amount of risk when engaging in a transaction with another party (Sutanonpaiboon & Abuhamdieh, 2008).

E-merchants must act in the best possible way to overcome consumer perception of uncertainty and risk by building trust, not only on their web sites but also in the wider internet environment. This includes strict elimination of all activities which adversely affect consumers and prevent them from performing e-transactions.

Trusted websites can provide customers with a secure and private online shopping experience. These sites could alleviate customers' concerns about the leakage, unauthorized collection, or the misuse of their private information, promote deep customer loyalty, and help the companies build a positive relationship with their customers while increasing their market share and profits (Lauer & Deng, 2007). Unfamiliar websites need to establish their trustworthiness, so that the customer will linger. Security seals, reassuring brand logos and privacy policies are cues customers use (Petre, Minocha & Roberts, 2006).

Ethics plays an important role in e-transactions and online trust. An essential element of ethics is the establishment of trust. However, trust among strangers who need to perform e-transaction is something that is very difficult to accomplish. Unfair business practices lead to serious violations of consumer trust. Fraud, lack of concern about the security of e-transactions and skepticism are very frequent in e-commerce. Respect and adherence to rules

and protocols online are an exception (Miller, 2005). Awareness of the importance of establishing ethical conduct is quite high, mainly because the rule of law and its enforcement still lag behind technological developments. The creation of rules of ethical conduct corresponding to the chosen values enables conduct to be regulated. Amongst the ethical factors likely to be of importance, it would appear that assuring e-consumer's privacy, security and e-merchant's accountability would be necessary to build and maintain confidence in conducting business in the e-market (Avshalom, Avshalom & Arik, 2007).

3. FACTORS OF ONLINE TRUST

There are multiple, interrelated dimensions of e-commerce trust. Thus, trust as a willingness to depend on a vendor to deliver on commitments is not the same as trust as a belief that the vendor uses consumer data ethically, or the same as trust as a perception that the internet is technologically secure (McKnight, Choudhury & Kacmar, 2002). Therefore, each dimension of trust differentially affects the consumer attitudes, as well as the positive or negative shopping behavior. If all dimensions of trust were present, every purchase over the internet would be perfect.

Information privacy concerns and information security concerns make buyers skeptical about online transactions (George, 2002), and they have been viewed as two major barriers to e-commerce adoption (Hoffman, Novak & Peralta, 1999; Rose, Khoo & Straub, 1999).

The most important factors for the development of online trust are: website usability, privacy, security, expected product performance, loyalty and electronic customer relationship management (e-CRM) (Angriawan & Thakur, 2008).

3.1. Website usability

Simply put, website usability represents the ease of use. Usability has been defined as "the extent to which a system can be used by specified users to achieve a specified goal with effectiveness, efficiency and satisfaction in a specified context of use" (Petre, Minacha & Roberts, 2006). Perceived website usefulness, ease of use and security are significant antecedents of initial trust. (Koufaris & Hampton-Sosa, 2004).

Effective website usability provides a mechanism and information for consumers and helps them to reduce uncertainty. According to this, the website should provide clear information, recommendations and healthy tips, not promises which cannot be kept. In the context of e-commerce, company website is the primary interaction method for the consumer. A high quality website is important because it allows the first contact between e-merchants and users and it is a crucial element in creating the first impression. If users recognize the quality of a certain website, they will assume that e-merchant has positive features and the trust building process will be able to start. On the other hand, inadequate design, slow website loading, various errors and poor navigation greatly affect online trust.

The first impression is very important. Therefore, many companies, engaged in online business, pay special attention to website design and development (Petre, Minacha & Roberts, 2006). Three factors that can be linked to website design are: reliability, persuasiveness and credibility (Tamimi & Sebastianelli, 2007).

If the website does not support the basic technical assumption - fast loading, users will access it with great difficulty which, in most cases, leads to their withdrawal. Many e-merchants are over-using elements that may cause slow website loading. Website loading is closely linked to the site design, given that the design includes the use of images and other files which, although they serve for the website to look good, greatly slow down its loading.

Therefore, it is very important to establish a balance between use of these mentioned elements and an acceptable length of website loading.

Website errors are part of daily life. Although they do not seem to be a serious and complex problem, their impact on building trust is significant. They prevent e-merchants to adequately present themselves and their products, and they also do not allow consumers to make purchases via the internet. The most common website errors are primarily website incompleteness (the lack of contact information), use of illegible letters, variegation, use of unnecessary images (and other files), use of hidden and nonexistent links, unnecessary pop-up windows, etc.

When a user visits a certain website and when it is not possible for him to inspect it logically, he will surely give up and leave. Negative characteristics of navigation are mainly reflected in the excessive complexity, inconsistency and poor organization, which greatly affect user trust.

3.2. Privacy

In the context of conventional transactions, there is a certain amount of risk involved for the consumer who, for example, may be uncertain about the quality or the durability of a product purchased. However, when it comes to e-transactions, the biggest privacy risk is based on the possibility of another's opportunistic acquisition and use of this personal information. (Dinev & Hart, 2006). E-transactions almost always require the exchange of sensitive personal and financial information. E-transactions involve highly delicate information that consumers will not share with e-merchants if they believe that it will invade their privacy. No information is secure and no institution is immune to the possibility of abuse (Caldwell, 2005). Therefore, privacy is an extremely important issue for the development of online trust. It requires lots of security mechanisms and technological control. Privacy is about a merchant's policies on customer information management. The merchant's information management can include usage tracking and data collection, choice, and the sharing of information with third parties (Belanger, Hiller & Smith, 2002). The main privacy problems are related to data collection, third party data collection, data storage, data sharing and marketing communication (Pollach, 2007). Unfortunately, many companies are abusing consumer information in order to make a profit, which consumers consider to be direct invasion of their privacy. (Culnan & Armstrong, 1999).

It is clear that consumers do not trust sellers who are not able to protect their information or who cannot adequately manage them. Trust mediates the relationship between privacy and behavioral intention to make an online transaction (Liu et al, 2004). As technologies for data collection and analyzing are becoming more sophisticated, the concern for privacy among consumers constantly grows.

Online privacy concerns the focus on the protection of important consumer information such as name, address, telephone number and financial information. In order to build consumer trust, e-merchants should strongly indicate that collected information at their websites would be used in a fair and responsible manner. Many e-merchants comply and have privacy policies on their websites in order to inform consumers about consumer information management. Although e-merchants behave fairly in this case, ethical behavior cannot be claimed for a third party that may arise in the process. This situation puts the emphasis on the security issue, which will be discussed later.

A factor that greatly affects consumer trust online is the level of control they have over their data (Hoffman, Novak & Peralta, 1999). Therefore, it is very important for consumers to perceive a certain company as credible and to recognize its true efforts to protect their data. To achieve this goal, many companies upgrade their rules with various privacy seals. The

more belief consumers have in a company, the more likely they are to do shopping on its website, visit it again or recommend it to others.

3.3. Security

E-commerce security issues are related to e-merchants' abilities to protect their online transaction systems. Consumers must be convinced that the company has the ability and willingness to protect their financial information from security vulnerabilities in order for e-commerce to reach full potential. (Pavlou, Liang & Xue, 2007). Information security is considered the most critical concern for those who do not purchase online (Yang & Jun, 2002). Security threats include destruction, disclosure, modification of data, denial of service, and/or fraud and abuse (Kalakota & Whinston, 1996).

Security refers to confidentiality and completeness of personal information, computer security, web and e-mail traffic secrecy. In order to achieve a certain level of security, it is necessary to install some protection programs. It is clear that information cannot travel directly from sender to recipient, but rather via various network nodes, which in turn can lead to message interception. Among other things, encryption systems are very important because they convert data into encrypted form before sending them over the internet, which prevents unauthorized access. Secure transaction methods using encryption and other technologies have existed for some time, yet the perceived risk of internet transactions is still significant (Salam et al, 2005). The mere installation of modern safety programs is not sufficient for a satisfactory security level because it is known that no security system can be 100% foolproof. There must also be a certain amount of knowledge in the form of IT literacy and awareness in order to successfully avoid many suspicious situations on the internet that could greatly impair the users' safety (opening unsafe and hazardous sites and giving personal data, running suspicious programs, opening e-mails from unknown senders).

3.4. Expected product performance

Online, customers can't look a sales clerk in the eye, can't size up the physical space of a store or office, and can't see and touch products. They have to rely on images and promises, and if they don't trust the company presenting those images and promises, they'll shop elsewhere. (Reichheld & Schefter, 2000). Therefore, e-merchants' integrity (which is closely linked to reputation) is of great importance and forms the basis for this factor. Consumers, in some way, identify e-merchant's integrity with product performance because, since they cannot see the product in person, e-merchant claims are the only information they can get.

3.5. Loyalty

Loyalty is defined as a customer's preference towards an e-merchant that results in repeat buying behavior (Srinivasan, Anderson, & Ponnavolu, 2002). Loyal customers are considered extremely valuable for e-commerce, and loyalty is generally associated with higher levels of service quality (Ribbink et al, 2004).

Loyalty is primarily manifested through the increased number of e-transaction, openness toward new products and participation in programs that require more personal (and other) information. The more online trust consumers have, the higher level of loyalty can be created. Although technology plays a role of great importance, technology alone is not enough to build loyalty; loyalty is achieved through superior shopping experience.

Building superior customer loyalty is no longer just one of many ways to boost profits. Today it is essential for survival (Reichheld & Schefter, 2000).

3.6. Electronic customer relationship management (E-CRM)

E-CRM refers to the marketing activities, tools and techniques delivered via the internet which includes e-mail, world wide web, chat room, e-forums etc. bearing on locating, building and improving long-term customer relationships (Lee-Kelley, Gilbert & Mannicom, 2003). It is a general strategy supported by information technology which assists companies to build powerful, personalized and mutually beneficial relationship, increase conversion rate, and achieve more efficient sales.

One of the reasons for the great popularity of e-CRM is the fact that digital channels, besides e-transactions, may also provide a unique positive shopping experience. The high level of interaction is another feature of e-CRM that greatly helps companies to properly respond to customer requests or problems and to achieve and maintain long-term relationship. The basis of e-CRM is to enable an organization to treat each customer as an individual, which is a goal that is very difficult to achieve. E-merchants serve a wide range of consumers and good individual relationship with each of them can be very important. It has already been proven that e-CRM has positive effects on customer retention and customer share development (Verhoef, 2003). It is also clear that different types of interaction provide different levels of trust (Angriawan & Thakur, 2008). CRM strategies such as personalization, one-to-one marketing, reliability, customer-control and efficient customer services aim to maximize customer satisfaction, retention and loyalty – and, hence, profitability for the organization (Petre, Minocha & Roberts, 2006).

