

# Financial I/2014 Theory & Practice

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in Croatia

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# Political budget cycles at the municipal level in Croatia

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Preliminary communication\*\*

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## Abstract

*This paper examines the existence of the political budget cycle (PBC) at the local unit level in Croatia. The research was focused on a sample of 19 county centres, the City of Zagreb and Pula in the period from 2002 to 2011. During that time three parliamentary (in 2003, 2007 and in 2011) and two local elections (in 2005 and in 2009) were held and all the results are calculated at the level of the selected cities. The results do not confirm the existence of opportunistic PBCs, either when the analysis takes in all five elections or when it considers only the parliamentary polls. They do however indicate the restructuring of total expenditures based on second-best strategies and institutional constraints. Analysis of local elections alone indicates the existence of Rogoff's model of information asymmetry. The paper also presents various theoretical models of the PBC together with a survey of empirical research regarding the existence of PBCs in the developed, transitional and developing countries.*

*Keywords: political-budget cycles, elections, dynamic panel data analysis*

## 1 INTRODUCTION

In the context of the path transition has taken in Croatia since the 1990s the problem with budget deficits at all government levels (national, regional and local) indicates the importance of analysing political constraints in the processes of both budget and economic policy formulation and implementation. Political constraints are the result of heterogeneity of preferences among economic agents as defined by public choice theory (politicians, voters, bureaucrats and interest groups) and their mutually confronting interests. They arise due to self-interest on the behalf of incumbents and their re-election motives. In other words, they are shown in a sub-optimal allocation of budget resources and in the creation of budget deficits. Thus, a wider perception of these constraints can be beneficial both for economic policy makers as well as for researchers, voters and other economic agents as defined by public choice theory. Additionally, the size and the influence of the state in the economy (measured as the percentage of GDP that is distributed through political decisions) is of too great an importance to keep the focus strictly on the analysis of market decisions and to claim that politicians and their preferences are exogenous.

The political-budget cycle (PBC) has been vigorously studied in the literature, from both theoretical (e.g. Rogoff and Siebert, 1988; Rogoff, 1990; Shi and Svensson, 2002; Drazen and Eslava, 2006) and empirical aspects (e.g. Persson and Tabellini, 2002; Brender and Drazen, 2004; Alt and Lassen, 2006; Schneider, 2010) with various country samples and methodological instruments. Despite the importance of political constraints in the formulation and implementation of optimal economic policies, PBCs in Croatia represent an area of research where scientific empirical literature has been rather silent, especially at the local level.



PBC models represent one of the most active branches of research within the new (positive) political economy (NPE). Due to their theoretical foundations and empirical validation they have almost entirely replaced previous research focused on political business cycles. PBC models can be defined as periodical fluctuations in fiscal policy induced by the electoral cycle. With respect to the model, fluctuations can take the form of a budget deficit or a change in the magnitude (increase) and composition of public spending or a reduction in public revenues. From this originates the primary goal of this paper, namely to establish which of the theoretical political budget cycle models is suitable for Croatia.

The main hypothesis of the paper is that in Croatia PBCs do exist at the municipal level and an additional hypothesis is that any party ideology shared at the municipal and national level is likely to be visible in public spending. More directly, public spending will rise if municipal and national incumbents share the same party ideology. To the best of the author's knowledge, there is no scientific empirical paper in the domestic literature that has tested the existence of PBCs at the municipal level. The fundamental contribution of this paper to the existing literature is in providing an empirical analysis of the results of combined parliamentary and local elections, and an analysis of separately held local and separately held parliamentary elections on a sample of Croatian cities.

Results that refer to joint parliamentary and local elections and to solely parliamentary elections do not confirm the main and the additional hypothesis. In election years, total spending decreases, which results in a lower budget deficit. Due to the institutional limitations set on the size of public debt at the local level, incumbents use opportunistic manipulations within public spending items. In other words, they cut capital and increase current spending. The analysis of solely local elections confirms the existence of PBCs at the municipal level and suggests that Rogoff's model of asymmetric information is optimal. The increase of the budget deficit in election years in combination with an increase in the average number of employees in the local bureaucracy and budgetary users corresponds with the theoretical predictions of the stated model. Both results indicate opportunistic behaviour on the part of the incumbent and the rent-seeking role of the local bureaucracy in the election process.

The article is organised as follows. The next section presents basic terms from the NPE and from public choice theory (PCT) that serve as the common ground on which both political business cycle and PBC models were developed. Section 3 presents three key PBC models: asymmetric information, moral hazard and the model of incumbent asymmetric preferences (pork barrel cycles), which constitute the theoretical basis of the empirical analysis. A survey of the empirical literature on PBC models in developed, transition and developing countries is presented in section 4. Data, methodology and the empirical results obtained are

presented in section 5. Finally, conclusions are reported in section 6 together with the directions that future research might take.

## 2 THE NEW POLITICAL ECONOMY AND PUBLIC CHOICE THEORY

The roots of the NPE as a research area can be traced to the theory of macroeconomic policy (Lucas' critique), rational choice theory and public choice theory (PCT) (Persson and Tabellini, 2000:2-3). Although founded on PCT grounds (methodological individualism<sup>1</sup> and utility maximisation) the NPE is primarily interested in the analysis of the economic effects of politics. In other words, the NPE takes the current institutional framework as a given constraint in the optimisation process without having any explicit intention of changing it.

Drazen (2000:7) argues that actual policies are often quite different from optimal policies due to technical, informational and political constraints. The NPE explains the choice of policies and thus economic outcomes that differ from optimal policies, and the outcomes those policies would imply. In this light the two following propositions are important for the NPE. First, heterogeneity and conflicts of interests among economic agents are a necessary condition for political constraints to exist. And second, the effect of politics on economics follows from the mechanisms by which these conflicts are resolved. It is the latter that is the key focus of the NPE.

The economic effects of political behaviour, within the existing literature, are divided between political business cycle and the PBC. Both theoretical and empirical researches into these phenomena stem from PCT. As an interdisciplinary research area, PCT unites theoretical paradigms of economics and political science and applies it in the analysis of behaviour of key economic agents within the theory itself (politicians, voters, bureaucrats and interest groups). PCT can be defined as a special form of "economic imperialism"<sup>2</sup>, as an economic theory of politics or based on Buchanan (2005:8) as "politics without romance". PCT is based on three assumptions: of self-interest, exchange and methodological individualism (Udehn, 2003:154). From these assumptions follows the behaviour of economic agents that aim to maximize their utility with respect to the given constraints.

Elections play a twofold role in this process. First, they include politicians and their preferences in economic models which in turn make them "richer" and more real. In that way, by incorporating the interactions of all economic agents, the economic models include conflicts due to incompatible preferences. Finally, through the election process, voters decide on the collective action (i.e. its start/end, intensity, etc.).

<sup>1</sup> The term highlights that it is the individual and his (rational) choices that are in the centre of the analysis. Arnsperger and Varoufakis (2006) suggest that methodological individualism implies the idea that all socio-economic explanations should be sought at the level of individual economic agent.

<sup>2</sup> The term is derived in the works of Tullock (1972), Stiegler (1984) and Udehn (2003).

The relationship between economic agents within PCT is best described through the agent-principal model in which preferences, in most cases, do not coincide. For instance, the agent (politician) can trick his principal (voter) due to information asymmetry prior, during or even after the election period. Once the elections are held, economic agents start negotiating and voting on various public policies. The policies chosen are then delegated to bureaucrats who are in charge of implementing them. During this whole process, interest groups apply pressure in order to bring about an outcome of the collective action that is in their favour.

McLean (1997:39, 41) analyses politicians as entrepreneurs that provide specific public goods and as “ideological entrepreneurs”. The first are responsible for producing and trading public goods, but are also characterised by their tendency to trade private goods also. It is their role as entrepreneurs that represents the basis for their re-election aspirations in front of the electorate. On the other hand we see “ideological entrepreneurs” who are genuinely interested in the contents of politics and the political. They ensure public goods regardless of the free rider problem. “Ideological entrepreneurs” do not expect to be compensated and consider their work as their calling.

Voters represent rational and self-interested economic agents that can be compared to consumers in the market. Their act of voting serves as a means to maximize their utility function. The biggest problem in the analysis of voter behaviour is that voters actually do not know how to vote for their own interests. The cost of acquiring information, in a (pre)election period, is too high for a rational *homo economicus*. Additionally, if information does not exist or is asymmetric the optimal strategy for every voter is to act as a rational ignoramus.<sup>3</sup> In such a case, a rational voter ignores all pre-election events and votes ideologically. In return, it is exactly the combination of rational ignorance, ideological voting and the so called “problem of full supply”<sup>4</sup> that stimulates politicians in their sub-optimal behaviour.

According to Niskanen’s model of bureaucracy, bureaucrats will aim to maximize their own budget due to the fact that they cannot maximize profit (McLean, 1997:100-101). Since they are monopolistic suppliers of their own goods this represents the only way in which they can ensure compensation through various privileges: bigger offices, higher salaries, public reputation, etc. Most theoreticians of public choice claim that during this process bureaucrats will tend to produce more than the politicians (and probably voters) would like them to do or that they will do it at a higher price (Lemieux, 2004:27). The literature also emphasises the role of information asymmetry or the power of bureaucracy to determine the agenda (Mueller, 2003:333, 342-343).

<sup>3</sup> But rational ignorance is also asymmetric, with the essential role of interest groups and incumbents in that process.

<sup>4</sup> The situation in which none of the programs offered to voters fully reflects their preferences.

Interest groups represent groups of individuals with common interests that conduct collective actions: caveats, lobbying, financing political party campaigns, etc. Their goal is to influence the outcome of collective actions that very often have the characteristics of a public good. Their activities rarely come to the tight bonding to those political options that would, in their opinion, best represent their interests in exchange for their support in the elections. Promoting the joint interest of their members, at the expense of others, is the main reason why interest groups enter into politics.

### 3 POLITICAL BUDGET CYCLES

Political decisions have economic outcomes that are visible in movements of economic variables and instruments. Political business cycle models represent election driven cycles in (macro)economic variables: unemployment rates, inflation rates and production. With respect to the rational expectations hypothesis and incumbents' motives (opportunistic vs. partisan) the existing political business cycle models can be divided into four large groups: adaptive opportunistic, adaptive partisan, rational opportunistic and rational partisan political business cycle models (Alesina, 1988:16). Drazen (2000:259) supplemented Alesina's division with "Hibb's model of changing objectives", which represents a synthesis of previous models in an environment characterised by rational expectations.

PBC models represent a periodical fluctuation in governmental fiscal policy induced by the cyclicity of elections (Shi and Svensson, 2003:67), that is, an increase in public spending (total or in certain items), budget deficit creation and a decrease in public revenues in election year. The key difference between PBC and political business cycle models is that the former focus on the analysis of instruments that are under the direct control of politicians. Various PBC models study the effects of political pressures aimed at increasing public spending and creating budget deficits. Just as in the political business cycle models, political pressures can take two forms: opportunistic and partisan. In the first case, opportunistic politicians can increase either total spending or individual budget items aimed at certain groups in order to improve their chances of re-election. Alternatively, incumbents might be beholden to a partisan constituency that gains from certain kinds of expenditure (Lohmann, 2006:534).

According to Mueller's ethical voter hypothesis that focuses on economic voting, the voter has an objective function, which he tries to maximize, with the two following variables: personal and social welfare.<sup>5</sup> In PBC models, voters value only personal, direct benefit from governmental programmes. Since information is asymmetric, their voting is labelled as rational retrospective, meaning that it

<sup>5</sup>Mueller (2003:298-299) denotes these two terms as egotropic and sociotropic variables in the objective function that the voter is trying to maximize. Egotropic variables measure voter expectations regarding the effect of the government's policies on the voter's own income, employment status, and so on. Sociotropic variables measure voter expectations regarding the effect of the government's policies on the economy at large, that is, on the welfare of all citizens.

follows from the incumbents' observed results during their term in the office (Alesina et al., 1997). In this way, voters are trying to determine exactly how much the incumbents contribute to their objective utility functions. In so doing, a rational voter will react to pre-election manipulation, e.g. when an incumbent tries to signalise its high level of competence through increased public spending and lower taxes or when it changes the structure of public spending in the (pre)election period. Under these conditions, the incentives faced by the politicians to manipulate budget items and to create budget deficits primarily depend on the fiscal preferences of voters (whether they prefer "high spending" or "low spending" politicians) and on the transparency of the budget process.

Shi and Svensson (2003:69-70) distinguish two types of PBC models: signal models (adverse selection-type models), that are based on asymmetric information regarding the politicians' level of competence, and models based on moral hazard. Drazen and Eslava (2006:16) expand this division with their own model of incumbents' asymmetric preferences (pork barrel cycles) in which alongside the overall level of expenditures one also observes the structure of expenditures among voters.

The key reason for analysing PBC models is in their empirical confirmation, which is stronger in the case of macroeconomic instruments than in that of macroeconomic results (Drazen, 2000:242-244). At the same time, empirical results clearly indicate that the manipulation of instruments by incumbents who wish to improve their re-election chances through opportunistic economic policies is more evident in the case of fiscal than in the case of monetary policy (Snowdon and Vane, 2005:536). This follows from Rogoff's concept of conservative central banker whose primary goal is price stability (Snowdon and Vane, 2005:552). Cycles that arise are shorter and have lower intensity, but the empirical advantage of PBC models is that they permit research into cycles at both national and local levels.

### 3.1 MODEL BASED ON ASYMMETRIC PREFERENCES

This model is based on signals that incumbents have sent to their electorate in the form of lower taxes and/or higher expenditures. The goal of incumbents in the (pre)election period is to present themselves as more competent than they really are. In that way, they create the illusion that they can provide a given level of public services with lower levels of public revenues.<sup>6</sup>

The basic argument of the model is that voters prefer public expenditures, but constantly undervalue their tax costs, i.e. they suffer from "fiscal illusions". The problem increases if the costs are postponed so voters support incumbents who

<sup>6</sup>Rogoff and Siebert (1988:2) define competence as the minimum amount of public revenues needed to ensure the given levels of public services.

can provide high levels of public expenditures, financed through public debt, and remove those who cannot.

### 3.1.1 Rogoff and Siebert PBC model

The PBC model by Rogoff and Siebert in 1988 assumes that each politician has a competence level (high or low) which is only known to him and not to the electorate. As a consequence, during elections, voters form their rational expectations based on observable current fiscal policy outcomes. A high-type incumbent will attempt to signal his type by engaging in expansionary fiscal policy, which leads to a pre-election budget deficit. A low-type incumbent will avoid this manoeuvre. The reason for this originates from the theoretical predictions of the model, in which both types of politicians put equal weights on re-election and social welfare.

Elections are held every two years and the incumbent provides a well-known, fixed level of public services financed through distortive (e.g. bond issuance) and non-distortive tax, depending also on the competence level of the incumbent (Rogoff and Siebert, 1988:5). Incumbents' competence is shown in the level and the structure of public revenues and it follows an MA(1)<sup>7</sup> process indicating that competence will not be signalled outside the election period. Voters vote taking into account the increase/decrease of their individual utility functions. Since they are all identical we are observing a representative voter who will, other things being equal, prefer a high-type incumbent who can finance public goods solely through non distortive taxes that do not further decrease voters' income level.

At the beginning of each election period, voters receive a signal from the incumbent in the form of a non-distortive tax. Only after the elections are held do voters infer the second signal, which is loss of income (e.g. costs of debt financing). This enables incumbents to signalise a higher level of competence, i.e. to provide more public goods for a given level of (non-distortive) taxes, in the election period through budget deficit creation (Rogoff and Siebert, 1988).

### 3.1.2 Rogoff's PBC model

In Rogoff's PBC model of 1990 public goods are divided into "consumption" and "investment" goods. Pre-election manipulations are shown in the structure of public expenditures that decreases capital expenditures for "investment" goods and increases transfers and current spending. The model also incorporates an ego rent for the incumbent that represents a non-monetary benefit for holding office (e.g. honour), but which "does not exclude a possibility of rent seeking behaviour" (Rogoff, 1990:2).

<sup>7</sup>MA(1) denotes a moving-average model which is conceptually a linear regression of the current value of the series against current and previous (unobserved) white noise error terms or random shocks.

According to Rogoff's 1990 model an incumbent's competence follows the MA(1) process and we analyse the public goods production function, but in *per capita* amounts. The production of public goods depends on the level of (non-distortive) tax and incumbent's (administrative) competence,<sup>8</sup> indicating that a competent incumbent is able to provide a given level of public goods at a lower level of taxes. Since the level of taxes and the amount of public "consumption" goods can be inferred by voters in time period  $t$ , which is the election period, the incentive for the incumbent to increase the amount of public "consumption" goods is evident. The exact level of the incumbent's competence will be clear in time period  $t + 1$ , once the production of public "investment" goods is noted. Thus in the election period voters do not know whether the increased amount of goods and services is a sign of higher competence or a result of a fiscal manipulation.

### 3.2 MODEL BASED ON MORAL HAZARD

In a PBC model based on moral hazard it is assumed that neither the electorate nor the politician can observe the politician's competence contemporaneously. A competent politician is defined by their ability to produce public goods without raising taxes. The easiest way to do this is through short-term excess borrowing, which voters infer only after the elections. Thus all politicians, regardless of their level of competence, will incur excessive pre-election budget deficits.

The supply of public goods depends on the incumbent's level of competence, taxes, excessive short-term borrowing and the cost function of public debt. The incumbent's competence also follows the MA(1) process, implying that the same level of competence does not last more than two periods. Exactly after these two periods, the elections are held.

At the beginning of period  $t$  incumbent decides on the level of taxes and excess short-term borrowing. During the observed time period there is shock in the incumbent's level of competence. The result of this shock is the *ex ante* uncertainty of the incumbent of his ability to convert revenues into public goods, i.e. his own competence. Since the elections are held at the end of the period, voters' ability correctly to evaluate the incumbent's decisions depends on the level of information. A share of the informed voters  $\sigma$  will know exactly the levels of taxes, public debt and public goods at the time of the election. A share of the uninformed voters  $(1 - \sigma)$  will only have information on variables that directly affect their level of utility (public goods and tax levels). Thus it follows that incumbents will more easily manipulate fiscal instruments when the level of uninformed voters is bigger. The model implies that countries with lower levels of voter awareness and higher "ego" rents will have higher levels of public debt, but also that "ego" rents will decrease with the development of institutions and higher transparency of budget process (Shi and Svensson, 2006:1376-1377).

<sup>8</sup> Rogoff (1990:23) identifies competence of politicians with the level of administrative intelligence quotient.

### 3.3 MODEL OF INCUMBENT'S ASYMMETRIC PREFERENCES: PORK BARREL CYCLE

Drazen and Eslava (2006) developed a PBC model in which incumbents influence voters by targeting government spending to specific group of voters at the expense of other voters or other expenditures. Using targeted spending, aimed at more “useful” voters, enables electoral manipulation with no effect on total spending and/or budget deficit. This is especially important for so called “old” democracies, where empirical research confirms that voters are “fiscal conservatives” who punish incumbents who generate budget deficits (Eslava, 2011:22). In the model, voters exactly know how the increase of spending is financed. Their only interest is in whether this structure of spending will continue to favour them once the elections are over. Total spending takes the three following forms in the model:

- geographically concentrated investment projects (a more narrow definition of “pork barrel spending”),
- expenditures and transfers targeted to specific demographic groups,
- tax cuts benefiting certain sectors.

A key innovation that enables the creation of PBCs is so called “policy” preferences of the incumbent over different voting groups that are not revealed to the electorate. Voters try to detect them by monitoring public goods spending over regions in the previous term. At the same time it is assumed that the incumbent has unobserved preferences concerning groups of voters or types of expenditure, which have some persistence over time. Monitoring the level of expenditures on public goods in one region enables the voter to infer the importance of that region in the time period  $t$  (election year) for the incumbents and their likely preferences in the future. In other words, a voter can rationally evaluate all future benefits if the incumbent remains in office (Drazen and Eslava, 2006).

### 4 SURVEY OF EMPIRICAL RESEARCH ON THE POLITICAL BUDGET CYCLE

This part of the paper presents 8 studies which empirically test the existence of PBC in OECD countries. All the papers are theoretically founded either on the asymmetric information or the moral hazard basis. Methodologically, research has been conducted via a static or a dynamic panel model. Six studies have been conducted at the local and the remaining two at the national level. The results in four studies confirm the existence of PBCs, while research undertaken by Rose (2006) indicates that PBCs are conditional on institutional constraints within the observed federal states of USA. Studies on federal states in the former West Germany yield interesting results. Seitz (2000) and Schneider (2010) reject the hypothesis that PBCs exist, while Galli and Rossi (2002) confirm it. Table 1 contains all the mentioned studies and lists: author names, methodology, variables and conclusions.



**TABLE 1**

*Empirical research on PBC in developed countries*

Authors	Methodology	Variables	Conclusion
Seitz (2000): 11 federal states of West Germany, 1970-1996	Fixed-Effect estimator (static panel data)	Primary budget balance, total expenditures, capital expenditures, federal grants, unemployment expenditures, total revenues, tax revenues	Partisan PBC model not confirmed.
Pettersson-Lidbom (2000): Sweden, 288 municipalities, 1974-1998	Anderson-Hsiao estimator (dynamic panel data)	Total spending, income tax rate, aggregate growth of the Swedish economy	In accordance with Rogoff's model, spending is raised and taxes are cut in election year, in the post-election year spending is higher and taxes are lower for re-elected than for newly elected governments, re-elected governments spend less and tax more in the post-election year as compared to the election year, conditional on taxes, spending is positively related to electoral success.
Galli and Rossi (2002): 11 federal states of West Germany, 1974-1994	Fixed-Effect estimator (static panel data)	Total expenditure, surplus/deficit, public administration, health care, education, roads and social security	Opportunistic PBC model confirmed, government spending increases in an election period.
Rose (2006): 43 federal states of USA, 1974-1999	GMM estimator (dynamic panel data)	Budget balance, taxes, expenditure, federal grants ( <i>per capita</i> )	Fiscal restrictions on borrowing in federal states limits politically-motivated fiscal volatility.
Alt and Lassen (2006): 19 OECD countries, 1990-1999	GMM estimator (dynamic panel data)	Budget balance (% GDP), fiscal transparency index	Politically more polarized and fiscally less transparent countries record cycles in budget balance in the election years.
Veiga and Veiga (2006): 278 municipalities in Portugal, 1979-2001	GMM estimator (dynamic panel data)	Budget balance, taxes and total expenditures ( <i>per capita</i> )	Opportunistic behaviour of local governments consistent with asymmetric information models, in pre-election periods they increase total expenditures and change their composition favouring items that are highly visible to the electorate.
Schneider (2010): federal states of West Germany, 1970-2003	Fixed-Effect estimator (static panel data)	Growth rates of deficit/surplus, total expenditure and social benefits	Due to institutional constraints incumbents manipulate budget structures, but there is no cycle in budget balance and total expenditure.
Katsimi and Sarantides (2012): 19 OECD countries, 1972-1999	Fixed-Effect estimator (static panel data)	Budget balance, total expenditures and revenues	Moral hazard PBC model was tested, only the negative effect of elections on revenue attributed to a fall in direct taxation was statistically significant.

Source: The author.