4. METHODOLOGY AND DATA

The goal of this study was to understand and explain factors that have the greatest influence on users in carrying out e-transactions and to define a model of trust in e-transactions.

The authors conducted the research among Internet users in Bosnia and Herzegovina in February 2010.

The questionnaire was developed by the authors based on research by Angriawan and Thakur's (2008). It included multiple-choice questions (two questions) expressing attitude rating from 1 to 5, where 1 means „strongly disagree" and 5 „strongly agree" (19 questions), two open-ended questions, as well as five questions related to socio-demographic status.

Data were collected using GoogleDocs, whereby a link with the survey was sent to 1,000 e-mail addresses in two waves. A total of 512 responses was collected; i.e. the rate of response was 51.2%.

4.1. Sample structure

The sample structure by various socio-demographic characteristics is shown in the following table.

Table 1. Sample structure

Socio-demographic characteristics		%
Gender	Male	45.5
	Female	54.5
Age	Up to 25	62.1
	26-35	25.6
	36-45	7.6
	46-55	3.9
	Over 55	0.8
Qualifications	College	9.8
	High-school	34.8
	University-educated	51.7
	Master or PhD	3.7
Income	Up to 250 EUR	39.8
	250-500 EUR	24.0
	500-750 EUR	19.3
	750-1000 EUR	10.5
	More than 1000 EUR	6.3

In terms of sample structure, it is obvious that sample is representative in terms of gender and heterogeneous in all other socio-demographic aspects. The sample structure by income reflects the standard of living in the B-H society.

4.2. Variables and constructs analyzed in the research

The basis for developing the questionnaire used for the research is Angriawan and Thakur's (2008) model, which classifies factors affecting trust in e-transactions into five categories: website usability, privacy, security, expected product performance, loyalty, and e-CRM, which was explained in the second section of the paper.

The research used the following variables - constructs:

o website usability (construct that includes 5 manifest variables),
o privacy (construct including 3 manifest variables),
o security (construct made up of 2 manifest variables),
o expected product performance (construct made up of 2 manifest variables), and
o electronic customer relation management, i.e. e-CRM.

Besides, the research tracked other variables related to the described constructs.

The importance of each of them was examined in order to understand whether the listed factors affect online trust and loyalty, to what extent and whether their improvement may increase users' trust in e-transactions and ensure their loyalty.

In order to determine and test correlations between the obtained ratings for the importance of individual constructs, the following research hypotheses were defined:

1. There is a positively-directed correlation between website usability and online trust.
2. There is a positively-directed correlation between expected product performance and online trust.
3. There is a positively-directed correlation between privacy and online trust.
4. There is a positively-directed correlation between security and online trust.
5. There is a positively-directed correlation between online trust and loyalty.
6. There is a positively-directed correlation between online trust and e-CRM.

5. RESEARCH FINDINGS AND DISCUSSION

Research results reveal that 55% respondents do not carry out e-transactions, and state the following reasons for that: lack of security when paying, threat to privacy, i.e. access to personal data, poorly organized and over-complicated website, lack of face-to-face interaction, and impossibility to check the product's physical characteristics before delivery, as well as lack of information. What is interesting is that many respondents also describe the impossibility of control, i.e. bigger spending when purchasing over the internet than by traditional shopping as a reason for not carrying out e-transactions.

Research results also show that 45% respondents actually carry out e-transactions, most frequently purchases, sales, and e-banking. The reasons stated include simplicity, speed and greater availability. In terms of frequency, 12% respondents carry out e-transactions a few times a week, 11% respondents carry out transactions once a week and considers them an easier way than the traditional one. A total of 29% respondents ventures on e-transactions once a month, mostly when it comes to paying bills online or monthly grocery purchasing, while 19% do so once a year. The remaining 29% refer to respondents whose e-transactions vary too much due to, for instance, money they have at the moment or changes in opinion and needs.

5.1. Descriptive statistics

The following table shows the descriptive statistics parameters we observed for the questionnaire questions (as separate variables).

Table 2. Descriptive statistics[4]

	Descriptive statistics parameters	min	max	average	standard deviation
ONLINE TRUST	**Trust in the company – seller is important in case of e-transactions.**	**1**	**5**	**4.63**	**0.84**
WEBSITE USABILITY	**Company – seller's website usability (ease of use) is important in case of e-transactions.**	**1**	**5**	**4.42**	**0.84**
	My first impression depends on the website design.	1	5	3.75	1.06
	Slow website loading results in giving up the browsing.	1	5	3.73	1.10
	Poor navigation results in my giving browsing up.	1	5	3.72	1.06
	Website should provide information that help decrease uncertainty related to e-transactions.	1	5	4.60	0.76
PRIVACY	**Privacy in important in case of e-transactions.**	**1**	**5**	**4.81**	**0.63**
	Distrust in e-transactions increases with the possibility of sharing my sensitive information with a third party.	1	5	4.56	0.85
	The stricter the rules on online privacy, the greater chances of my carrying out the transaction.	1	5	4.43	0.85
SECURITY	**Security is important in case of e-transactions.**	**1**	**5**	**4.85**	**0.55**
	I feel insecure when exchanging sensitive information over the internet due to potential abuse.	1	5	4.19	1.06
EXPECTED PRODUCT PERFORMANCE	**I would not carry out e-transaction because I am not able to see the product until the moment of delivery.**	**1**	**5**	**3.06**	**1.25**
	Company –seller's integrity affects building of my online trust.	1	5	4.26	0.84
LOYALTY	**Online trust is the basic factor for building loyalty to company - seller.**	**1**	**5**	**3.98**	**1.06**
e-CRM	**Online trust increases through a personalized relationship with the company - seller**.	**1**	**5**	**4.13**	**0.94**

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[4] Questions that directly express the importance of individual factors are bolded in the table.

Online trust is viewed as a key differentiating factor that determines the success or failure of internet-based operation. Most users are not willing to approve access to sensitive data to a company they do not trust. It is perfectly understandable, since users fear abuses and frauds. For this reason, it is crucial for users to trust both in the positive outcome of an e-transaction and in the company's ability to protect their data from a third party. The average rating of the importance of online trust on a scale from 1 to 5 is 4.63. It can be observed that a high percentage of respondents (79% of them) rated this factor with 5. It proves that trust is of great importance for users in Bosnia and Herzegovina, and that an e-transaction will not occur in case there is no trust. Companies should act the best they can in order to overcome users' perception of insecurity and risk. This implies strict elimination of any activities that affect users negatively and directly prevent them from carrying out e-transactions.

In the context of e-commerce, the company's website is the main way of interaction. From the described attitudes, we can see that the average rating that dictates the importance of website usability is 4.42, which means that users definitely pay attention to website quality, which in turn helps them to perceive the company's seriousness and starts the process of trust building. Presented results clearly reveal that an efficient website can indeed generate trust. Good navigation, fast loading, design and providing all the necessary information make up the elements of website usability, and the following analysis shows which of them are decisive for respondents:

- o Respondents' views show that information on the website is a usability element they pay the greatest attention to. The average rating on providing information that helps decrease uncertainty is high, and amounts to 4.6. Thus, we can conclude that it is very important for a website to be complete and without errors.
- o With respect to poor navigation, the average rating is 3.72 and although it is comparatively high, we expected it to be even higher due to all the collected data on this problem. In any case, users give up browsing if sites are over-complex and poorly organized. It should be pointed out that it is extremely important to use simple navigation.
- o Interestingly, slow website loading has a somewhat greater effect on users than problems with navigation. The average rating of this statement is 3.73, which shows that more users give up browsing if website loading is slow, compared to those who give up due to poor navigation.
- o Many companies involved in online business pay a particular attention to investment in website design and its improvements. The general opinion is that, if a website design is poor and uncoordinated, a user will simply not trust in everything it offers. We therefore attempted to examine whether, and to what extent, the first impression depends on the website design, and we obtained unexpected results. Although we believed that the percentage of affirmative answers will be extremely high, opinions vary considerably. What is interesting is that the average rating of this statement is 3.75, which does not follow trends in the least. However, it is understandable after the full analysis of usability elements, since it has already been stated that respondents rated website information as the most important element, which in turn means that its appearance is less important for them.

It has already been pointed out that privacy greatly affects the development of online trust, which is additionally supported by this research results. Respondents are definitely convinced that privacy is important in case of e-transactions, which is proven by the average rating of 4.81. As much as 90% respondents rated it 5. It is evident that e-transactions include exchange of sensitive information while privacy in this context implies their adequate management. The management involves their use, monitoring, and sharing with a third party.

We learned that respondents believe that their distrust in e-transactions increases with the possibility of sharing their information with a third party (average rating of 4.56). In this respect, their greatest concern is the purpose they are used for and whether their inboxes will be crammed with unapproved messages. Unethical internet behavior is the cause for this concern, and it is therefore crucial to pay more attention to the protection of their privacy, in order to prevent them from giving up e-transactions. Besides, the stricter the rules of online privacy, the greater chances for success (average rating of 4.43).

Respondents consider security to be the most important factor in case of e-transactions, which is proven by the average rating of 4.85 (slightly higher than privacy). Besides, most of them feel insecure when exchanging sensitive information. The main reason for such views is a great degree of distrust in electronic systems in Bosnia and Herzegovina, since it is believed that there is no sufficient degree of protection, and that the risk is too high. In order for e-commerce to reach its full potential, it is necessary to provide adequate security mechanisms that would protect financial and sensitive information and reduce security omissions to a minimum. If applications that support the security codes practice are not sufficiently developed and used, many users will clearly give up e-transactions or, even if they decide to carry them out, will feel a reasonable fear.

Due to the internet specificity, where face-to-face interaction is impossible and where products cannot be seen and touched, users must rely on promises and images. Most present studies show that they give up e-transactions because they do not have the opportunity to see products and make sure of their performance until the very moment of delivery. However, respondents' views on this issue in this research are surprising. The average rating of 3.06 leads to the conclusion that, although many of them believe that there is a possibility of not receiving what they actually ordered, they still carry out e-transactions (naturally – if the requirements concerning privacy and security have been met, which has already been discussed). If the company has a good reputation in these matters, it is also believed that it provides a realistic picture of its products and delivers them with the expected performance (average rating of 4.26).

The internet has changed the old rules of doing business – it is true, but when it comes to a specific factor such as consumer loyalty, old rules are still in place. Loyalty in this context is still related to users' trust and they will certainly, after a superior online experience always stay loyal to the company that provided them with such an experience. Research results, with the average rating of 3.98 reveal that over half of respondents believe that, before they become loyal, companies must gain their trust, which makes sense. They pay attention to the already described factors, which increase trust and make up a whole that cannot function properly if any of them is missing. Only a few of them believe that online trust is not a basic factor in building loyalty to the company – seller.

It is a fact that companies that do not aspire to build long-term relations are in an unenviable position since they cannot fully understand which factors truly increase their satisfaction, successfully initiate repeat purchases and lead to increased trust. The high average rating of 4.13 provides evidence that their online trust increases through the personalized relationship with the company, which refutes all views that in the online world, a personalized relationship is not important for generating trust.

5.2. Model of mutual dependence

Since some constructs have been derived based on the average value of responses to questions pertaining to given constructs, an analysis of reliability[5] for responses from the questionnaire and derived constructs was performed in the very beginning (Table 3.).

Table 3. Analysis of reliability

		Cronbach alpha
WEBSITE USABILITY	Company – seller's website usability (ease of use) is important in case of e-transactions.	0.664
	My first impression depends on website design.	
	Slow website loading results in my giving up browsing.	
	Poor navigation results in my giving up browsing.	
	Website should provide information that help decrease uncertainty related to e-transactions.	
PRIVACY	Privacy is important in case of e-transactions.	0.724
	Distrust in e-transactions increases with the possibility of sharing my sensitive information with a third party.	
	The stricter the rules on online privacy, the greater the chances of my carrying put an e-transaction.	
SECURITY	Security is important in case of e-transactions.	0.641
	I feel insecure when exchanging sensitive information over the internet due to possible abuse.	
EXPECTED PRODUCT PERFORMANCE	I would not carry out an e-transaction because I am not able to see the product until the moment of its delivery.	0.670
	Company – seller's integrity affects building of my online trust.	

All the Cronbach alpha values are higher than 0.6, which proves that the assumption of reliability has been satisfied, and that the defined constructs can be analyzed further.

The structural model involves a series of linear regression models that describe how some variables depend on others. These models are called structural equations, while a group of structural equations makes up a structural model. Coefficients describe the way in which the dependent variable depends on the independent variable values and are called path coefficients. We used Amos, software which is part of SPSS package to calculate these coefficients. A model that included the constructs as manifest variables (website usability, privacy, security, expected product performance, and e-CRM), and the obtained results (path coefficients) are presented in Graph 1.

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[5] Cronbach's alpha is a measure of internal consistency, that is, how closely related a set of items is as a group. A "high" value of alpha is evidence that the items measure an underlying (or latent) construct. Cronbach's alpha is not a statistical test - it is a coefficient of reliability (or consistency).

Graph 1. Structure model
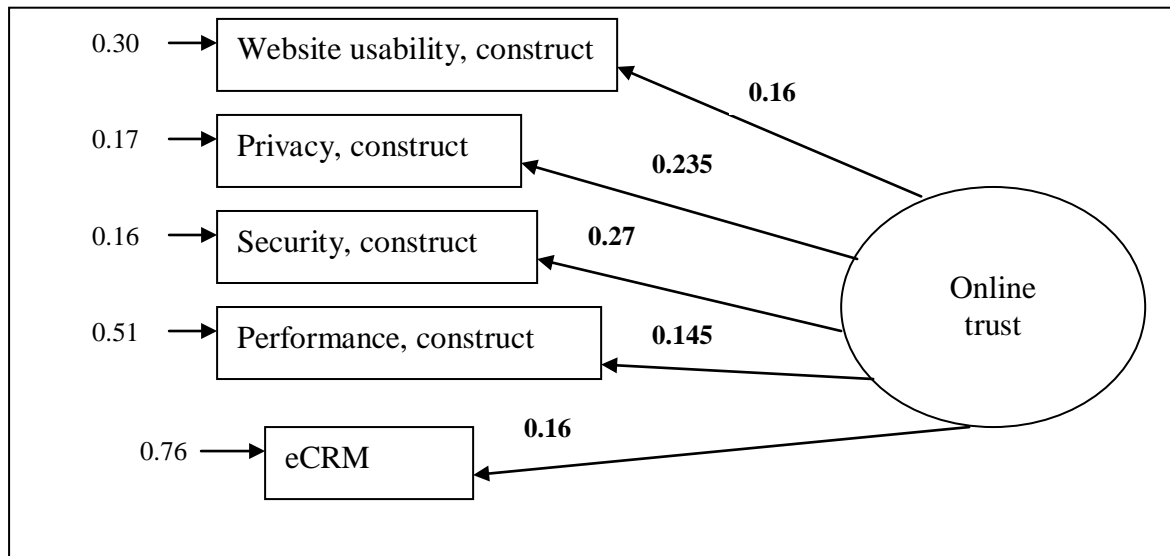
Chi square value for the obtained model is 14.27 with p value of 0.014, while the RMSEA value[6] is 0.06, which is lower than the critical value of 0.08. This indicates the adequacy of the obtained model. Since online trust is also directly rated through the questionnaire, the comparison of the original ratings with those that would be obtained using the presented model has been made:

$$\text{online trust (estimated)} =$$

$$= 0.16 \cdot \text{website usability} + 0.235 \cdot \text{privacy} + 0.275 \cdot \text{security} + 0.145 \cdot \text{performance} + 0.16 \cdot \text{eCRM}$$

The average value of absolute deviation of the original from rated valued for online trust is 0.197 with standard deviation of 0.263. When this value is related to the average value of the original rating for the importance of online trust (4.63, cf. Table 2), the model variation coefficient of 4.25% is obtained, which indicates the significance of the obtained structure model and its applicability in further forecasts.

Similar to Angriawan and Thakur's model, our model also proves a direct correlation between online trust and manifest variables included in the model; however, we cannot directly compare model results (path coefficients), since manifest variables are not included in these structural models in the same way.

In order to check the postulated hypotheses, we calculated partial coefficients of correlation between original ratings for online trust and variables included in the model (Table 4).

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[6] RMSEA is the root mean square error of approximation. This is test of model fit, good models are considered to have a RMSEA of 0.08 or less.

Table 4. Partial coefficients of correlation with the online trust variable

	r	P value
Website usability	0.098	0.039
Privacy	0.271	0.000
Security	0.202	0.000
Performance	0.112	0.011
e-CRM	0.105	0.024

All the obtained correlation coefficients are significant with the first-type error of 5% (p value is lower than 0.05), which means that the following hypotheses have been proven:

1. There is a positively-directed correlation between website usability and online trust.
2. There is a positively-directed correlation between expected product performance and online trust.
3. There is a positively-directed correlation between privacy and online trust.
4. There is a positively-directed correlation between security and online trust.
5. There is a positively-directed correlation between online trust and e-CRM.

Since the importance of online trust and loyalty was directly rated through the questionnaire, the correlation coefficient was used to analyze correlation between them. The obtained correlation coefficient has the value of 0.42 with p value 0.000, which proves the set hypothesis that: There is a positively-directed correlation between online trust and loyalty.

6. CONCLUSION

All e-transactions imply a certain degree of uncertainty in terms of their outcome, as well as the exchange of personal and sensitive data. Poor business practices make e-commerce difficult causing dissatisfaction and uncertainty. E-merchants must act in the best possible way in order to overcome consumers' perception of insecurity and risk by building trust. It implies strict elimination of all activities that negatively affect consumers and directly prevent them from carrying out transactions.

The research proved that basic factors of online trust model development include: website usability, privacy, security, expected product performance, loyalty, and electronic customer relations management (e-CRM).

There is a strong mutual correlation among these factors and e-merchants must therefore use an integral holistic approach in their programs of online trust development, building trust with consumers and ensuring security and privacy.

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MODEL POVJERENJA U E-TRANSAKCIJE

SAŽETAK

Trend razvoja e-trgovine osim značajnih koristi kreira i dosta izazova u smislu razvoja povjerenja između kompanije i potrošača. Nedostatak povjerenja vodi ka neobavljanju e-transakcija. Cilj ovog rada jeste identifikacija i objašnjenje najvažnijih faktora modela koji utiču na povećanje povjerenja korisnika u e-transakcije. Osim analize dostupnih radova iz ove oblasti provedeno je i terensko istraživanje na uzorku od 512 ispitanika uz pomoć online ankete. Nalazi istraživanja potvrđuju da su osnovni faktori modela online povjerenja: upotrebljivost web stranice, privatnost, sigurnost, očekivane performanse proizvoda, lojalnost i elektronsko upravljanje odnosom s klijentima (e-CRM).

Ključne riječi: *e-transakcije, e-trgovina, povjerenje*

Marko Miletić[∗]

STOCK PRICE REACTION TO DIVIDEND ANNOUNCEMENT IN CROATIA

ABSTRACT

The aim of this research is to analyze the connection between dividend announcement and stock price on Croatian capital market using event study methodology. Research period was the period from the year 2007 to the year 2009. Results have confirmed that dividend change has statistically significant value for investors. Dividend increase and dividend decrease resulted with statistically significant stock price change in the same direction, while dividend retention resulted with no statistically significant stock price change.

Key words: dividend, dividend announcement, stock price, abnormal returns

1. INTRODUCTION

If there is information symmetry every participant has the same information about the company on market. If one participant or a group has superior information about company in comparison to other participants, information asymmetry exists on the market. A great number of economic theoreticians and investigators from finance believe that managers posses superior information about the company they run with respect to other participants on the market. Larger information asymmetry means larger probability of manager opportunistic behavior. Manager opportunism results in occurrence of the problem called hidden information problem. Hidden information problem presents the situation in which manager is in the advantage due to having hidden information other stockholders don't have and having the possibility to hide information. A possible solution of hidden information problem is signaling. Basis of the signaling theory is information asymmetry which exists on market and represents an unequal access to information between managers and stockholders. The presumption on which this theory is based is the possibility of reducing information asymmetry by dividends which are used by insiders when they want to signal company situation. The concept of signaling theory originates in the work of Lintner (1956), who demonstrated how stock price often reacts to dividend changes.