**TABLE 2**  
*Empirical research on PBC in transition and developing countries*

<b>Authors</b>	<b>Methodology</b>	<b>Variables</b>	<b>Conclusion</b>
Hallerber and de Souza (2000): 10 new EU member states, 1990-1999	Time series analysis	Budget balance, money supply and exchange rate	Countries with fixed exchange rate exhibit an increase of budget deficit around 1.5% of GDP in pre-election period, while countries with flexible exchange rates exhibit an increase in money supply around 0.14 % of GDP in pre-election period if the central bank is not independent.
Akhmedov and Zhuravskaya (2004): Municipal level in Russia, 1996-2003	Fixed-Effect estimator (static panel data) and LOGIT	Total expenditures, social expenditures, education expenditures, expenditures on culture, health care expenditures, media expenditures, expenditures on industry, share of social expenditures, share of media expenditures, total revenues, tax revenues, deficit, transfers, growth, inflation, wage	Rogoff's type of PBC model is confirmed, existence of an opportunistic cycle in the level and structure of total expenditure in election period is confirmed (current expenditures rise), the magnitude of cycle decreases with institutional development and over time, pre-electoral manipulation increases incumbents' chances for re-election.
Maurel (2006): 25 EU countries, Bulgaria, Romania and Croatia, 1990-2005	Fixed-Effect estimator (static panel data)	Budget balance, total expenditures, total revenues, money aggregate M3	Increase in total expenditures and budget deficit in the election period in both "old" ad "new" member states.
Klašnja (2008): 25 post-communist countries, 1990-2006	Fixed-Effect estimator (static panel data)	Budget balance, total expenditures and revenues, social transfers and "local public goods" (current and capital expenditures, personnel expenditures, i.e. instruments that can be socially or geographically targeted) (% GDP)	Increase in budget deficit of 1.05% and in total expenditures of 0.82% in an election period, within total expenditures there is an increase of 0.63% on social transfers in an election and 0.45% in a post-election period, countries with presidential democracy and majoritarian election system exhibit cycles in social transfers with simultaneous cuts in tax revenues that are not recorded in countries with parliamentary democracy and proportional election system.
Vucković (2010): Croatia, 1995-2008	Time series analysis	Budget balance, total expenditures, total revenues (% GDP)	Opportunistic cycles in the total expenditures (increase in last quarter prior to elections and decrease in first quarter after elections).
Schuknecht (2000): 24 developing countries, 1973-1992	Fixed-Effect estimator (static panel data)	Budget balance, total expenditures, total revenues, capital and current expenditures and personnel expenditures	Total expenditures increase in pre-election period, together with an increase in capital as compared to current expenditures in pre-election period.

<b>Authors</b>	<b>Methodology</b>	<b>Variables</b>	<b>Conclusion</b>
Gonzalez (2002): Mexico, 1957-1997	Time series analysis	Budget balance, total expenditures and revenues, capital expenditures and social transfers	Capital expenditures in infrastructure and social transfers confirm the existence of an opportunistic PBC model.
Persson and Tabellini (2002): 60 countries, 1960-1998	Fixed-Effect estimator (static panel data)	Total expenditures, total revenues, deficit/surplus, social expenditures	Taxes decrease in pre-election period in both parliamentary and presidential democracies, but only the latter exhibit expenditure cuts and tax increases in a post-election period.
Khemani (2004): 14 federal states in India, 1960-1994	Time series analysis	Budget balance, public investment, total expenditures, total revenues	Election year is positively correlated with public investments and negatively correlated with certain consumption taxes, there is no cycle in budget deficit.
Brender and Drazen (2004): 68 countries, 1960-2001	Fixed-Effect estimator (static panel data)	Budget balance, total expenditures, total revenues (% GDP)	Both expenditures and budget deficits increase in election years in countries labelled as "new" democracies.
Drazen and Eslava (2005): Columbia (municipal level), 1992-2000	GMM estimator (dynamic panel data)	Current expenditures, capital expenditures, investment, debt service	There is no increase in total expenditures in the election period, rather a change in the structure of total expenditures, current expenditures decrease and capital expenditures increase with an increase in personnel expenditures for permanent personnel.
Shi and Svensson (2006): 85 developed and developing countries, 1975-1995	GMM estimator (dynamic panel data)	Budget balance as a percentage of GDP	Budget deficit increases around 1% in election year, stronger effect exhibited in developing countries due to weaker institutional variables and lack of access to information.
Brender and Drazen (2009): 74 countries, 1970-2003	LOGIT	BALCH_term (change in balance/GDP ratio in the period of 2 years prior to elections compared to balance/GDP ratio in the period of 2 years prior to that) and BALCH_ey (change in balance/GDP ratio in the election year compared to change in balance/GDP ratio in the year prior to election year)	Budget deficit in the election year decreases or does not have a statistically significant effect on re-election chances.
Naruhiko Sakurai and Menezes-Filho (2011): Brazil, 1989-2005	GMM estimator (dynamic panel data)	Budget balance, total expenditures (current and capital), tax revenues of local municipalities	Existence of opportunistic and partisan cycles at the local level in accordance with Rogoff's PBC model, budget deficit increase due to increase of current expenditures and decrease of local tax revenues in the election period.

Source: *The author.*

A survey of empirical studies of the existence of PBCs in the sample of transition and developing countries encompasses 13 studies, out of which 10 confirm the existence of PBCs. Methodologically, research was also conducted via static or dynamic panel models on a large sample of countries, but also via time series analysis. Brender and Drazen (2009) did not test for existence or statistical significance of budgetary variables in election period rather whether opportunistic creation of cycles helps boost re-election chances for the incumbent with LOGIT regression.<sup>9</sup> Also Akhmedov and Zhuravskaya (2004) use LOGIT regression but combine it with static panel analysis. Methodology, variables and conclusions of surveys are presented in table 2 in chronological order. First are listed surveys in transition countries and after them surveys for developing countries, also in chronological order.

## 5 RESEARCH ON POLITICAL BUDGET CYCLES AT THE MUNICIPAL LEVEL IN CROATIA

### 5.1 DATA

The model encompasses 21 cities (19 county centres plus the City of Zagreb and Pula) in time period from 2002 till 2011. In the observed time period 3 parliamentary elections (2003, 2007 and 2011) and 2 local elections (2005 and 2009) were held, with all results calculated and shown at the municipal (local) levels. The sample encompasses all the county centres and the City of Zagreb, but instead of Pazin, in Istarska County, it includes Pula. Since Pula represents the economic, financial, cultural, transportation, health and educational hub of Istarska County, the choice was obvious. These 21 cities, out of the 33 that have taken over decentralised functions, were selected because of their size and due to the fact that they are generators of trends in fiscal variables at the local level. Furthermore, the NPE is based on a Hamiltonian approach to political economy which emphasises not just the importance of economic incentives, but also of political constraints, in its analysis of economic outcomes. The latter are shown in the symbolic value of holding office in the selected cities for all political parties. From that, it clearly follows that political constraints will significantly influence economic outcomes.

Data used in the model come from Ministry of Finance local budget archives, the State Election Committee and the Croatian Bureau of Statistics. As the starting year of the analysis, 2002 was chosen, because it was the year when the fiscal decentralisation process started and local-level data became available.

Dynamic panel regressions with dependent variables taken from local budgets are used in the model. Stated dependent variables in the model are:

- 1) Budget balance (% of total revenues),
- 2) Total expenditures (% of total revenues),

<sup>9</sup>LOGIT or logistic regression is a special form of regression analysis in which the dependent variable is a binary variable (Hair et al., 1995:130). In survey conducted by Brender and Drazen (2008) dependent variable takes the value of 1 if incumbent remains in office and 0 otherwise.

- 3) Current expenditures (% of total revenues),
- 4) Other expenditures (% of total revenues),
- 5) Capital expenditures (% of total revenues),
- 6) Average number of employees in local bureaucracy (% of total population),
- 7) Average number of employees in budgetary users (% of total population),
- 8) Personnel expenses for local bureaucracy (% of total revenues),
- 9) Personnel expenses for budgetary users (% of total revenues).

Model also includes 6 binary/dummy variables:

- 1) *Election year* (which takes the value of 1 in election year and 0 otherwise),
- 2) *Pre-election year* (which takes the value of 1 in pre-election year and 0 otherwise),
- 3) *Post-election year* (which takes the value of 1 in post-election year and 0 otherwise),
- 4) Partisan compatibility between national and local incumbents *IDEO* (which takes the value of 1 if national and local incumbent share the same party membership and 0 otherwise),
- 5) *Margin* (which takes the value of 1 if the percentage spread of votes received by the electoral winner is less than 5% compared to the runner up and 0 otherwise),
- 6) *Crises* (which takes the value of 1 in the period 2009-2011 and 0 otherwise).

The paper shares and uses the assumption that elections take place every second year, as stated in theoretical PBC models of asymmetric information.<sup>10</sup> The goal of the paper is to empirically test whether total expenditures and budget deficits increase in an election period, i.e. is there an opportunistic cycle at the municipal level in Croatia.

The dummy variable *IDEO* is used to test whether partisan alliances at national and local level result in an increase of total expenditures in an election period. Results are compared to Naruhiko Sakurai and Menezes-Filho (2011) who tested for a similar effect on fiscal variables in their paper.

In accordance with Brender and Drazen (2009) the paper includes following control variables as an additional control of business cycle: *GDP per capita* and *GDP gap*.<sup>11</sup> This is primarily due to the fact that the revenue side of the local budget depends on revenues from the central budget through shared taxes. As in Pettersson-Lidbom (2000) we also add population as a final control variable.

<sup>10</sup> Having elections every two years follows from the assumption of incumbent's competence, which follows the structure of the MA (1) process, meaning it lasts exactly two periods after which it needs to be signalled again.

<sup>11</sup> GDP gap was calculated in EViews 7 with Hodrick-Prescott's filter (l=100).

## 5.2 METHODOLOGY

As a research method, dynamic panel data analysis is applied in economic research in which the current value of a variable, for example, total expenditure budget, depends on the previous values of the same variable (Baltagi, 2008:135). Since autocorrelation is not included in the static panel model assumptions, the optimal choice is a dynamic panel model. Otherwise, the estimated parameters will be consistent, but inefficient, and the standard error of the estimated parameters will be biased (Škrabić, 2009:28). The advantage of dynamic panel analysis is also reflected in its wider economic application. Using the dependent variable with one or more lags, regardless of whether the estimated coefficients are of direct interest, significantly affects the consistent assessment of other parameters in the model (Bond, 2002). A dynamic panel model, which contains a dependent variable with  $t - 1$  lag and  $K$  independent variables  $x_{itk}$ ,  $k = 1, \dots, K$ , is written as:

$$y_{it} = \mu + \gamma y_{i,t-1} + \beta_1 x_{it1} + \beta_2 x_{it2} + \beta_K x_{itK} + \alpha_i + \varepsilon_{it}, \quad i = 1, \dots, N, t = 1, \dots, T, \quad (1)$$

where  $N$  denotes the number of units of observation,  $T$  the number of periods, and  $x_{itk}$ ,  $k = 1, \dots, K$  denotes the value of  $k$  independent variables in period  $t$ . The parameter  $\alpha$  is a random or fixed effect, and  $\beta_1, \dots, \beta_K$  parameters are exogenous variables to be estimated in the model. It is assumed that the idiosyncratic shocks  $\varepsilon_{it}$  are  $IID(0, \sigma_\varepsilon^2)$ .

Since the lagged dependent variable  $y_{i,t-1}$  is included in the model, it is correlated with the individual-specific effect  $\alpha_i$ . If the above model is estimated using least squares, OLS estimators of model parameters would be biased and inconsistent, even in the case where  $\varepsilon_{it}$  are mutually uncorrelated, random variables. Arellano and Bond (1991:277-297) propose a new GMM (generalized method of moments) estimator for dynamic panel models.<sup>12</sup> Given this, the first difference of equation (1) can be written as follows:

$$y_{it} - y_{i,t-1} = \gamma(y_{i,t-1} - y_{i,t-2}) + \beta_1(x_{it1} - x_{i,t-1,1}) + \beta_2(x_{it2} - x_{i,t-1,2}) + \beta_K(x_{itK} - x_{i,t-1,K}) + (\varepsilon_{it} - \varepsilon_{i,t-1}); \quad i = 1, \dots, N, t = 1, \dots, T. \quad (2)$$

In order to ensure that parameter estimator of  $\gamma$  was consistent in dynamic panel model we need to include additional instruments. The valid instruments for  $(y_{i,t-1} - y_{i,t-2})$  are lagged values of the dependent variable in level  $(y_{i1}, y_{i2}, \dots, y_{i,t-2})$ . Through the introduction of additional instruments for the independent variables, the GMM procedure solves the problem of endogenous variables and reverse causality. Valid instruments for values of independent variables in first differences  $(x_{i,t-1,k} - x_{i,t-2,k})$ ,  $k = 1, 2, \dots, K$  are lagged values of independent variables in level  $(x_{i1k}, x_{i2k}, \dots, x_{i,t-2,k})$ ,  $k = 1, 2, \dots, K$ .

<sup>12</sup> Arellano-Bond estimator is optimal in the analysis of panel data, which are characterized by large  $N$  (number of units of observation) and small  $T$  (number of periods), as is the case in this paper.