In their seminal paper Miller and Modigliani (1961) stated that dividend policy is irrelevant for company value, but they also stated that market perception about dividend change can influence stock price reaction. If the company has established dividend policy with long term dividend payout ratio, change in dividend payout ratio would be seen as change in management view of company prospect. Dividend change conveys information, based on which investors make revaluation of their investments. Simply stated, dividend initiation or increase conveys bullish information and as a consequence stock prices usually rise, while dividend omission or decrease conveys bearish information and stock prices usually decrease.

Information content of dividend change presents the object of this investigation while the goal is to investigate influence of unexpected dividend change on stock price. Scientific

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literature reveals three methods used to test the ability of dividend to convey information. The type of approach depends on which of the following questions researcher wants to answer (Lease et al., 2000, 109):

1. Do unanticipated changes in dividends, when announced, cause stock price reaction to change in the same direction?
2. Are unanticipated announcements of changes in dividends accompanied by revisions in the market's expectations of future earnings in the same direction as the dividend change?
3. Do dividend changes predict future earnings beyond those predicted by past earnings?

This paper deals with the approach handling the first question. Research based on the second approach is not possible to accomplish because there is no revision of earnings forecast by an amount that is positively related to the size of the announced dividend change in Croatia. Stock market in Croatia is relatively new and it's not possible to do research of a longer period in time which could make the third approach relevant. Therefore, answering the second and the third question is not the subject of this paper.

The paper is organized as follows. Section 2 presents a brief literature review regarding dividend announcements. This is followed by a description of the data, hypothesis and methodology in Section 3. The empirical analysis of the relationship between dividend announcement and stock price reaction is described in Section 4. Last section is the conclusion.

2. LITERATURE REVIEW

In the second half of the 20th century theoretical signaling models where developed. Among a large number of theoretical models several of them need to be mentioned. Bhattacharya's model (1979) is the one in which company with high-quality investment project will pay high dividend, while managers in company with not so quality projects won't be able to pay high dividend because payoffs from projects are not sufficient to cover high dividends and the company will resort to outside financing which involves transaction costs. According to Bhattacharya (1979), managers signal the quality of an investment projects by committing to a specific dividend policy. Another model is John and Williams' model (1985) based on adverse tax consequences of dividends. John and Long (1991) constructed a model based on insider trading around dividend announcement, where insider trading represents the main information in signaling mechanism. The basic idea of these models is management usage of dividends to signal private information about future prospects of company.

The idea according to which a dividend could be used as a signal of company's business is established among financial directors of large companies in the USA. Abrutyn and Turner (1990) made a survey of financial directors of large companies in the USA in which 63% of examinees stated signaling to be the first or the second most likely reason to make dividend payout. Companies initiate or increase dividends only when they are certain about the maintenance of their good business because they avoid dividend cuts or omission. Lintner (1956) and Fama and Babiak (1968) have found a relationship between dividend and earnings consistent with the hypothesis that companies which paid out dividend, increase the dividend only when management is convinced that it can be sustained in the future.

Petit (1972) was one of the first researchers who tried to investigate signaling theory via dividend change. He investigated the speed of market reaction on dividend change and concluded that stock price entirely reflect dividend change positively and negatively on the announcement day and the day after. Petit believes that market uses information conveyed in the announcement in a way that they question company's market value on the basis of this information. Asquitha and Mullins' (1983) research results show significant positive returns connected with initiation or new dividend payoff ten years after the preceding dividend

payoff. Based on this research and a sample similar to the one taken by Asquitha and Mullins' (1983), Healy and Paelpu (1988) confirm results shown in Asquitha and Mullins (1983). Fuller and Goldstein (2004) made a research during economy rise and during economy decline. They stress that a signal that company is experiencing problems is company's dividend decrease during recession. Nevertheless, company's dividend decrease during market expansion has less information content than its dividend decrease during recession. Capsaff, Klæboe and Marshall (2004) made a research of dividend announcement impact on stock price in Norway. Research showed statistically relevant abnormal stock returns for unexpected increase and decrease of dividend payoff rate, whereas unchanged dividends resulted in statistically irrelevant negative changes which confirmed one of the conditions of signaling theory.

Kalay and Loewenstein (1986) claim that market adjusts to potentially negative information (dividend decrease) concerning the date when the information should be revealed to market and they stated how this price change (decrease) is lower for that negative information which was conveyed afterwards since market already gradually included potentially negative information in the price.

Besides announcement impact of unexpected dividend change on stock price, there are researches showing dividend announcement impact on stock turnover. Richardson, Sefcik and Thompson's (1986) research abnormal turnover increase linked to dividend change. They state that increased turnover is mainly connected with information dividend content. Besides abnormal turnovers, research results show an abnormal 4% return caused by information about dividend initiation. Research made by Gurgul, Majdosz and Mestel (2006) was focused on investigating impact of dividend announcement change on stock price and turnover change on German capital market. Positive and negative dividend change had a statistically significant influence on price change in the same direction as the announcement. Research results show that dividend information represents new and valuable market information. Investors are informed differently and have differently valuable information (real information) so they react differently to new information which leads to significant turnover increase. According to Haw and Kim (1991), the change of dividend payoff rate has a greater impact on the perception of investor who owns stocks of smaller companies. The assumption is that information asymmetry is greater in smaller companies. Investors in larger companies are better known with the business of larger companies and they can anticipate better information content of dividend change, therefore, stock price of large companies already includes piece of information which needs to be conveyed with dividend change announcement.

Connection between dividend announcement and stock price was investigated on many markets in the world and by many authors but in Croatia, unlike the developed markets, connection between dividend announcement and stock price has not been investigated yet.

3. SURVEY STRUCTURE

3.1. DATA

Research period in survey dates from the beginning of year 2007 to end of year 2009, while basic population from which the sample is taken presents companies listed on Zagreb Stock Exchange. Regular and preferred stocks were taken in research. To enter the sample companies had to meet following three criteria (in sequence):

1. Companies had to announce dividend change in period 2007 – 2009 compared with year before announcement. In Croatia dividend amount is usually first time announce through General Meeting notice. Companies which announced special dividend in addition to

regular cash dividend weren't taken in examination because this kind of dividends are often object of separate investigation with respect to regular dividends.

2. Next criterion was absence of any other unexpected significant information[1] which could influence on stock price on the announcement day.

3. The third criterion was that minimum turnover in the year when dividend change was announced which had to be 50 million HRK. Companies which made turnover less than 50 million HRK weren't taken into consideration. The aim was to avoid one of flaws of the Croatian capital market by taking 50 million HRK as minimum turnover. The aforementioned flaw is a great number of illiquid stocks which are not subject of every day trading and in which small daily turnover can have huge effect on stock price.

In order to get consistent research results, stocks of companies fulfilling previously mentioned criteria need to be set in three groups. These groups need to be defined based on dividend announcement direction. Therefore, one group was consisted of companies which announced unexpected dividend increase, second group was consisted of companies which announced unexpected dividend decrease, and third of companies which announced payoffs of unchanged dividends. A naive model was used when defining increase, decrease or maintenance of the same dividend per stock. According to naive model, expected dividend in an observed year equals the dividend paid the previous year.

From year 2007 to year 2009 22 companies made 35 dividend increase announcements. In the same period 10 companies made 11 dividend decrease announcements while 9 companies made 10 announcements of unchanged dividend.

3.2. HYPOTHESIS

Information content of dividend change presents the problem of this investigation while the goal is to investigate influence of unexpected dividend change on stock price. On the basis of the goal of this research main hypothesis was set up and it reads:

H₁.: Announcement of dividend change has significant value for investors on Croatian stock market.

Within the elaboration of the main hypothesis, dividend information value for investors is analyzed. Following this idea, according to the previous research in this area, the connection between dividend change and abnormal return is examined where abnormal return represents the difference between actual and expected return.

Since dividend change can have three directions; increase, decrease or maintenance of the same dividend amount, three backing hypotheses are being formed in order to confirm or to reject the main hypothesis.

H₁.₁.: There is a statistically significant connection between unexpected dividend increase and positive abnormal return.

H₁.₂.: There is a statistically significant connection between unexpected dividend decrease and negative abnormal return.

Unexpected dividend increase or decrease represents relevant information for the market based on which decisions about investment are made, while unexpected dividend doesn't represent relevant information and, therefore, the third backing hypothesis is:

H₁.₃.: There is no statistically significant relationship between unchanged dividend and abnormal return.

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[1] e.g. announcement of recapitalization can have significant influence on stock price.

3.3. METHODOLOGY

Event study was used to investigate stock price reaction to dividend announcement in the paper. Event study is a commonly used method when examining stock market reaction to dividend announcement, but there is no single "best" methodological approach for an event study. Analysis period of 40 days is used in the conducted event study. Accordingly to Johnson (1998) a comparison period of 30 days gives the best results in the event study and that period is used in survey. Announcement period was 10 days. It was consisted of seven days before the event date, event day (day of the dividend announcement) and two days after dividend announcement. Figure 1 presents analysis period which was used for analyzing relationship between dividend announcement and stock price reaction.

Figure 1

Defining the analysis period

Analysis period

40 days

Comparison period   Announcement period

30 days   10 days

-7   t = 0   +2
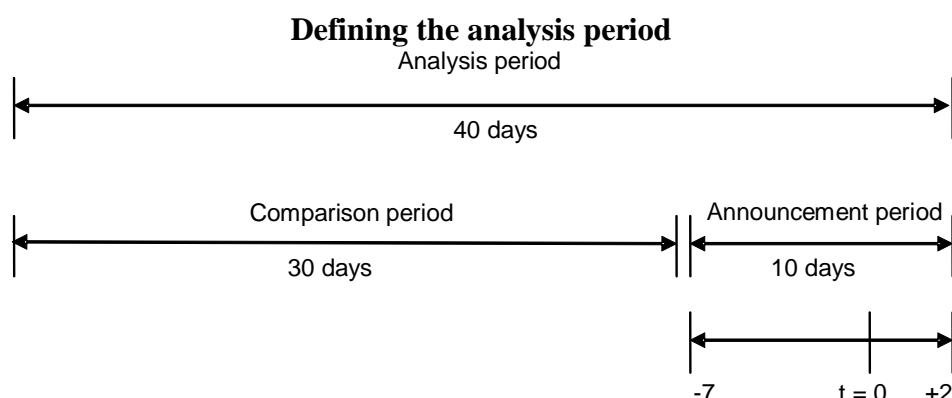
In order to examine return behavior of selected stocks around the event day, it is necessary to quantify the return which exceeds expected return in announcement period or to calculate abnormal return. In event study the actual stock return is compared with expected stock return to determine whether the stock market reaction occurred. Daily stock price data in research are obtained from the web pages of Zagreb Stock Exchange[2] (ZSE). Daily stock returns (R_{it}) are calculated by following expression:

$$R_{it} = \ln\left(\frac{P_{it}}{P_{it-1}}\right), \qquad (1)$$

where P_{it} stands for price of stock i on day t, while P_{it-1} presents price of stock i on day $t-1$.

Expected stock return on day t (E (R_{it})) is calculated on the basis of market model and is based on the previous 30 daily returns data before the announcement period. The beta (β) was calculated from a comparison period of 30 trading days prior to the announcement period. Expected stock return is calculated by following regression equation:

$$E(R_{it}) = \alpha_i + \beta_i R_{mt} + e_{it}. \qquad (2)$$

R_{mt} in equation 2 presents market return and it is calculated by following expression:

$$R_{mt} = \ln\left(\frac{P_{mt}}{P_{mt-1}}\right), \qquad (3)$$

where P_{mt} stands for daily point situation of CROBEX (official share index of ZSE) on day t and P_{mt-1} stands for point situation of CROBEX on day $t-1$. An abnormal return (AR_{it}), which is calculating in announcement period, is calculated by following equation:

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[2] www.zse.hr

$$AR_{it} = R_{it} - E(R_{it}),$$ (4)

In order to test posed hypotheses it is necessary to test if the average abnormal returns for each group of stocks are statistically significant different from 0. Average abnormal return (AR_t) on day t is calculated by equation 5:

$$AR_t = \frac{1}{n} \sum_{i=1}^{n} AR_{it}$$ (5)

Cumulative abnormal returns (CAR) are calculated by cumulating average abnormal return in announcement period.

4. EMPIRICAL RESULTS

In order to investigate the validity of the main hypothesis, it is necessary to investigate the influence of every direction of dividend announcement on stock price movement individually. Research starts with investigating unexpected dividend increase announcement on stock price. Results given by investigating the influence of unexpected dividend increase announcement on stock price is shown in the table 1.

Table 1.

Stock price reaction on dividend increase announcement

Day	Test value = 0						
	t	df	Sig. (2-tailed)	Mean difference (Abnormal return)	CAR	95% Confidence interval of the difference	
						Lower	Upper
-7	0,152	34	0,88	0,073643	0,073643	-0,90946	1,056741
-6	1,144	34	0,261	0,715146	0,788789	-0,55501	1,985303
-5	1,347	34	0,187	0,641669	1,430457	-0,32653	1,609871
-4	0,412	34	0,683	0,238969	1,669426	-0,94116	1,419095
-3	1,476	34	0,149	0,517471	2,186897	-0,19516	1,2301
-2	0,376	34	0,709	0,225277	2,412174	-0,9913	1,441852
-1	-0,597	34	0,555	-0,30735	2,104823	-1,3539	0,739199
0	2,209	34	0,034	1,558823	3,663646	0,124533	2,993112
1	0,184	34	0,855	0,102409	3,766054	-1,02586	1,230677
2	-0,856	34	0,398	-0,43037	3,335683	-1,45163	0,590891

Dividend announcement day - day 0, (table 1) shows statistically significant stock price increase when compared to other days. Average abnormal return on the announcement day was 1,56%. Positive abnormal stock return on the announcement day is statistically significant on a 5% level. Other returns in the announcement days aren't statistically significant. Hence, we can draw a conclusion about accepting the first backing hypothesis $H_{1.1}$.

Table 2 shows results of investigating the connection between the announcement of unexpected dividend decrease and stock price.

Table 2.

Stock price reaction on dividend decrease announcement

Day	Test value = 0						
	t	df	Sig. (2-tailed)	Mean difference (Abnormal return)	CAR	95% Confidence interval of the difference	
						Lower	Upper
-7	-0,432	10	0,675	-0,260555	-0,260555	-1,60464	1,083527
-6	-1,703	10	0,119	-0,701482	-0,962036	-1,61948	0,216512
-5	0,047	10	0,963	0,024636	-0,937400	-1,13579	1,185068
-4	0,073	10	0,943	0,046000	-0,891400	-1,36014	1,452135
-3	-1,075	10	0,308	-0,622955	-1,514354	-1,91413	0,668224
-2	-1,152	10	0,276	-0,705100	-2,219454	-2,0693	0,659097
-1	-2,173	10	0,055	-1,244009	-3,463464	-2,51932	0,031303
0	0,648	10	0,532	0,440255	-3,023209	-1,07325	1,953764
1	-1,068	10	0,31	-1,237691	-4,260900	-3,81866	1,343275
2	0,308	10	0,765	0,204636	-4,056264	-1,27718	1,686457

Unexpected dividend increase resulted in statistically significant positive abnormal return on the announcement day, whereas unexpected dividend decrease showed a statistically significant negative abnormal return on the day before a dividend announcement (day -1) which can be explained by information leakage. Abnormal return on the dividend decrease announcement day isn't statistically significant. On day-1 average abnormal return was -1,24% and is statistically significant on 10% level. The second backing hypothesis $H_{1.2.}$ is confirmed on the basis of the research made on the connection between unexpected dividend decrease and stock price.

Differently from unexpected increase or decrease dividend announcement which, according to hypothesis' assumption about dividend information content, should result in a significant stock price movement in the direction of announcement movement, maintaining the same level of dividends doesn't represent a significant information for investors. As stated above, announcement of payoff of the same dividend as the previous year shouldn't result in a statistically significant positive and negative stock price movement in the announcement period.

Results of the research of the connection between expected dividend announcement and stock price are shown in table 3.

Table 3.

**Stock price reaction on unchanged dividend announcement**

Day	Test value = 0						
	t	df	Sig. (2-tailed)	Mean difference (Abnormal return)	CAR	95% Confidence interval of the difference	
						Lower	Upper
-7	0,849	9	0,418	0,61251	0,61251	-1,01918	2,244197
-6	-0,28	9	0,786	-0,20747	0,40504	-1,88332	1,468379
-5	0,039	9	0,97	0,02713	0,43217	-1,56025	1,614506
-4	0,539	9	0,603	0,42305	0,85522	-1,35206	2,198155
-3	1,2	9	0,261	0,55268	1,4079	-0,48931	1,594666
-2	-0,6	9	0,563	-0,45446	0,95344	-2,16677	1,25785
-1	-0,144	9	0,889	-0,10995	0,84349	-1,84008	1,620184
0	-1,735	9	0,117	-0,9432	-0,09971	-2,17279	0,286387
1	0,693	9	0,506	0,43331	0,3336	-0,98088	1,847504
2	-0,805	9	0,441	-0,57606	-0,24246	-2,19386	1,041743

Announcement of the same dividend (table 3) as the previous year doesn't have a statistically significant influence on stock price movement on any day within the announcement period. Unchanged dividend doesn't represent statistically significant information for the market, which differentiates it from unexpected dividend increase or decrease announcement which concurs with signaling theory assumption. The third backing hypothesis $H_{1.3}$ can be accepted based on the research made on unchanged dividend announcement influence.

Figure 2 shows cumulative abnormal stock returns for dividend increasing companies, dividend decreasing company and companies which have maintained the same dividend level. Figure 2 graphically confirms information value which dividend announcement has for investors. Graph shows the influence of dividend announcement direction on abnormal cumulative return of particular stocks.

Figure 2

Cumulative abnormal stock returns
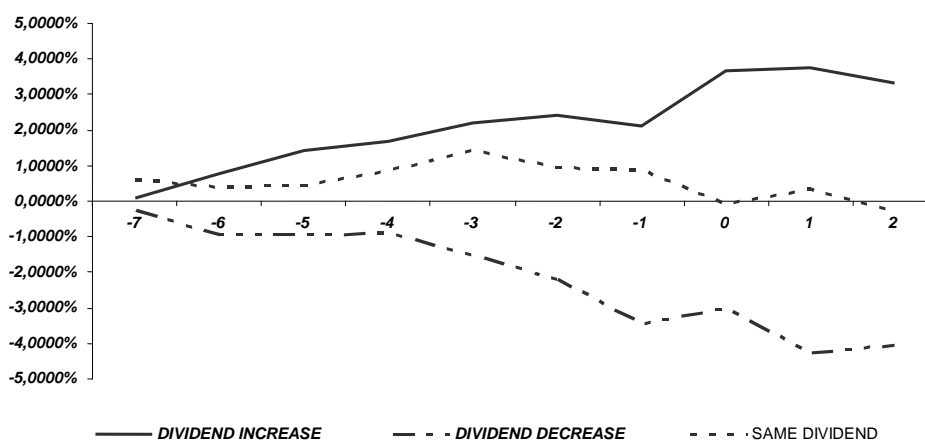
Stocks which announced an unexpected dividend increase, gained a positive 3.34% abnormal cumulative return on the last day in announcement period. Stocks of companies which announced an unexpected dividend decrease gained a negative -4.06% abnormal cumulative return, while group of companies which announced payoffs of unchanged dividends reported abnormal cumulative return of -0,24%. Abnormal cumulative return direction is the same as dividend announcement direction.

Based on previously confirmed backing hypotheses, abnormal cumulative return figure in announcement period, a conclusion can be drawn about confirming the main hypothesis of this paper that says:

H_1.: Announcement of dividend change has significant value for investors on Croatian stock market.

CONCLUSION

Research confirmed that dividend change represents a information relevant for market investors. Based on the shortage of information about company's present and/or future business, investors use management's dividend decisions as information upon which they question company's market value. If announced dividend is above expected, investors perceive this signal as positive information used by management to signal present and/or future company business. In case of positive information (dividend increase), company's stock price on dividend announcement day will increase above expected. If dividend announcement is below expected, investors perceive this as negative information used by management to signal present and/or future company business. In case of negative information, company's stock price on dividend announcement day will decrease below expected.

The empirical part of the paper examines the influence of unexpected dividend change in positive and negative direction as well as the influence of unchanged dividend announcement on stock price on the Zagreb Stock Exchange. Unexpected dividend increase announcement resulted in statistically significant stock price increase on the announcement day. Return gained on the announcement day was 1.56% higher than expected. Companies which announced unexpected dividend decrease showed statistically significant abnormal stock price decrease on the day before dividend announcement. Unexpected dividend decrease announcement resulted in return that was 1,24% lower than the expected return. The connection between unexpected dividend increase and stock price increase is confirmed on 5% significance level, while the connection between unexpected dividend decrease and stock price decrease is confirmed on 10% significance level. The connection between unchanged dividend and stock price is not statistically significant which conforms to assumptions of dividend information content hypothesis that abovementioned information does not represent significant information for the investors.