Validity of chosen instruments for parameters estimation can be tested using the Sargan test. If a null hypothesis is accepted by the Sargan test it means that all chosen instruments are valid, that is, the dynamic panel model is adequately specified. Arellano and Bond (1991:282) developed two additional diagnostic tests for serial correlation:  $m_1$  and  $m_2$ . The second-order autocorrelation in the differenced residuals would imply that the estimates are inconsistent.

The advantage of using a two-step GMM estimator is because a one-step estimation assumes the error terms to be independent and homoscedastic across countries and over time. A two-step estimator relaxes the assumption of independence and homoscedasticity by using the residuals obtained from the first step estimation to construct a consistent estimate of the variance-covariance matrix. Thus, when the error term  $\varepsilon_{it}$  is heteroscedastic the two step estimator is more efficient (Višić and Škrabić Perić, 2011:178).

When interpreting the model, special attention was given to the dummy variables and their estimated parameters  $\beta_1, \dots, \beta_K$ . In the first step, we are interested in whether they are statistically significant and at what levels of significance. In the second step, we are interested in the sign of their coefficient, i.e. whether the sign corresponds to the theoretical predictions stated in PBC models.

### 5.3 EMPIRICAL RESULTS

The dynamic panel model used in the paper is written as follows:

$$BV_{it} = \alpha + \gamma BV_{i,t-1} + \beta_1 GDP\_PC_{it} + \beta_2 GDP\_GAP_{it} + \beta_3 TOT\_POP_{it} + \beta_4 IDEO_{it} + \beta_5 ELE\_YEAR_{it} + \beta_6 CRISES_{it} + \beta_7 MARGIN_{it} + \varepsilon_{it}, \quad (3)$$

where  $BV_{it}$  represents one out of nine budget variables and  $BV_{i,t-1}$  the value of the dependent variable in the previous period. Control variables are:  $GDP\_PC_{it}$ ,  $GDP\_GAP_{it}$  and  $TOT\_POP_{it}$ , while the dummy variables  $IDEO_{it}$  and  $ELE\_YEAR_{it}$  are used in order to test the existence of ideological alliances and opportunistic cycles, respectively. In the sub-samples that examine local and parliamentary elections separately, the model was expanded by two additional dummy variables:  $ELE\_YEAR(-1)_{it}$  and  $ELE\_YEAR(+1)_{it}$ . The former represent the pre-election and latter the post-election year. Finally, the model also includes two dummy variables:  $CRISES_{it}$  and  $MARGIN_{it}$ .

Nine different models are estimated in the paper using a two-step GMM Arellano Bond estimator. All calculations were made in the statistical program Stata/SE 11.

Appendix contains descriptive analysis together with the correlation matrix. At a 5% significance level we see that the independent variables are not strongly correlated, which indicates that in the estimated models there are no problems of multicollinearity. Estimated models that test the existence of PBC are shown in tables 3-5.

**TABLE 3**  
*The results of dynamic panel data analysis: joint parliamentary and local elections*

Dependent variable	Budget balance (SAL)	Total expenditures (UR)	Current expenditures (TC)	Other expenditures (TC_OST)	Capital expenditures (RNFI)	Average number of employees in local bureaucracy (ZPT)	Average number of employees in budgetary users (ZPK)	Personnel expenses for local bureaucracy (RZT)	Personnel expenses for budgetary users (RZK)
<i>GDP gap</i>	-0.351355 (.1123043)	.173179*** (.1026024)	-3.18688* (.1088477)	.0704949** (.0355532)	.2981087* (.0821392)	-1.1470291* (.0242799)	-2.935822* (.0747549)	-2.167674* (.02405)	.0381303 (.0648817)
<i>GDP pc</i>	2.29e-09* (4.57e-10)	-3.29e-09* (6.22e-10)	7.63e-10*** (4.10e-10)	-5.18e-10* (1.98e-10)	-2.26e-09* (4.80e-10)	-6.20e-11* (2.71e-12)	-1.63e-10* (6.25e-12)	6.02e-11 (8.06e-11)	3.58e-10** (1.13e-10)
<i>Total population</i>	4.52e-06* (1.20e-06)	-7.46e-06* (1.54e-06)	-2.08e-06** (8.08e-07)	-3.37e-07 (4.23e-07)	-4.83e-06* (9.60e-07)	-9.60e-08* (4.06e-09)	-2.39e-07* (1.60e-08)	-1.11e-07 (2.23e-07)	-4.53e-08 (1.91e-07)
<i>IDEQ</i>	5.02e-06 (3.90e-06)	-1.00e-05** (4.00e-06)	4.40e-07 (2.22e-06)	3.23e-06*** (1.89e-06)	-0.000102* (3.23e-06)	1.34e-07* (2.82e-08)	5.88e-07* (1.28e-07)	-3.03e-07 (3.71e-07)	-8.11e-07 (1.23e-06)
<i>Election year</i>	.0198274 (.0128713)	-.0460624* (.008964)	.0040866 (.0068872)	.0114179** (.004935)	-.0253755** (.0098597)	-8.69e-06 (.0000835)	-.0001955 (.0001803)	-.0004434 (.0030327)	-.0055763 (.0062833)
<i>Crises</i>	.0186727* (.0054602)	-.0278911* (.0079538)	-.0093125 (.0038173)	.0093686* (.002925)	-0.136125*** (.0077923)	-.0005339* (.000027)	-.001467* (.0001072)	.0027968* (.0009586)	-.0056405* (.0007756)
<i>Margin</i>	-.0854314* (.0132365)	.100419* (.0155893)	.0846415* (.0128869)	.0011065 (.061255)	.0026573 (.0166741)	.0017613* (.0000767)	.0039293* (.0001801)	.0117726* (.0030927)	.0190663* (.0036976)
<i>-cons</i>	.0008164 (.0115389)	.0138415 (.0165515)	-.0154585*** (.0093059)	-.0025566 (.0042739)	.0307741** (.014926)	.0003067* (.0000482)	.0006735* (.0002458)	-.0038908 (.0025652)	-.0061244** (.0027036)
<i>Sargan test (p-value)</i>	-.7211676** (.3229327)	2.338167* (.3242469)	1.060523* (.2795429)	-1.524102 (.1705197)	1.672986* (.2824686)	-.0029356 (.0030242)	-.0354755** (.0150286)	.085889** (.0411293)	.2049066 (.1281029)
<i>AR(1) test</i>	N 168	168	168	168	168	168	168	168	168
<i>AR(2) test</i>	0.9996	1.0000	0.9995	0.9998	0.9997	0.9955	0.9904	0.9988	1.0000
	0.0154	0.0060	0.1256	0.0403	0.0055	0.0001	0.0089	0.0387	0.2438
	0.8070	0.8419	0.1000	0.0988	0.3446	0.7807	0.0694	0.5722	0.4396

Note: \*, \*\*, \*\*\* denotes statistical significance at the level of 1%, 5% and 10%. Standard errors in parentheses.

Source: Calculated by author.



Tax autonomy of cities is enabled because the total revenues of the majority of cities refer to tax revenues which again come mostly from taxes shared with the central government.<sup>13</sup> Papers by Bajo and Jurlina Alibegović (2008) and Rogić Lugarić (2010) also confirm this statement. Accordingly the revenue side of the budget has not been analysed and all other budgetary variables are presented as a proportion of total revenue. The other two variables, the average number of employees in local bureaucracy and in budgetary users, are expressed as a percentage of total population in the city selected in the reference year.

Results presented in tables 3-5 indicate that all three diagnostic tests for the validity of the estimated dynamic models are satisfied. Based on the results of Sargan's test, we can conclude that the instruments used are well chosen. The basic premise of dynamic panel models and the Arellano-Bond estimator that there is no autocorrelation of error terms of the first and second row of the first differences of residuals is rejected only in the case of a second-order autocorrelation. This is the case only in the model with other expenditures and in the model with the average number of employees in budgetary users in table 3 at a 10% significance level and in the model with current expenditures and in the model with other expenditures in table 4 and table 5 at a 10% significance level.

Results of the dynamic panel analysis (table 3) indicate a rejection of the hypothesis of the existence of PBC in the selected sample in the observed period. In the model with budget balance and in the model with total expenditures, the dummy variable election year is statistically significant, but the coefficient has a sign which is opposite to the theoretically expected one. That is, in election years the budget balance, on average, increases by 1.9% of total revenue, while total expenditures, on average, decrease by 2.8% of total revenues.

Based on the obtained results, the selected Croatian cities cannot be classified into the paradigm set by the "old democracies". Brender and Drazen (2004) obtained a negative coefficient for this group of countries and more importantly the coefficient was statistically insignificant. In accordance with Rose (2006), the results indicate that the opportunistic manipulation of fiscal instruments is determined by the institutional context within the budgetary process takes place. Limitations on borrowing at the local level in Croatia represent a confirmation of the findings of Bajo and Jurlina Alibegović (2008) and Primorac (2011). Therefore, these results indicate that budgetary constraints regarding public debt accumulation at the local level<sup>14</sup> actually reduce the magnitude of opportunistically motivated PBC.<sup>15</sup> The implications of this conclusion, at the national level, could potentially result in a

<sup>13</sup> In the selected sample the share of tax revenues in total revenues amounted up to 64-68% in the observed time period.

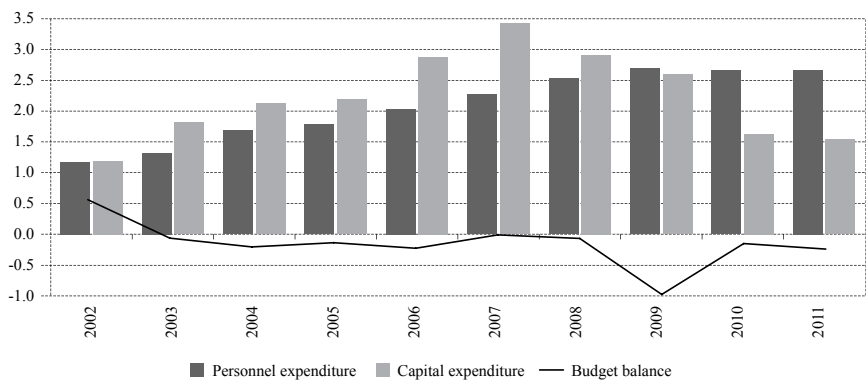
<sup>14</sup> Government and the Ministry of Finance restrict local government borrowing up to 2.3% of total revenues of all local units (Bajo and Jurlina Alibegović, 2008:135).

<sup>15</sup> Primorac (2011:461) states that cities can borrow through utility companies that are in their possession and thus circumvent institutional constraints specified in the Budget Law and the Law on State Budget Execution.

reduction of total expenditures in election years which is a point strongly advocated by the constitutional political economy. Furthermore, Vučković (2011) finds that the only statistically significant variable with the expected theoretical sign, at the consolidated central government level, is total expenditures. This raises a number of questions connected with the conduct of economic policy within such a context, the most important being the limited use of countercyclical fiscal policy. Descriptive analysis (figure 1) shows that capital expenditures have declined since 2008 while personnel expenditures have increased or remained at the same level. In other words, fiscal policy was not used as a countercyclical instrument, rather it was a result of “state capture” and rent-seeking behaviour by the bureaucracy.

**FIGURE 1**

*Budget balance, current and capital expenditures (in billion kuna)*



*Source: Calculated by author.*

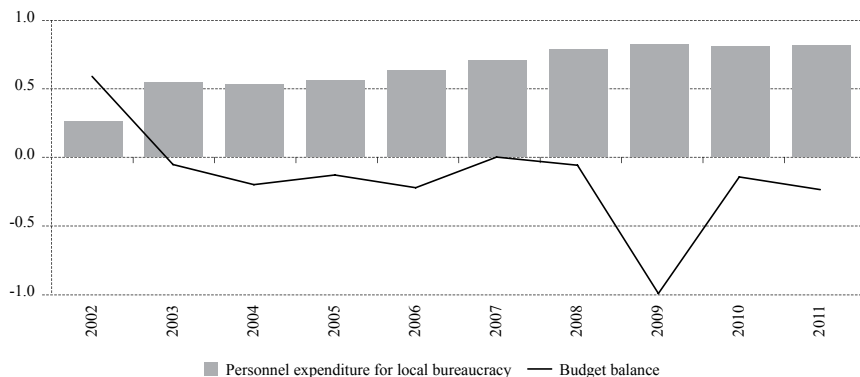
Econometric analysis also confirms that in election years capital expenditures decrease (on average by 1.4% of total revenues), while other expenditures (on average by 0.9% of total revenue) and personnel expenditure for local bureaucracy (on average by 0.3% of total revenues) simultaneously increase. It follows that the manipulation of the structure of total expenditures serves as the second best strategy for the incumbent in election years. As in Schneider (2010) we find that incumbents use this fiscal strategy, the only one remaining due to institutional constraints.