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UTJECAJ OBJAVE DIVIDENDE NA KRETANJE CIJENA DIONICA U REPUBLICI HRVATSKOJ

SAŽETAK

Cilj ovog istraživanja je ispitivanje veze između objave dividende i cijena dionica na hrvatskom tržištu kapitala uporabom metode studije događaja. Za period istraživanja uzet je period od početka 2007. godine do kraja 2009. godine. Rezultati istraživanja potvrdili su kako promjena dividende ima statistički značajnu vrijednost za ulagače na hrvatskom tržištu kapitala. Povećanje i smanjenje dividende rezultiralo je statistički značajnom promjenom cijena dionica u smjeru objave dividende dok objava očekivane isplate dividende nije rezultiralo statistički značajnom promjenom cijena dionica.

Ključne riječi: *dividenda, objava dividende, cijena dionice, abnormalni prinos*

Radojko Lukić[*]

ESTIMATES OF ECONOMIC PERFORMANCE OF ORGANIC FOOD RETAIL TRADE

ABSTRACT

As it is known, in recent years the phenomenon of "organic products" is getting more global and interdisciplinary character. The world has seen an increase of farmers' organic products, certification and the Earth's surface designed to produce organic products as well as sales of organic products. The role in the retail distribution of the produced organic products becoming a more significant.

Bearing all this in mind, this paper will deal, first, with the trend in retail development and characteristics of organic food observed globally, by country and formats (types of stores). Then we point out the key determinants of retail sales of organic food, and especially we will, as a primary goal of this paper, give a detailed overview of the theoretical-methodological and empirical problems, as well as the specific measurement of financial performance of retail sales of organic food.

Research into these problems is, for the purpose of considering the practical dimensions, based on recent relevant empirical data. The research results should serve as the basis for the creation of appropriate policies and strategies and, especially, for building integrated system of managing business and financial performance of retail organic food in the future. This is particularly true for of retail originating from a country with the distinction in the market development of organic food, as is the case with Serbia.

Key words: organic food value chain, the reasons for buying organic food, organics food prices, premium prices, organic food efficiency distribution.
JEL Classification: D40 L81 M41

1. INTRODUCTION

The management of organic food is very important and complex. It can be studied from different angles. The literature that is devoted to this subject, is specifically examined from the perspective of organic food global market, the motives for purchasing organic foods, analyses of the value chain of organic food, cost and operational efficiency of production and distribution of organic food.

In the context of this study, the subjects are almost all of these aspects of organic food, with special emphasis on economic performance. The effort is made to explore these problems in the complex theoretical, methodological and empirical way. The goal is to create a good theoretical and methodological framework for more efficient management of organic food, and in the whole value chain, with special emphasis on retailers.

In this paper, among other things, provides the answer to the question: Why are costs of production and distribution of organic food so high? Are customers willing to pay the high

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cost of organic food? Knowing the correct answer to these questions is a precondition for more efficient management of production and distribution of organic food.

2. LITERATURE REVIEW

It is a rich literature devoted to the analysis efficiency of production management and distribution of organic food. In addition to published articles on this topic in different high-ranking scientific and professional journals, there is a number of specialized institutes that are with more, because of its importance, more engaged in the research of key issues in the production and distribution of organic food.

Analysis of the effectiveness of the organization and functioning of most developed world markets organic food - through the relevant literature is the assumption for improving market efficiency in the development of organic food (Raynolds, 2004), as is the case of Serbia. Almost all developing countries, especially in transition, are characterized as – markes in development of organic food.

All scientific and technical knowledge to that obtained in the literature, as well as the results of specialized institutes, are used in this work in the research of theoretical, methodological and empirical analysis of the efficiency problem of retail organic food.

3. HYPOTHESES, METHODOLOGY AND EMPIRICAL DATA

The management of the organic food business is very complex and can be studied from different aspects (economic, legal, medical) and studied by various research hypotheses. In this paper, the following research hypotheses are tested:

- **The first hypothesis (H1):** The influence of culture on the globalization of production and distribution of organic food.
- **The second hypothesis (H2):** The need to develop more effective marketing of organic food.
- **The third hypothesis (H3):** Specific features of structural change in retail organic food and its implication on their economic performances.
- **The fourth hypothesis (H4):** The development of a quality measurement system in order to improve business performance retail of organic food.
- **The fifth hypothesis (H5):** Identification and control of the key determinants of performance of retail of organic food.

When testing these hypotheses appropriate methodology is used. In addition to traditional methods, statistics and research methods are applied, primarily for quantification of effect of certain key factors (for example, the satisfaction of customers) on business performances of retail sales of organic food.

By applying the appropriate methodology, the study of individual hypothesis is based on relevant empirical data, primarily for countries with developed market for organic food. The results of the hypotheses should serve as a basis for creating the appropriate strategy for the development of retail organic food, especially in countries with characteristics - market in development of organic food.

The main objective of this work is to be based on analysis of available empirical evidence, review the specifics of the cost structure and financial structure of the retail organic food compared to other types of retailers. It should serve as a basis for creating the appropriate financial management strategies in retail organic food.

The basic methodology for studying the basic problems is a given ratio analysis. It is supported with appropriate statistical analysis.

In this paper, all the tested hypotheses were confirmed. Developed a complex system of measures contribute to improving the performance of retail organic food.
 Limiting the analysis of this type of problem is the lack of adequate empirical data. In addition to the literature that treats this problem is scarce.

4. RESULTS

4.1. The globalization of organic food market

General development characteristics of the phenomenon of "organic food" include: increase in farmers' organic food certification and area of arable land (in hectares) under organic food and organic food sales. It takes on more and more characteristics of the process of globalization (internationalization) production and distribution of organic food. Are shown in the Table 1 major international markets selling organic food.

Table 1 Leading organic food market

Country	Sales (in millions of euros)
United States	15,582
Germany	5,850
France	2,591
United Kingdom	2,494
Italy	1,970
Canada	1,392
Switzerland	905
Austria	810
Denmark	724
Sweden	623

Source: Kahl, J. et al., (2010), "Organic food claims in Europe", *Food Technology,* 3, p. 42.

From the data presented in a given table is clear that the United States is the world's leading country for market development of organic food.
Is characteristics for the United States the pace of increase in share of total sales of organic food (Table 2).

Table 2 The share of total sales of organic food in the United States, 2000-2009

Year	The share of organic food in total sales (%)
2000	1.2%
2001	1.4%
2002	1.6%
2003	1.9%
2004	2.2%
2005	2.5%
2006	2.9%
2007	3.2%
2008	3.6%
2009	3.7%

Source: NBJ Organic Data Report featuring OTA, *Nutrition Business Journal,* 2010.

The comparison of certain products, there is the different structure of organic food sales in the United States. So, for example, the share of individual products in total sales of organic food in 2009 was the following: meat, poultry and fish 2%; bread and cereals 11%, fruit and vegetables 38%, milk 15%; spices 2%, packaged and prepared foods 14%; snacks 5% and beverages 13% *(NBJ's 2010 Organic Featuring an OTA Data Report)*. The largest share, therefore, refers to fruits and vegetables.

Sales of organic food in the United States is different in (some) channels. So, for example, the share of individual channels in total sales of organic food in 2009 was the following: mass marketing retail (conventional retailers) 54%, natural and special retail 40% and direct / exports 6% *(NBJ's 2010 Report Featuring Organic OTA Data)*. An increasing importance has been selling organic food in conventional stores.

Organic food stores are in many characteristics different from others in grocery retail (Table 3). They are characterized by prices that are high, the depth range of shallow-medium, the varieties of narrow-medium and the size of a small-medium.

Table 3 Characteristics of different types of retail stores in grocery

Dimensions	Discount	Supermarket*	Organic food shop	Weekly Market
Price	Low	Low-Medium	High	Low-high
Depth range	Shallow	Medium-deep	Shallow-medium	Medium-deep
Varietà	Narrow	Medium-wide	Narrow-Medium	Narrow-Medium
Size	Small	Medium-large	Small-Medium	Small-large

* Includes a variety of formats of supermarkets, such as conventional supermarkets, and hypermarkets superstore.
Source: Zielke, S. (2010), " How price image dimensions influence shopping intentions for different store formats", *European Journal of Marketing*, Vol. 44, No. 6, p. 753.

By itself, due to the specific, supply chain management organic food is very complex. There is large number of members - a mediator in organic food supply chain of from farmer to retailer, restaurant or institution. Their participation in this is different (Tondel, 2006). It requests appropriate coordination between them in order to improve supply chain management of organic food, in order to minimize those activities that add no value.

One of the important features of organic food market is intense development - private brands. So, for example, the number of new organic products marked private brands has increased from 350 in 2003 to 540 in 2007 (Dimitri, 2009). Market share of private brands in retail milk (in the period 2004 - 2007) more than doubled: 2004 - 12% and 2007 - 27% (Dimitri, 2009). Private brand is one of the important factors to improve performance of retail organic food. The significant factors to improve performance of organic food retailing, in addition to private brands, include - the premium price. Table 4 of the sake of illustration, shows the premium price of milk in retail in the United States by individual months for 2007.

Table 4 Premium retail milk prices in the United States, 2007

	March	June	September	December
Organic price *	4.67	4:32	4:45	4:40
Conventional price *	2:06	2:24	2:46	2:43
Premium *	2.61	2:08	1.99	1.97
Premium as a percentage of conventional prices **	126%	93%	81%	81%

Note: All prices are expressed in dollars per half gallon of milk. ** Author's calculation of the database, the source alleged.
Source: *USDA, Economic Research Service* calculations using Nielsen data.

From the data presented in the given table we see much higher organic than conventional milk prices in the United States. This is the case with other organic products, whose prices contain high premiums. They (premium price) are treated as incentives for increase (efficiency) production and distribution of organic products.

In the last period there has been a growing trend of organic food sales in *Europe*. In Europe, market leader in organic food sales are Germany, France, the United Kingdom, and Italy (Table 1). In these countries, in other words, there is a significant share of organic food in the customer's total expenditures on food (Table 5).

Table 5 The share of organic in the customer's total expenditure for food in Europe, 2007

Country	Organic food expenses mio €	Share of total food expenses %	Organic food expense per capita €
Germany	5.300	3,7	64,4
France	2.069	1,4	32,4
Italy	1.387	1,0	21,4
The United Kingdom	2.835	2,7	41,7
EU-15	14.381	1,9	35,9

Source: *An analysis of the EU organic sector,* European Commission - Agriculture and Rural Development, June 2010.