The relationship between budget balance and personnel expenditure for local bureaucracy is shown in figure 2. It indicates that personnel expenditure grew continuously until 2009, regardless of whether the budget was balanced or not. Personnel expenditures declined in 2010, but in the year of the last parliamentary elections, 2011, they again increased. Throughout this period, the budget balance of selected cities was in surplus only in 2002 and in 2007. This indicates not only the fiscal irresponsibility of the political elite at the local level, but also to political economy issues in planning and implementing budgetary policies and the appa-

rent rent-seeking behaviour of the local bureaucracy. Apparently incumbents calculate that this will provide them additional votes. Tullock (1987:1043) cites empirical studies, which confirm the above.

**FIGURE 2**

*Budget balance and personnel expenditure for local bureaucracy (in billion kuna)*



Source: Calculated by author.

Econometric analysis shows that while in election years the average number of employees both in local bureaucracy (on average by 0.15% of total population) and in budgetary users (on average by 0.15% of total population) decreases, the personnel expenditure for local bureaucracy increases on average by 0.27% of total revenue. Also, the decline in personnel expenditure for budgetary users (on average by 0.56% of total revenue) with the concurrent increase in personnel expenditure for local bureaucracy may be associated with incumbents' distribution policies, according to Lowi's typology of public policies (Petak, 2008:455). The increase in personnel expenditure for local bureaucracy apparently was financed by reducing other budget items. In this way, employees in local bureaucracy are protected and rewarded for their loyalty, while the salaries of employees in budget users are reduced. Employees in budget users, that is, particularly, in culture and education, are usually not politically reliable since their working place mandates certain professional knowledge that enables them to be free from the direct influence of the incumbent. The above coincides with the findings of Rogić Lugarić (2012:116-117) in a situation in which a budget surplus occurs in municipalities. Excess of revenue in the budget can be used to reduce existing taxes, to reduce debt or can be transferred to the next year and allocated to specific, mostly current, expenditure. Such a decision on the allocation of scarce resources is distributive and political. Drazen and Eslava (2005:22) also found a statistically significant increase in the personnel expenditures for permanent personnel, which reinforces the widespread belief that incumbents in Colombia trade jobs for political support and election votes.

Partisan compatibility between national and local incumbents, or variable *IDEO*, is statistically significant only in the case of the following variables: total expenditures, other expenditures and capital expenditures. All three variables are statistically significant even when we look at particular outcomes of parliamentary and local elections. Even their signs and the estimated coefficients are equal. A negative sign obtained for the variable total expenditure (a reduction, on average, by 4.6% of total revenue) and capital expenditures (a reduction, on average, by 2.53% of total revenue) points to the following two conclusions. First, the movement of these variables is the opposite of the expected theoretical direction and the results do not coincide with those of Naruhiko Sakurai and Menezes-Filho (2011) in the case of local elections in Brazil. Second, the resulting signs of coefficients are equal both for dummy variable *Election year* and *IDEO*, suggesting that partisan compatibility apparently does not play any role in the allocation/distribution of budget funds. As in Jurlina Alibegović et al. (2010) it is evident that the connections between central and local government units are primarily determined through decentralized functions and fiscal equalization model. With respect to the latter, Bajo and Bronić (2007), on a sample of 5% of cities and municipalities, and Bronić (2010), on a sample of counties, judge it inefficient, but in the identification of reasons do not find any related to party affiliation.

In order to capture the potential benefits of pre-election manipulation, in a situation of uncertainty of election outcome, the model was augmented with an additional dummy variable – *margin*. The obtained results again indicate that the incumbent turns to his second best strategy in that situation. Through restructuring items on the expenditure side of the budget, the incumbent, in the election year, on average, reduces current expenditures by 1.5% of total revenue and simultaneously increases capital expenditures, on average, by 3.1% of total revenues. In other words, voters in these cities can expect an increase in capital investment, a reduction in current expenditures and no cycle in the budget balance. Khemani (2004) obtained identical results for local elections in 14 states in India. Also, the incumbent increases the average number of employees in the local bureaucracy, on average, by 0.03% of total population and the average number of employees in budgetary users, on average, by 0.06% of total population. This electoral manoeuvre is “paid for” by a decrease in personnel expenditures for budgetary users in the amount of, on average, 0.6% of total revenues.

The dummy variable *crisis* unambiguously shows that in the period 2009-11 the budget balance deteriorated, on average, by 8.54% of total revenue. Total expenditures in the reporting period increased, on average, by 10.04% of total revenue as a result of the increase in current expenditures, on average, by 8.46% of total revenue. Franić (2012) analysed employment at the local level in Croatia in the 2008-11 period and found that the total number of employees that received wage from local and regional government increased by 15%. This increase was evident both in the absolute and the relative increase in the proportion of total expenditure.

Given that during this period new units were not established, and that no significant progress in decentralization was made, which would have required new jobs, it is evident that this was a political-economy answer to unemployment issues on the labour market. The same trend is observed in our sample of cities. The model records an increase in the average number of employees in local bureaucracy, on average, by 0.17% of total population and an increase in the average number of employees in budgetary users, on average, by 0.39 % of total population. Also, personnel expenditures for local bureaucracy, on average, increase by 1.17% of total revenues and personnel expenditures for budgetary users, on average, increase by 1.9% of total revenues.

If local elections are analysed separately then the hypothesis on the existence of PBC is confirmed. As in Naruhiko Sakurai and Menezes-Filho (2011), we find that budget deficit increases, on average, by 4.45% of total revenues. The budget deficit is also statistically significant in the pre-election and post-election year. In pre-election year, the budget deficit increases, on average, by 4.81% of total revenue and in post-election year the budget deficit increases, on average, by 2.36% of total revenue. Rašić Bakarić et al. (2013), on a sample of 127 cities, and Bratić (2008), in an analysis of the decision-making processes on local budgets in Croatia, conclude that political commitment does not affect the movement of budgetary variables. In other words, all politicians opportunistically manipulate budget items in order to ensure re-election.

In the model with total expenditures, there is a statistically significant increase in the pre-election (on average by 3.41% of total revenues) and the post-election year (on average by 2.06% of total revenues). In the composition of total expenditures, for all three selected periods, only other expenditures are statistically significant, decreasing, on average, by 1.65% of total revenues in the pre-election year.

Also, in each of the selected periods there is a statistically significant increase in variables that measure average numbers of employees in a local bureaucracy and in budgetary users with the most significant coefficients in a post-election year (0.105% and 0.296% of total population, respectively). In a situation in which the outcome of the elections is unclear, the dummy variable *margin* in the election year also confirms a statistically significant and positive coefficient of the mentioned variables (0.034% and 0.052% of total revenues, respectively). The above mentioned phenomenon points to the incumbents' motivation, which is for the incumbent to ensure political support in local elections by providing jobs to the electorate. Since the turnout in local elections is much lower than the turnout in the parliamentary elections (SEC, 2013) the marginal benefits of such a manoeuvre are much larger.

**TABLE 4**  
*The results of dynamic panel data analysis: local elections*

Dependent variable	Budget balance (SAL)	Total expenditures (UR)	Current expenditures (TC)	Other expenditures (TC_OST)	Capital expenditures (RNFI)	Average number of employees in local bureaucracy (ZPT)	Average number of employees in budgetary users (ZPK)	Personnel expenses for local bureaucracy (RZT)	Personnel expenses for budgetary users (RZK)
<i>GDP gap</i>	-1.734933** (.0866908)	-0.0318814 (.0995042)	-4.08451* (.1519903)	1.589668** (.0759598)	288.2844** (.1347161)	.1326647* (.0503974)	-1.212022 (.133616)	.1608494* (.0230038)	.1414747** (.0559279)
<i>GDP pc</i>	1.44e-09* (4.44e-10)	-2.07e-09* (6.33e-10)	1.22e-09* (4.43e-10)	-7.42e-10* (2.56e-10)	-2.36e-09* (4.79e-10)	-5.92e-11* (2.51e-12)	-1.52e-10* (8.48e-12)	-1.56e-11 (1.02e-10)	3.87e-10** (1.56e-10)
<i>Total population</i>	4.49e-06* (1.01e-06)	-5.62e-06* (1.43e-06)	-1.35e-06** (5.37e-07)	-1.62e-07 (6.37e-07)	-4.72e-06* (9.39e-07)	-8.12e-08* (4.35e-09)	-2.08e-07* (2.04e-08)	-4.04e-07 (2.81e-07)	-9.91e-08 (3.32e-07)
<i>IDEO</i>	6.28e-06 (3.94e-06)	-8.17e-06** (3.88e-06)	5.15e-07 (2.65e-06)	1.33e-06 (2.31e-06)	-8.93e-06* (3.04e-06)	7.32e-08** (4.19e-08)	3.34e-07*** (1.84e-07)	3.81e-07 (6.64e-07)	5.92e-07 (1.42e-06)
<i>Pre-election year (-)</i>	.0116954 (.0097328)	-0.0213806** (.0099305)	.0111766 (.0094053)	-0.110828** (.0055944)	-0.0258052** (.0120865)	-0.000987* (.0004482)	-0.0002981* (.0001134)	.0006123 (.0060345)	-0.008577 (.007873)
<i>Post-election year (+)</i>	-0.045553* (.0124494)	.021568 (.0148752)	.0075801 (.0059256)	.002812 (.0027731)	-0.0012691 (.0132777)	.0005471* (.0000461)	.0015661* (.0001054)	-0.0065418* (.0011563)	.0019676 (.0029124)
<i>Crises</i>	-0.0481236* (.0098106)	.0341971* (.0117483)	.0052825 (.0102531)	-0.016565* (.0053745)	.012516 (.0121139)	.0004098* (.0000563)	.0008391* (.000168)	-0.0040639** (.001831)	.0107797* (.0028454)
<i>Margin</i>	-0.236024** (.0110145)	.0206571** (.0089672)	.0150651 (.0084286)	-0.0032058 (.0044925)	.0080385 (.0113395)	.0010559* (.0000577)	.0029689* (.0001996)	-0.0066008* (.0008626)	.0007081 (.0023724)
<i>-cons</i>	-0.0547207* (.0140535)	.0750296* (.0170365)	.0667683* (.0139985)	.0050259 (.0081244)	.0075472 (.0186699)	.0001167* (.0000819)	.0025568* (.0002581)	.0162795* (.0035466)	.018282* (.0062298)
	.005664 (.0134177)	-0.0116937 (.0139365)	-0.0128702 (.0113066)	-0.0039785 (.0051802)	.025805 (.0183804)	.0003477* (.0000705)	.0005276*** (.000294)	-0.0049563** (.0023088)	-0.015283** (.0045706)
	-0.963466* (.3004852)	2.284333* (.305952)	1.098516* (.2950632)	.0027445 (.224111)	1.599955* (.3069513)	-0.011136 (.003651)	-0.0106099 (.0273451)	.04637 (.0753964)	.0522293 (.13734)

	Budget balance (SAL)	Total expenditures (UR)	Current expenditures (TC)	Other expenditures (TC_OST)	Capital expenditures (RNFI)	Average number of employees in local bureaucracy (ZPT)	Average number of employees in budgetary users (ZPK)	Personnel expenses for local bureaucracy (RZT)	Personnel expenses for budgetary users (RZK)
N	168	168	168	168	168	168	168	168	168
Sargan test (p-value)	0.9999	1.0000	1.0000	1.0000	0.9994	0.9883	0.9933	0.9995	1.0000
AR(1) test	0.0139	0.0140	0.3844	0.0280	0.0113	0.0003	0.0026	0.0363	0.0475
AR(2) test	0.6785	0.9105	0.0861	0.0609	0.4385	0.6835	0.1300	0.5006	0.7927

Note: \*, \*\*, \*\*\* denotes statistical significance at the level of 1%, 5% and 10%. Standard errors in parentheses.

Source: Calculated by author.

**TABLE 5**  
*The results of dynamic panel data analysis: parliamentary elections*

Dependent variable	Budget balance (SAL)	Total expenditures (UR)	Current expenditures (TC)	Other expenditures (TC_OST)	Capital expenditures (RNFI)	Average number of employees in local bureaucracy (ZPT)	Average number of employees in budgetary users (ZPK)	Personnel expenses for local bureaucracy (RZF)	Personnel expenses for budgetary users (RZK)
<i>GDP gap</i>	-1.734933** (.0866908)	-0.0318814 (.0995042)	-4.08451* (.1519903)	.1589668** (.0759598)	.2882844** (.1347161)	.1326647* (.0503974)	-1.212022 (.133616)	.1608494* (.0230038)	.1414747** (.0559279)
<i>GDP pc</i>	1.44e-09* (4.44e-10)	-2.07e-09* (6.33e-10)	1.22e-09* (4.43e-10)	-7.42e-10* (2.56e-10)	-2.36e-09* (4.79e-10)	-5.92e-11* (2.51e-12)	-1.52e-10* (8.48e-12)	-1.56e-11 (1.02e-10)	3.87e-10** (1.56e-10)
<i>Total population</i>	4.49e-06* (1.01e-06)	-5.62e-06* (1.43e-06)	-1.35e-06** (5.37e-07)	-1.62e-07 (6.37e-07)	-4.72e-06* (9.39e-07)	-8.12e-08* (4.35e-08)	-2.08e-07** (2.04e-08)	-4.04e-07 (2.81e-07)	-9.91e-08 (3.32e-07)
<i>IDEO</i>	6.28e-06 (3.94e-06)	-8.17e-06** (3.88e-06)	5.15e-07 (2.65e-06)	1.33e-06 (2.31e-06)	-8.93e-06* (3.04e-06)	7.32e-08*** (4.19e-08)	3.34e-07*** (1.84e-07)	3.81e-07 (6.64e-07)	5.92e-07 (1.42e-06)
<i>Election year</i>	.0116954 (.0097328)	-.0213806** (.0099305)	.0111766 (.0094053)	.0110828** (.0055944)	-.0258052** (.0120865)	-.0000987** (.0000482)	-.0002981* (.0001134)	.0006123 (.0060345)	-.008577 (.007873)
<i>Pre-election year (-)</i>	.0445553* (.0124494)	-.021568 (.0148752)	-.0075801 (.0059256)	-.002812 (.0027731)	.0012691 (.0152777)	-.0005471* (.0000461)	-.0015661* (.0001054)	.0065418* (.0011563)	-.0019676 (.0029124)
<i>Post-election year (+)</i>	.0209529** (.0099074)	-.0009108 (.0121103)	.007485 (.009289)	-.0060179 (.0045741)	.0093077 (.0103009)	.0005088* (.0000262)	.0014028* (.0001245)	-.0000589 (.0010896)	-.0012595 (.0018583)
<i>Crises</i>	-.0547207* (.0140535)	.0750296* (.0170365)	.0667683* (.0139985)	.0050259 (.081244)	.0075472 (.0186699)	.0001167* (.0000819)	.0025568* (.0002581)	.0162795* (.0035466)	.018282* (.0062298)
<i>Margin</i>	.005664 (.0134177)	-.0116937 (.0139365)	-.0128702 (.0113066)	-.0039785 (.0051802)	.025805 (.0183804)	.0003477* (.0000765)	.0005276*** (.0002294)	-.0049563** (.0023088)	-.0115283*** (.0045706)
<i>cons</i>	-1.008021* (.3013278)	2.305901* (.3056829)	1.106096* (.2946027)	.0055566 (.2248378)	1.598686* (.3060791)	-.0005666 (.00366633)	-.0090438 (.0273811)	.0398282 (.0754164)	.0541969 (.1391131)



Budget balance (SAL)	Total expenditures (UR)	Current expenditures (TC)	Other expenditures (TC_OST)	Capital expenditures (RNFI)	Average number of employees in local bureaucracy (ZPT)	Average number of employees in budgetary users (ZPK)	Personnel expenses for local bureaucracy (RZI)	Personnel expenses for budgetary users (RZK)
168	168	168	168	168	168	168	168	168
0.9999	1.0000	1.0000	1.0000	0.9994	0.9883	0.9933	0.9995	1.0000
0.0139	0.0140	0.3844	0.0280	0.0113	0.0003	0.0026	0.0363	0.0475
0.6785	0.9105	0.0861	0.0609	0.4385	0.6835	0.1300	0.5006	0.7927

Note: \*, \*\*, \*\*\* denotes statistical significance at the level of 1%, 5% and 10%. Standard errors in parentheses.

Source: Calculated by author.

The dummy variable *margin* indicates a decrease of personnel expenditures for local bureaucracy (on average, by 0.49% of total revenues) and for budgetary users (on average, by 1.15% of total revenues). At the same time, personnel expenditures for a local bureaucracy, on average, decreases in each of the three periods, with the most significant coefficient in the *post-election year* (on average, by 0.66% of total revenues). On the other hand, personnel expenditures for budgetary users, in a *pre-election year*, showed a statistically significant increase, on average, by 1.07% of total revenues. Having all that in mind, one can conclude that in the case of local elections too there is a certain amount of restructuring among expenditure items in order to finance the increased number of personnel. The increase in “visible” expenditures (the average number of employees and personnel expenditures) in combination with an increase in the budget deficit refers to the theoretical assumptions of Rogoff’s PBC model.

Given the budget constraints that apply to the local level, incumbents are aware that the budget deficit created may be minimal as confirmed by the items that change in the election years (the average number of employees and personnel expenditures for the local bureaucracy). Thus, the legislator took a “weapon” from the incumbents’ hands at the local level, but did not manage to diminish their motives and their tendency to opportunistic behaviour. Furthermore, the existence of budget constraints for borrowing *de facto* abolishes the distinction between competent and incompetent incumbent. In the selected period, the average value of the budgetary balance (appendix, print out A1) indicates an average deficit in the observed time period, meaning that all incumbents take their toll in creating a deficit. The only question is how the incumbents restructure expenditure items and guess the preferences of the electorate.

Identical variables are statistically significant for the dummy variable *crisis* (SAL, UR, TC, ZPT, ZPK, RZT and RZK), as they were in the joint analysis of local and parliamentary elections. All estimated coefficients are positive and lower than those estimated for the joint analysis, except for the coefficient related to personnel expenditures for local bureaucracy, which, on average, increases by 1.62% of total revenue. In addition, estimated coefficients have the same sign and size in both local and parliamentary elections.

The variables SAL, ZPT, ZPK and RZT are statistically significant in the analysis of parliamentary elections, but they have opposite signs of the estimated coefficients in relation to the analysis of local elections. That is, budget deficit decreases, on average, by 4.45% of total revenue as well as the average number of employees in local bureaucracy (by 0.05% of the total population on average) and in budgetary users (by 0.15 % of the total population on average). The last two results are equivalent to those obtained in the joint sample, while the personnel expenditure for local bureaucracy in the election year increases, on average, by 0.65 % of total revenue. In a pre-election year, the average number of employees

in the local bureaucracy and in budgetary users increases, while the budgetary deficit decreases. A post-election year records a statistically significant decrease in other expenditures and in the average number of employees in the local bureaucracy and budgetary users, with a simultaneous increase in personnel expenses for budgetary users. The signs and estimated coefficients on the dummy variables margin and crisis have exactly the same sign and size in both local and parliamentary elections.

## 6 CONCLUSION

From the viewpoint of political economy, analysis of the informational, technical and political constraints faced by incumbents and by other participants in PCT is becoming increasingly relevant in an environment characterized by fiscal consolidation. In accordance with Aristotle's notion that man is "a political animal", every individual, directly or indirectly, creates an environment in which market and non-market activities take place. Therefore, any analysis of non-market decision making processes (such as decisions in the budget process) that ignores political constraints is incomplete and inadequate.

This paper investigates the relationship between PBC theory and its empirical implications on a sample of Croatian cities. The fiscal strategies of incumbents seeking re-election within the institutional constraints placed at the local level have also been analysed. The correlation between budget items in selected Croatian cities (19 county centres, the City of Zagreb and Pula) with the election results in the period 2003-11 has been empirically tested. Dynamic panel models have been estimated using the Arellano and Bond two-step GMM estimator. The paper presents not only the empirical part but also various theoretical models of PBC as well as a review of empirical research on the existence of PBC in developed, transition and developing countries. A total of 27 econometric models in three different samples have been estimated. The first nine models were related to the joint analysis of the impact of local and parliamentary elections on budgetary variables in a selected sample of cities; the following nine on impacts of local elections and the last nine on impacts of the parliamentary elections.

The results of dynamic panel analysis on the joint sample indicate a rejection of the hypothesis that opportunistic PBCs exist at the level of the observed Croatian cities. In election years, the budget deficit and total expenditures decrease as opposed to the theoretical assumptions of the model. Due to the institutional constraints on local level public borrowing incumbents manipulate the structure of total expenditure in order to maximize re-election. The results indicate that budget constraints on public borrowing result in a decrease of opportunistically motivated PBCs. This has important repercussions when applied to the level of consolidated central government and consolidated general government.

An increase in current expenditures (personnel expenditure for local bureaucracy and other expenditures) and a decrease in capital expenditures represents a second best strategy for incumbents. This underscores the rent-seeking role of the bureaucracy in the electoral process, which is consistent with Niskanen's assumptions on the maximization of the bureaucrats' budget. At the same time this represents a rational decision on behalf of incumbents, who count on a turnout of public servants in the elections that is high compared to the rest of electorate. In a situation in which the outcome of the election is uncertain, the estimated models suggest that incumbents increase the average number of employees in local bureaucracy and in budgetary users. In addition to that, there is an increase in capital expenditures with a simultaneous reduction of current expenditures.

In the sample of parliamentary elections, the results of the analysis do not differ significantly from those obtained from the joint sample. The budget deficit reduces in election years, while total expenditures are not statistically significant at standard levels of significance. Incumbents' strategy in election years is marked by an increase in the average number of employees in local bureaucracy and in budgetary users, combined with a reduction in personnel expenditures.

Confirmation of the hypothesis of the existence of opportunistic PBC's at the level of observed Croatian cities was found in a sample analysing only local elections. Estimated coefficients in models with budget balance, average number of employees in local bureaucracy and an average number of employees in budgetary users are statistically significant and in line with the theoretical predictions of Rogoff's PBC model presented in chapter 3.

The results of the dynamic panel analysis in none of the three samples confirm the additional hypothesis that an increase of public expenditure follows when the incumbents at the central and local level share the same party membership. Given that the central and local levels are connected via financing of the decentralized functions and through the fiscal equalization model, incumbents at the central level do not have any additional space for discretion in the election cycle.

The limitation of this study stems from the relatively short time series. Furthermore, a more complete analysis of the opportunistic motives of incumbents at the local level should include utility companies owned by local units and their respective budget. It is through utility companies and their excessive short-term borrowing that the municipalities are able to circumvent budget constraints on public borrowing. The latter also represents a direction for future research. Also, according to the theoretical foundations of the model of an incumbent's asymmetric preferences and the extreme fiscal centralization in Croatia, it would be interesting to analyse the impact of spending from the central government budget targeted to specific social groups and/or geographical areas, and the results of elections at local and regional levels.

PRINT OUT A1

Descriptive analysis

```
. summarize bdp_jaz bdp_pc br_stan rnfi rzk rzt sal tc tc_ost ur zpk zpt
```

Variable	Obs	Mean	Std. Dev.	Min	Max
bdp_jaz	210	5.80e-06	1.48e+07	-3.05e+07	2.07e+07
bdp_pc	210	55889.54	19930.38	27905.64	1381195
br_stan	210	91873.93	160860.7	11832	793616
rnfi	210	.2295255	.1035899	.0362604	.677106
rzk	210	.1434883	.048639	0	.2378531
rzt	210	.0787342	.0377541	0	.2968779
sal	210	-.0153087	.0838408	-.2339418	.2229724
tc	210	.7857832	.0865491	.4152943	.9790033
tc_ost	210	.1535218	.0713549	.0187538	.5186317
ur	210	1.015309	.0838408	.7770276	1.233942
zpk	210	.0056085	.003115	0	.0149832
zpt	210	.001921	.001066	0	.0066568

Source: Calculated by author.