Leading global retailers in Europe offer a number of diverse organic products and mostly have private own distinctive brand (Table 6). This is definitely a positive impact on their overall performance.

Table 6 Leading global retailers of organic products in Europe, 2003

Retail chain	Country	Number of items	Private labels
Albert Heijn	The Netherlands	275	AH Biologisch
Auchan	France	700	N / A
Billa	Austria	700	Ja! Natürlich
Carrefour	France	800	Carrefour Bio
Coop Schweiz	Switzerland	800	Naturaplan
Coop	Italy	240	Bio-logici
Edeka	Germany	500	Bio-Wertkost, Bio-Gutfleisch
Esselunga	Italy	400	Esselunga Bio
Grona Konsum (KF)	Sweden	1,200	Anglamark
Kesko	Finland	500	Pirkka
Sainsbury's	The UK	1,300	Organic Sainsbury's
SuperBrugsen (FDB)	Denmark	1,300	Natura Okologi
tegut ...	Germany	1,300	tegut ... Bio
Tesco	The UK	1,300	Tesco Organic

Source: Sahota (2004). By: Privato, S., Misano, N. and Tencati, A. (2008), "The imact of corporate social responsibility on consumer trust: the case of organic food", *Business Ethics: A European Review,* Volume 17, Number 1, p. 9.

In Europe - Germany is the leader in market development of organic food. Sales of organic food is done in specialized organic food stores, conventional supermarkets and directly to consumers (Table 7).

Table 7 Market share of organic food marketing channels in Germany, 2008

Marketing channels	Market share (%)
Farmers	8
Processors	4
Health Food Stores	3
Organic Food Stores	22
General merchandise retailers	57
Other	6

Source: www.organic-world.net/statistics-germany.html

In the *United Kingdom* (in the previous period) an upward trend in sales of organic food has been noticed. Sales of organic food in 2009 decreased compared to 2008 for 13.63% probably because of the economic crisis (Source: *An analysis of the EU organic sector,* European Commission - Agriculture and Rural Development, June 2010). This is the case, otherwise, and with other countries. The comparison of certain products, most of the sales is related to milk, fruit and vegetables and meat. Participation of other organic products is much lower.

In the United Kingdom, as in other countries, there are various channels of selling organic food (Table 8). Participation of multi-retailers *(The Co-operative, Morrisons, Sainsbury's, Tesco, Waitrose)* is dominant (73.7%) in sales of organic food. Participation of other independent retailers is also significant (14.2%). Sales of organic food is done electronically.

Table 8 The share of retail organic food market in the United Kingdom , 2009

Marketing channel	Market share (%)
Multiple retailers	73.7%
Box schemes/home deliver/mail order	8.4%
Farm shops	1.8%
Farmers' markets	1.0%
Catering	0.9%
Other independent retailers	14.2%

Source: Soil Association - *Organic market report 2010*

Production and distribution of organic food in *Serbia,* compared to the United States and leaders in Europe is ata very low level (Source: Renko, N. et al. (2010), *Deliverable No. 1.7 National report per country on the organic production on the basis of bibliography and data collection,* June 2010, FOCUS-BALKANS, FP7 KBBE 2007 1 GA 212 579 (www.focus-balkans.org).

It belongs to the so-called emerging markets. Over 90% of organic products are exported *(Organic Agriculture in Serbia,* GAIN Report Number: RB9002, 08/06/2009). In Serbia, sales of organic food is done in small special shops, in green markets and increasingly in supermarkets (43%) and hypermarkets (Source: Renko, S., *Marketing channels relation to organic products,* Focus Balkans 4th Project Meeting Split, Croatia, Monday 1 st Februaray 2010). By comparing with neighboring countries, sales of organic food in Slovenia is done through the following channels: specialized organic food stores 18%, conventional retailers 78% and other distribution channels 5%, and in Croatia: specialized organic food stores 20%, conventional retailers 75% and other sales channels 5% (Source:Vaclavik, T., *Specialised Organic Retail Report Europe 2008, Compendium of Organic Market in 27 European Countries,* ORA, February 20, 2009, BioFranch 09). In these countries the participation of

specialized organic food stores is therefore less than 25% and the share of conventional retailers. Is high such a structure of channel sales of organic food will probably be in Serbia in the future, ie. Conventional retailers will have greater part in selling the organic food. All in all, there is a great potential for development of production and distribution of organic food in Serbia. Significant measures to improve efficiency of production and distribution of organic food in Serbia in the future include improving the legal framework, method of testing taste, quality organic food production, as well as higher budgetary allocations for the production and sale of organic food.

4. 2 Determinants of organic food sales performance

By individual countries consumption of organic food is different. The consumption of organic food is influenced by numerous *factors,* market and political nature, and their intensity of impact varies from country to country. The market factors include (1) motives on the demand side (value orientation, concern for environmental protection, available food culture, level of income - growth) and (2) opportunities on the supply side (the soil and climate, relative prices, distribution channels). The policy factors include (1) regulations (EU-federal laws and regulations, national - state laws and regulations, subsidies) and (2) market development (control, certification, brand, information). (Thøgersen, 2010)

Research in practice sets out a number of *reasons* why customers buy organic foods. These are natural and unprocessed, restrictions on the use of pesticides, better taste, better for the good, better for the planet, etc. *(Organic Market Report 2010,* Soil Association).

Consumer's satisfaction and enthusiasm are important determinants of the sale and consumption of organic food. It affects economic performance (sales per square meter), frequency of purchase and recommendation. Factors that influence the customer satisfaction and enthusiasm are: product quality, customer service, store atmosphere, price satisfaction, protection of environment and location of stores (Bolten, J. et al., 2006). Their successful control can affect the level of customer satisfaction and enthusiasm and therefore the sale and the consumption of organic food. To illustrate, according to a study, (for example Germany) using the regression model showed that customers' satisfaction affects 32% and customer's enthusiasm 27% of organic food sales per square meter (Table 9).

Table 9 Regression models for explaining economic performance in the retail organic food

Independent variable	Beta	t
Customer satisfaction	.62	2:47 *
Dependent variable: Annual sales per square meter of sales area. Adjusted R ^{2} = .32, F = 6.11 *, * p $\leq$ .05		
Independent variable	Beta	t
Customer enthusiasm	.58	2.23 *
Dependent variable: Annual sales per square meter of sales area. Adjusted R ^{2} = .27, F = 4.96 *, * p $\leq$ .05		

Source: Bolten, J. et al. (2006), "Perspectives of Small Retailers in the Organic Market: Customer Satisfaction and Customer Enthusiasm," Paper prepared for presentation at the 98th EAAE Seminar 'Marketing Dynamics within the Global Trading System: New Perspectives', Chania, Grete, Greece as in 29 June-2 July, 2006.

Customers with higher incomes and education, as well as older families (due to health) buy more organic products. Customers tend to buy fewer organic products when they buy concentrates. Customers tend to buy more products marked *private brands* than the national. The promotion of private brands affects increased sales of organic food. The price inversely affects sales of organic food (Ngobo, 2010).

Effective managing of the development of private brands of organic products is very complex because of the pro-and anti-competitive effect (Table 10). But no matter, in any case the development of private brands is a significant factor in sales performance of organic products.

Table 10 Pro-and anti-competitive impact of private brands of organic products

Relation from	Pro-competitive impacts	Anti-competitive impact
Manufacturer-retailer	Lower prices at high quality; Improving supply chain management; Facilitation entry	Flexibility loss due to vertical integration
Retail	High margin / rate of return; Distinction from competitiors; Price pressure	Turnover losses for conventional products
Retail - consumer	Diffusion of organic products; Consumer loyalty	Lower-cost imitations; PL as strategic weapon; Insufficient communication

Note: PL is a group of organic products: nutriments, fruits and vegetables, meat and fish, dairy products, juices, oil, fat and parfaits and natural stimulants. The share of these organic retail products is very significant.
Source: Janas. A. and Roosen, J. (May 2004), "Private labels for premium products - the axample of organic food," *Working Paper* EWP 0404, Department of Food Economics and Consumption Studies, University of Kiel.

4. 3 Specifics of the financial structure and profitability of the retail organic food

The organic food retail key determinants of overall financial performance are: the efficient management of liquidity, indebtedness, margin, operating expenses and profit.
It is known that organic sales price are higher than non-organic products. Why is this so? The cause of the high input costs of organic products, high margin, and the willingness of customers to - for some reason - buy them at that price.

By its nature *margin* as the difference between sales and cost of goods sold is one of the very important indicators of overall performance - profitability of retail organic food. It is generally speaking, used to cover operating costs and achieve a certain profit for the growth and development.

Cost structure of retail organic food is specific in relation to other retail sectors, ie. product categories (Table 11).

Table 11 Comparative performance in retail health food

Benchmark (Comparison)	Annual turnover range		
	Low $ 75,000 - $ 150,000	Medium $ 150,000 - $ 600,000	High $ 600,000 - $ 2,000,000
Cost of goods sold / turnover	52% -64%	57% -65%	59% -65%
Work / turnover	0% -9%	3% -13%	10% -16%
Rent / turnover	6% -16%	6% -12%	7% -11%

Source: Health food retailing, 27 April 2010. (www.auto.gov.au/business/cintent.asp?doc=/content/00238499, htm)

Three main categories of costs in the retail organic food are: the cost of goods sold, labor and rent. Their effective management can, therefore, cause an increase in retail profit of organic food.

Specifics of the financial structure and profitability of retail organic food in this work we will demonstrate global business retailer *Whole Foods Market*, which operates with 275 stores in 38 states (Table 12).

Table 12 Historical performance of Whole Foods Market

Metric	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Store number at the end of the year	145	145	135	126	163	175	186	276	275	284
Comp Store Sales Growth	8.6	9.2	10.0	8.6	15.0	12.8	11.0	7.0	4.9	
Average Store Size ('000 Square Feet)	22	25	30	36	32	33	34	34	36	37

Source: Chacon, F. , SBDCNet Connections Issue 57: *Retail Organic Food Industry in the United States*, March 2010, NAICS Code: 445299, SIC Code: 5499 (www.sbdcnet.org)

Table 13 shows key financial indicators for the analysis of financial health of *Whole Foods Market*.

Table 13 Key financial indicators of Whole Foods Market, 2009.