PRINT OUT A2

Correlation matrix (on 5% significance level)

```
. pcorr bdp_jaz bdp_pc br_stan ideo izb_god izb_god_1_ izb_god_1_01 kriza  
margina rnfi rzk rzt sal tc tc_ost ur zpk zpt, star(5)
```

	bdp_jaz	bdp_pc	br_stan	ideo	izb_god	izb_g-1_	izb_g-01
bdp_jaz	1.0000						
bdp_pc	-0.1743*	1.0000					
br_stan	-0.0007	0.6933*	1.0000				
ideo	-0.0907	-0.2661*	-0.1590*	1.0000			
izb_god	0.1218	0.0121	-0.0012	0.0042	1.0000		
izb_god_1_	0.2694*	-0.0904	0.0006	0.0042	-0.4286*	1.0000	
izb_god_1_01	-0.4331*	0.0477	0.0006	0.0190	-0.3273*	-0.3273*	1.0000
kriza	0.4836*	0.2090*	-0.0031	-0.1621*	0.0476	0.0476	-0.3273*
margina	-0.1873*	0.0037	-0.0450	0.0942	0.2124*	-0.2124*	-0.1217
rnfi	-0.3095*	-0.0062	-0.0415	0.0986	-0.0858	-0.1245	0.2160*
rzk	0.0874	0.1149	-0.0856	-0.0843	0.0257	-0.1797*	0.0591
rzt	0.2156*	-0.1055	-0.1412*	0.0005	0.0727	0.0495	-0.0948
sal	0.0393	-0.0262	0.0184	0.0392	0.1707*	0.0851	-0.1483*
tc	0.3324*	0.0328	0.0318	-0.1560*	-0.0627	0.0666	-0.1149
tc_ost	-0.0996	0.0689	-0.0713	0.0040	0.0220	-0.0184	-0.0387
ur	-0.0393	0.0262	-0.0184	-0.0392	-0.1707*	-0.0851	0.1483*
zpk	-0.3643*	0.3172*	0.1675*	-0.0234	-0.3391*	0.1210	0.1117
zpt	-0.3186*	0.3861*	0.2391*	0.0255	-0.3687*	0.1662*	0.1043
kriza							
margina							
rnfi							
rzk							
rzt							
sal							
tc							
tc_ost							
ur							
zpk							
zpt							
tc_ost							
ur							
zpk							
zpt							

Source: Calculated by author.

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# Determinants of non-performing loans in Central and Eastern European countries

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Article\*\*

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## Abstract

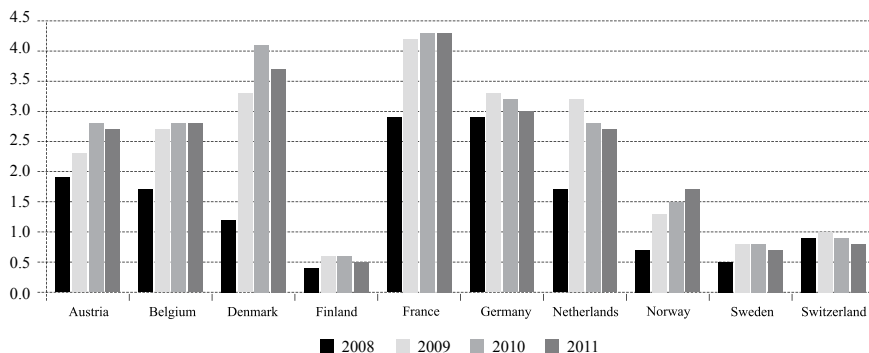
*This paper analyses the determinants of the changes in the non-performing loan (NPL) ratio in selected European emerging markets. The model was estimated on a panel dataset using a fixed effects estimator for seven Central and Eastern European (CEE) countries between Q3:2007 and Q3:2012. The countries analyzed are Bulgaria, Croatia, Czech Republic, Hungary, Latvia, Romania and Slovakia. Although the literature on NPLs is quite extensive, this is the first empirical research on the countries of CEE region using aggregate, country-level data on problem loans. The results suggest that the primary cause of high levels of NPLs is the economic slowdown, which is evident from statistically significant and economically large coefficients on GDP, unemployment and the inflation rate.*

*Keywords: non-performing loans, macro-financial linkages, Central and Eastern Europe, panel regressions, financial stability*

## 1 INTRODUCTION

The recent financial crisis has left a legacy of extremely high levels of NPLs in the CEE region. In 2008, countries that had based their economic growth on the booming banking sector (Sirtaine and Skamnelos, 2007) at the beginning of the past decade found themselves faced with a sudden credit growth halt (European Banking Coordination “Vienna” Initiative, 2012). This is attributable to both the reduced demand for financing and reduced willingness to lend on the part of the European banks. The high levels of NPLs are becoming a growing issue, given that experiences from past financial crises show that a lasting recovery requires a “clean-up” of the financial sector. It is also clear that NPLs induce uncertainty and impact the banks’ willingness and ability to keep lending, therefore affecting aggregate demand and investments. Furthermore, unresolved NPLs suppress the economic activity of currently overextended borrowers and trap resources in unproductive uses. All of these problems are particularly prominent in the CEE region, where recovery following the extreme economic slowdown has been very weak. To illustrate the strong impact of the global recession on the economic performance of CEE countries, it is sufficient to state that in 2009 all of the 7 countries analyzed in this paper suffered negative annual real GDP growth rates of over 4% (Latvia’s economy, for example, contracted by 17.7% in 2009, on a year-to-year basis).

Moreover, despite the efforts from the banking sector and regulatory institutions, NPL levels still remain high, especially compared with the advanced economies in Western Europe. Table 1 shows World Bank data on annual NPL levels for 10 selected advanced European economies. According to the data, the levels of NPLs grew throughout the four-year crisis period in these economies as well, but have not risen above 5%. In the CEE region, on the other hand, Bulgaria, Romania, Latvia and Croatia finished 2011 with NPL ratios of 16.87%, 14.3%, 17.23% and 12.27% respectively.

**FIGURE 1***Annual levels of NPLs, 2008-2011**Source: World Bank.*

Although the literature on NPLs is quite extensive, this is the first empirical research on the countries of CEE region using aggregate, country-level data on problem loans. This empirical analysis includes 7 countries of the CEE region: Bulgaria, Croatia, Czech Republic, Hungary, Latvia, Romania and Slovakia. It needs pointing out that the choice of the countries analyzed (as well as the observed time period) was determined primarily by the scarcity of data on NPLs. The data was collected from quarterly financial stability reports by central banks of the 7 countries included in the research; no earlier data were available for all 7 countries (or other CEE countries) – therefore, in order to have a balanced panel for all 7 countries, with aggregate data, this time period was chosen. The model was estimated on a panel dataset using ordinary least squares and including fixed effects. The results suggest that the primary cause of high levels of NPLs is the extreme economic slowdown.

The rest of the paper is organized as follows. Section two provides a summary of the relevant literature discussing the determinants of NPLs. Section three describes some stylized facts about recent developments in the banking sectors of the CEE countries, data used in the analysis and states the potential impact of each variable on the NPL ratio. This is followed by a description of methodology and the presentation of results. Section five concludes.

## 2 LITERATURE OVERVIEW

The macroeconomic determinants of NPLs, or the quality of bank assets in general, have generated a substantial amount of interest since the outbreak of the financial crisis in the autumn of 2008.

There is a rich theoretical literature on the subject of the interactions between the financial system and the wider economy. The most prominent examples are Bernanke and Gertler (1989) and Bernanke, Gertler and Gilchrist (1998) who develo-

ped the concept of the “financial accelerator”, arguing that credit markets are procyclical and that information asymmetries between lenders and borrowers as well as the balance sheet effect work to amplify and propagate credit market shocks to the economy. The Kiyotaki and Moore (1997) model showed how relatively small shocks might suffice to explain business cycle fluctuations, if credit markets are imperfect.

## 2.1 EMPIRICAL STUDIES: SINGLE ECONOMY ANALYSES

Keaton and Morris (1987) introduced one of the earliest empirical studies on NPLs investigating the causes of loan loss diversity on a sample of 2,500 banks in the USA. Their study showed that a substantial part of the variation in loan losses was due to differences in local economic conditions and to unusually poor performance in particular industries like agriculture and energy. On the other hand, only a minor part of the remaining variation in losses can be attributed to bank-level factors, such as banks deliberately taking greater risks and granting loans that they knew had a high probability of default. Gambera (2000) also analyzed quarterly data on US loans to prove the link between macroeconomic dynamics and bank asset quality. The empirical results suggest that a limited number of regional and national macroeconomic variables are often good predictors of problem loan ratios, and that simple, bivariate VAR systems of one bank variable, one macroeconomic variable, and seasonal dummies can be quite effective. These variables include bankruptcy filings, farm income (particularly for countries where farming has an important role), state annual product, housing permits, and unemployment. Furthermore, VAR methodology was also used in the studies by Blaschke and Jones (2001) for USA, Baboučak and Jančar (2005) for Czech Republic and Hoggarth, Logan and Zicchino (2005) for the United Kingdom. The latter employed UK quarterly data to evaluate the dynamics between banks’ write-off-to-loan ratio and several macroeconomic variables. They found that the important factors influencing financial stability and loan portfolio quality were the dynamics of inflation and interest rates. Baboučak and Jančar (2005) found evidence of positive correlation between the NPLs, unemployment rate and consumer price inflation, whereas GDP growth decelerates the NPL ratio. They also found that the real effective exchange rate appreciation does not exacerbate the NPL ratio. Salas and Saurina (2002) compared the determinants of problem loans of Spanish commercial and savings banks, taking into account both the macroeconomic and individual bank-level variables. The GDP growth rate, corporate and family indebtedness, rapid past credit or branch expansion, inefficiency, portfolio composition, size, net interest margin, capital ratio, and market power are all variables that explain credit risk. Jimenez and Saurina (2006) presented an extended piece of research on NPL determinants in Spain, demonstrating that the acceleration of GDP, as well as the decline in real interest rates, brings about a decline in problem loans. They also found that credit growth lagged four years has a positive and significant influence on NPLs, proving that the rapid credit growth today results in lower credit standards and, eventually in higher levels of problem loans. Rajan

and Dahl (2003) used panel regression models to suggest that credit terms have a significant effect on Indian non-performing loans in the presence of bank size induced risk preferences and macroeconomic shocks. The changes in the cost of credit in terms of expectations of higher interest rates induce a rise in NPLs. On the other hand, factors like the horizon of maturity of credit, better credit culture, favorable macroeconomic and business conditions all lead to the lowering of NPLs. Quagliariello (2003) presented a regression between the evolution of Italian NPLs as the dependent variable and a set of explanatory variables: the real GDP growth rate, growth of real gross fixed investment and consumption, change in the unemployment rate, CPI, real exchange rate and M2 growth rate. He showed that the declining GDP growth and increasing unemployment rate have a significant negative effect on loan portfolio quality in Italy. Arpa et al. (2001) also applied regression analysis showing that risk provisions in the total loans of the Austrian banking sector vary with real GDP growth, CPI inflation, real estate price inflation and real interest rates. Shu (2002) examined the NPL ratio in Hong Kong using regression models. His analysis showed that the increasing NPL ratio can be attributed to the increasing nominal interest rates and the number of bankruptcies, whereas the NPL ratio decreases with higher CPI inflation, economic growth and property price inflation. Louzis, Vouldis and Metaxas (2011) explored both bank-specific and macroeconomic determinants of NPLs in Greece, using dynamic panel data sets separately for each loan category (consumer, business loans and mortgages). Their study shows that all categories of Greek NPLs can be explained by macroeconomic variables (GDP growth, unemployment, interest rates, public debt) as well as by management quality.