	Whole Foods Market	Industry
Liquidity ratios		
Angry ratio	0.8	0.3
Current ratio	1.5	1
Leverage ratios		
The long-term debt / equity	0.45	1.03
Total debt / equity	0.45	1.14
Total debt / assets	0.57	-
Activity ratios		
Asset turnover	2.2	2.6
Turnover of receivables	7.3	50.2
Fixed Assets Turnover	-	-
Inventory turnover	15.7	12.1
The average collection period of receivables (days)	73	50.2
Profitability ratios		
Return on sales	3.9	0.6
Return on investment	6.2	1
Return on equity	5.9	2.8
Earnings per share	70.6	-
Income from dividends	0	1.7
Payment of dividends	0	2.4
Price / Earnings	36.6	142.8

Source: Onley, M. (March 5, 2010), "Qualitative and Quantitative Analysis of Whole Foods Market, Regis University.

From the data presented in the given table we see - compared to the average - much better liquidity, financial indebtedness and profitability of *Whole Foods Market*. In other words this means, , that the management of any profit was satisfactory, as well as asset turnover (total for all forms) and financial indebtedness, viewed as a component of so-called strategic profit model.

The retailer *Wal-Mart* also sells more organic products and is one of the strong competitors. It has a comparative advantage over other competitors in terms of distribution networks and suppliers' price control capabilities. This affects the rate of gross margin *Wal-Mart* which is (23.1%) lower than that of *Whole Foods Market* (35.0%). (Source: Chacon, F. , SBDCNet Connections Issue 57: *Retail Organic Food Industry in the United States*, March 2010, NAICS Code: 445299, SIC Code: 5499 (www.sbdcnet.org)

Profitable performance of the retailer *Whole Foods Market* could improve, among other things, with efficient management of operating costs. This is especially true for the direct costs of stores, which dominate in the total operating costs (Table 14). It contributes greatly to the use of modern information and communication technology, and efficient human resources management.

Table 14 Operational performance of Whole Foods Market (as a percentage of sales)

	2009	2008	2007
Sales	100%	100%	100%
Cost of goods sold and occupancy costs	65.7	66.0	65.2
Gross profit	34.3	34.0	34.8
Direct store expenses	26.7	26.5	26.0
General and administrative expenses	3.0	3.4	3.3
Pre-opening expenses	0.6	0.7	0.9
Relocation, store clousure and lease termination costs	0.4	0.5	0.2
Operating incomes	3.5	3.0	4.5
Interest expense	(0.5)	(0.5)	(0.1)
Investment and other income	-	0.1	0.2
Income before income taxes	3.1	2.6	4.6
Provision for income taxes	1.3	2.6	4.6
Net income	1.8	1.4	2.8
Preferred stock dividends	0.3	-	-
Income available to common shareholders	1.5%	1.4%	1.8%

Note: Amounts due to rounding are not equal to the sum of the constant number 100
Source: 2009 Annual Report.

5. CONCLUSION

Because of its importance, the process of globalization of the market of all organic products, which means food too have been expressed lately. According to the realized sales, a leading organic food market in the world, Are the United States, Germany, France, United Kingdom, and Italy. Knowledge of their achievements in this area is very important for effectively management of the emerging markets of organic food, as is the case with Serbia. In the function of an efficient market development of organic food in Serbia in the future it is necessary, like in this country, to improve regulations, methods for testing the taste, quality and much higher budget allocations for these purposes.

Prices of organic food have been known higher when more as compared to conventional. Margins and input costs of organic food are also higher. Three major categories of organic food retailing costs are: costs of goods sold, labor and rent. In addition to organic prices, premium rates, customer satisfaction and the development of private brands are important as well determinants of organic food sales.

Sales of organic food is done in specialized stores, conventional supermarkets and hypermarkets and direct customers. In all countries, increases, the participation of conventional retailers in selling organic foods is increased.

Based on the empirical research - the case of *Whole Food Market*, general conclusion: is that organic food retailers are in a position to get almost all the indicators of very positive financial performance (liquidity, solvency, profitability), well above average. The causes of this are, among other things, high prices, margins and effectively managing costs and available capital. In the future they will be largely determined by the degree of application of modern information technology and communication. Identification and effective management of all the key determinants is therefore a prerequisite for efficient management of overall performance in the retail organic food.

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PROCJENE EKONOMSKIH PERFORMANSI TRGOVINE NA MALO ORGANSKE HRANE

SAŽETAK

Kao što je poznato, u novije vrijeme fenomen "organski proizvodi" poprima sve više globalni i interdisciplinarni karakter. U svijetu je zabilježen porast broja farmera organskih proizvoda, certifikata i zemljine površine namijenjene za proizvodnju organskih proizvoda, kao i prodaje organskih proizvoda. Sve je značajnija i uloga maloprodaje u distribuciji proizvedenih organskih proizvoda.

Imajući sve to u vidu, u ovom radu osvrnut ćemo se, prvo, na trend i karakteristike razvoja maloprodaje organske hrane promatrano globalno, po pojedinim zemljama i formatima (tipovima prodavaonica). Zatim ćemo ukazati na ključne determinante razvoja maloprodaje organske hrane. I na kraju ćemo se, kao primarni cilj ovog rada, detaljno osvrnuti na teorijsko-metodološke i empirijske probleme, kao i na specifičnosti mjerenja financijskih performansi maloprodaje organske hrane.

Istraživanje ovih problema je, u svrhe sagledavanja praktične dimenzije, zasnovano na najnovijim relevantnim empirijskim podacima. Pri tom je primijenjena prije svega najednostavnija tradicionalna metodologija istraživanja. Dobiveni istraživački rezultati trebaju poslužiti kao osnova za kreiranje odgovarajuće politike i strategije razvoja i, posebno, za izgradnju integralnog sustava upravljanja poslovnim i financijskim performansama trgovine na malo organskom hranom u budućnosti. To se posebno odnosi na maloprodaju porijeklom iz zemlje sa odlikom tržišta u razvoju organske hrane, kakav je slučaj sa Srbijom.

Ključne riječi: *lideri tržišta organske hrane, lanac vrijednosti organske hrane, razlozi kupnje organske hrane, premija cijene organske hrane, privatna robna marka, učinkovitost distribucije organske hrane.*

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BOOK OUTLINE

TITLE: The Challenges of the International Market
AUTHOR: Prof. Bruno Grbac, Ph.D.
PUBLISHER: University of Rijeka, Faculty of Economics of Rijeka, Promarket
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Published in Rijeka in 2009 by the Faculty of Economics of the University of Rijeka, *The Challenges of the International Market* (ISBN 978-953-6148-74-5) is a scientific book and university textbook. It contains 379 pages and has a B5 format with hard covers.

Bruno Grbac, Ph.D., Tenured Full Professor and research adviser at the Faculty of Economics of the University of Rijeka is the book's author. As editor, author or co-author, he has published 21 books dealing with marketing management and international marketing. He has also published papers concerning his research in a number of domestic and foreign scientific journals, as well as in the proceedings of international conferences. Rapid and wide-reaching change influences business in the international marketplace. While change has always been a familiar term and phenomenon, never before have changes in the marketplace been so complex or evolved so quickly. Businesses that operate or plan to operate on the international market seek to resolve the complexity of relationships and adjust to change by making careful analyses, taking an integrated approach and monitoring business performance.

Cultural, demographic and technological changes occurring on the international market influence the way end consumers and business customers react, and make competition in the international marketplace keener. End consumers and business customers on the international market have always been, and will continue to be, the focus of interest of businesses manufacturing products or providing services that are transformed into value only when accepted by those for whom they are intended, that is, end consumers and business customers.

When competing on the international market, businesses must be quicker than their rivals in anticipating market needs. In addition, they must focus on providing their products and services with added value, making them as attractive as possible to potential end consumers and business customers, as well as capable of meeting and exceeding expectations. Hence, international marketing is becoming vital to businesses wishing to survive and flourish on the international market. The implementation of international marketing, however, requires businesses to be knowledgeable in resolving complex relationships and problems on the international market.

The Challenges of the International Market has received favourable reviews from two experienced researchers: Marcel Meler, Ph.D., Tenured Full Professor and research adviser at the Faculty of Economics of the J.J.Strossmayer University of Osijek, and Biljana Crnjak-Karanović, Ph.D., Tenured Full Professor and research adviser at the Faculty of Economics of the University of Split.

The book's author presents the results of his research in five interrelated and coherent chapters. Chapter 1, entitled *The Concept of International Marketing*, brings together debates on the nature, understanding and evolution of international marketing. It explores the

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attributes of international marketing and analyses international marketing and international trade.

The next chapter, *The Dynamics of an International Environment*, examines the powers that operate within an international environment, looks at opportunities for international marketing, and makes a case for the need of taking a systematic approach in researching the international market.

Chapter 3, *Winning International Markets*, explores the appropriate approaches to take in competing on the international market, identifies strategies for competing on the international market, and defines international market expansion strategies and global business strategies.

The chapter entitled *The Determinants of an International Marketing Mix* deals with the characteristics and special features of international product management, pricing on the international market, and the determinants of international distribution channels and logistics. It also focuses on the special traits of international marketing communication.

The fifth and final chapter outlines the *Future of International Marketing*. It discusses trends that influence international marketing activities and focuses on the strategic aspect of international marketing.

Each chapter ends with two case studies, one concerning a foreign business entity, the other, a domestic business entity.

This book is intended for anyone wishing to succeed in the international market, whether they are managers engaged in, or planning to engage in, devising a strategy for competing on the international market, or new employees, working in international marketing, export or market development markets, for whom this book is a good start in learning about the international marketplace. It is also aimed at undergraduate and postgraduate students. The book assumes the reader has basic knowledge of marketing or has been exposed to the international environment through previous work.

The ideas and citations of many other researchers and authors, used to argue certain points, have contributed to making this book, as have many managers whose approaches to success on the international market are analysed in the book. The author compares theory and practices linked to international market issues, bringing them fully into perspective for the reader. To this end, the book abounds in practical examples of business operations on international markets, as well as citations, especially of foreign authors, to help explain the nature, essence and, in particular, the necessity of doing business on the international market. While the book addresses issues at the required scientific level, it also focuses heavily on the practical aspect by providing a series of examples taken from practice that readers can use as guiding principles when dealing with the international marketplace in their everyday work.

What adds to the significance of this book, dealing with the importance of the international market and the role of international marketing in helping businesses rise to market challenges, is the fact that, until now, no other book in the Republic of Croatia has addressed either the complexity of relationships on the international market or the role of international marketing in such a clear and comprehensive way.