## 2.2 PANEL ANALYSES

The Espinoza and Prasad (2010) study on the determinants of NPLs in the Gulf Cooperation Council (GCC) banking sector is one of the first examples of regional empirical research on the topic. It uses a bank-wise panel dataset and fixed effect, difference GMM, and System GMM models. They found strong evidence of a significant inverse relationship between real (non-oil) GDP and NPLs. Their study also attempted to estimate the feedback from rising NPLs to the real economy using a panel VAR. Overall, the model suggested that there is strong but short-lived feedback effect on non-oil growth in the GCC. Nkusu (2011) analyzed NPL determinants and feedback effects for a panel of 26 advanced economies. The findings are in line with previous studies and expectations. They confirm that deterioration in the macroeconomic environment (proxied by slower growth, higher unemployment or falling asset prices) is associated with debt service problems, reflected into rising NPLs. Finally, according to Beck, Jakubik and Piloiu (2013), who used a panel of 75 countries, real GDP growth, share prices, exchange rate and lending interest rate significantly affect NPL ratios. Overall, it can be stated that a considerable amount of empirical evidence regarding the anti-cyclical behavior of NPLs can be found. The common finding of all these studies is that when

there is a slowdown in the economy, the NPL level is likely to increase, as unemployment rises and borrowers face greater difficulties in repaying their debt.

### 3 DATA AND STYLIZED FACTS

In the following chapter, a discussion on the common treatment of the non-performing loans in macroeconomic statistics will be presented. In addition, the variables used in the analysis and their expected channel of impact on the NPL ratio will be introduced, as well as a short overview of the banking sector in the CEE region.

#### 3.1 DATA

The dependent variable here is the ratio of NPLs to total (gross) loans. The definition of NPLs differs across countries and regions, so it is necessary to be cautious when making international comparisons. The main problem with the NPL data is that there is no internationally accepted standard for NPL measurement. Some of the most commonly used definitions are those by the IMF, Basel Committee for Banking Supervision (BCBS), Institute of International Finance (IIF) and the International Financial Reporting Standards (IFRS). The IMF's definition of NPLs was developed in the framework of the Financial Soundness Indicators (FSIs). The FSI Compilation Guide of March 2006 (IMF, 2006) recommends that "loans (and other assets) should be classified as NPL when (1) payments of principal and interest are past due by three months (90 days) or more, or (2) interest payments equal to three months (90 days) interest or more have been capitalized (re-invested into the principal amount), refinanced, or rolled over (i.e. payment has been delayed by arrangement)." BIS (2006) also advises the 90 days rule, more precisely, "a default is considered to have occurred with regard to a particular obligor when the obligor is past due more than 90 days on any material credit obligation to the banking group." Many national regulations follow the IIF recommendation (IIF, 1999) for classifying loans as standard, watch, substandard, doubtful and loss; non-performing loans usually comprise the categories substandard (interest and/or principal are more than 90 days overdue), doubtful (interest and/or principal are overdue more than 180 days) and loss loans (where the loan is virtually uncollectible; interest and/or principal are overdue for more than a year). The FSI website as well as the World Bank's database offer cross-country comparative presentations of NPL time series. However, for most developing countries, the NPL data presented by both sources are not yet comprehensive, as the time series are rather limited. The data on the NPL ratio in this study is therefore collected from the central banks' databases of each country included in the analysis. This data set contains quarterly observations for 7 countries of the Central and Eastern Europe (CEE) region, from the third quarter of 2007 to the third quarter of 2012. The countries included in the sample are: Bulgaria, Croatia, Czech Republic, Hungary, Latvia, Romania and Slovakia. Reassuringly, the NPL series are highly correlated with the FSI data. Furthermore, recent research by Barisitz (2011) looks into the national definitions of NPLs in the CEE region and concludes that



NPL definitions based on national credit quality classifications of CEE countries largely appear to be comparable as they are based on the “90-days-past-due criterion”.

However, it should be noted that apart from the days of overdue, there are other differences among the definitions and NPL classification criteria across countries. These include taking into account whether or not a judicial procedure has been started against the debtor (e.g. Romania), reporting NPL levels net of provisions (instead of in gross terms, which is the international standard) and the role of collateral and guarantees.

### 3.2 VARIABLES AND EXPECTED CHANNELS OF IMPACT

The independent variables are commonly used country-specific macroeconomic indicators and the level of loans in the banking sector. The aforementioned macroeconomic aggregates include the real GDP growth, unemployment rate, nominal effective exchange rate (NEER), harmonised index of consumer prices (HICP), share prices index and the 3 month money market interest rate. The data on real GDP growth, unemployment rates, HICP, 3 month money market interest rates and the share prices indices are obtained from Eurostat. Nominal effective exchange rates are calculated as geometric weighted averages of bilateral exchange rates, with 61 economies included in the basket, and are taken from the Bank for International Settlements database. The data on total loans refers to outstanding amounts of domestic loans in all currencies (originally in millions of euro) at the end of each period (quarter), and are retrieved from the European Central Bank statistics.

The relevance and expected signs of the relationships between NPL ratio and the selected variables are as follows:

- Following the results of previous empirical studies on NPLs and their proven countercyclical nature, it can be expected that real GDP growth and employment will be negatively associated with NPLs. A growing economy increases borrowers’ income and ability to repay debts and it generally increases overall financial stability.
- An increase of NEER represents an appreciation of the domestic currency. Currency appreciation can weaken debt-servicing capabilities of export-oriented firms and thus increase the NPL ratio. However, it could also positively affect private debtors whose loans are denominated in foreign currency, reducing the NPL ratio. The sign of the relationship between NEER and the NPL ratio is thus indeterminate. However, it should be noted that the countries of the CEE regions are known for a large proportion of foreign currency loans.
- The HICP gives comparable measures of inflation in the countries in the sample. The relationship between NPLs and inflation is ambiguous. Theoretically, inflation should reduce the real value of debt and hence make debt

servicing easier. However, high inflation may pass through to nominal interest rates, reducing borrowers' loan-servicing capacity or it can negatively affect borrowers' real income when wages are sticky. It is also necessary to emphasize the short run relationship between inflation and NPLs as well. If the income does not increase in line with inflation, a rise in inflation increases costs (for both households and corporates) and thus lowers the amount of available funds for debt repayment. Finally, price stability is generally considered a prerequisite for economic growth. Bearing in mind this background, the relationship between NPLs and inflation can be positive or negative. Rinaldi and Sanchis-Arellano (2006) find a positive relationship between the inflation rate and non-performing loans, while Shu (2002) reports a negative relation.

- An increase in interest rates weakens borrowers' debt servicing capacity, more so if loan rates are variable. Therefore, NPL is expected to be positively related to interest rates.
- In the case of share prices, the direct impact on NPLs is not obvious. Beck, Jakubik and Piloiu (2013) use this variable in their examination of NPL determinants, assuming that share prices are correlated with housing prices, on which there are insufficient data. Empirical analysis should then reflect the notion that a drop in the value of collateral for housing loans could negatively affect the quality of consumer loans. At the same time, shares, while rarely used as collateral, might be correlated with other risky assets which serve as a collateral for loans.
- NPLs should increase following rapid credit growth; therefore the increase of domestic loans should be associated with higher levels of NPLs. However, high loan levels could indicate high debt burdens, which make debtors more vulnerable to adverse shocks affecting their wealth or income, thereby raising the likelihood of running into debt-servicing problems.

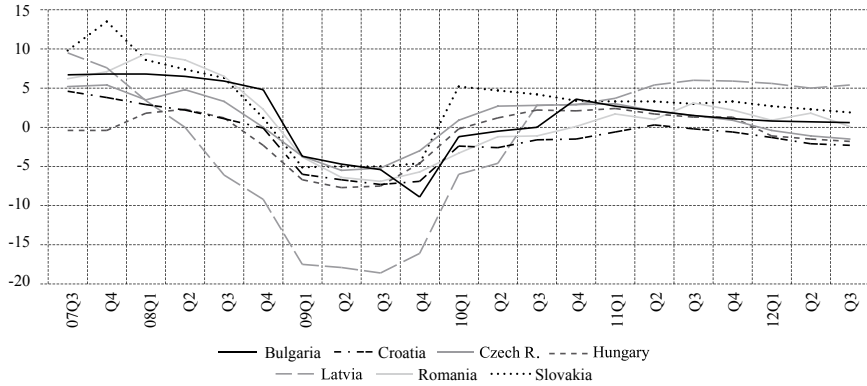
### 3.3 STYLIZED FACTS

The CEE region was hit very hard by the global economic slowdown in 2009, especially given the high positive growth rates in the region in the period between 2000 and 2007, i.e. prior to the global recession. In these years, Latvia, for example, had an average annual real GDP growth rate of 8.5%. However, in 2008 Latvia was (alongside Estonia, which is not analyzed in this paper) the only country in the region with a contracting economy – GDP decreased by 2.8% from 2007. In 2009, however, all of the countries in the sample had a negative GDP growth rate. The quarterly data shows that in 2009, in the third quarter, Latvia had an almost incredible GDP decrease of 18.9%; the GDP numbers were also followed by a strong rise in the unemployment figures. In the third quarter of 2007 the unemployment rate in this country was 6.6%, whereas in the first quarter of 2010 it reached 21.1%. Despite dramatic GDP figures from 2009, in 2011 all the countries in the region had positive real GDP growth rates – apart from Croatia.

Economic recovery in this country has been very slow, with persistently high unemployment rates. In 2012, however, two more countries slid back into recession – Czech Republic and Hungary.

**FIGURE 2**

*Real GDP growth rates*

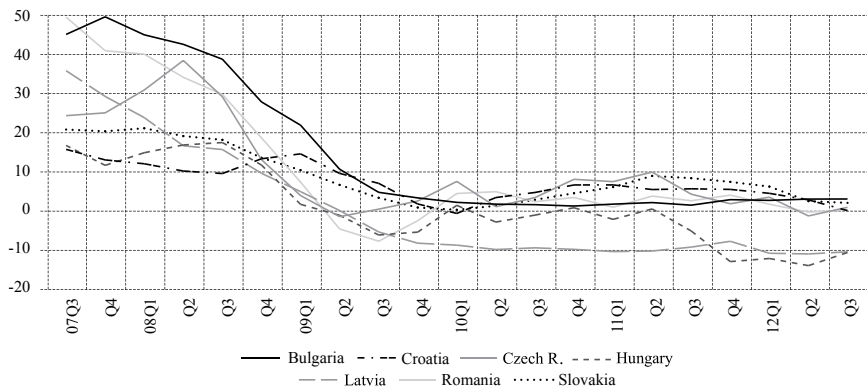


Source: Eurostat.

Figure 3 shows quarterly growth rates of all domestic loans, as compared to the same quarter in the previous year. A strong downwards trend in loan growth rates can be noticed in the graph for virtually all the countries of the CEE region in the period between the third quarter of 2007 and the beginning of 2009. As presented in the banking overview section of this paper, a halt in credit demand, particularly by households, is still a big problem in the countries of the region, and has been slowing down further economic recovery.

**FIGURE 3**

*Loans growth rates*



Source: ECB.

Apart from the second half of 2008 and the beginning of 2009 (the start of the global recession) – especially in Romania and Bulgaria, NEER has been relatively stable in all the analyzed countries. It can be argued that NEER is not an appropriate measure for exchange rate volatility in this analysis, and this will be further elaborated in the empirical section of the paper. Finally, inflation rates (as measured by Eurostat's HICP) have been rising steadily in all CEE countries, but particularly in Hungary, Romania, Bulgaria and Latvia.

### 3.4 BANKING SECTOR OVERVIEW IN CEE

The banking sector development of CEE countries has been a vital part of their overall economic growth and financial integration. As a part of the economic transition, domestic banks had been sold to strategic foreign investors, who were expected to import better bank governance, more modern banking practices and induce better supervision by home authorities. High foreign ownership is still one of the main characteristics of banking sectors throughout the region, as BIS data show that bank assets owned by foreign banks exceed 50 percent of GDP in virtually all countries. This translates into dominant market shares, in some places as high as 90 percent (IMF, 2013c). High foreign ownership has led to high foreign funding in the mid-2000s when foreign banks provided financing to CEE through their own subsidiaries, fueled by high global liquidity and rapid economic growth in the region (IMF, 2013c). This led to a credit boom in the region and a surge in foreign currency loans which raised concerns about the increasing systemic risks to financial stability emerging from such a large exposure of households and the corporate sector to foreign currency risks. Between 2008 and 2012, however, there was substantial deleveraging in CEE countries, where most of the outflows were the result of a reduction in loans to banks. The following section will give a brief overview of the current state of the banking system for each of the analyzed countries.

According to the Banks Bulletin publication of Croatian National Bank (CNB, 2012) (last data available), at the end of June 2012, there were 31 banks operating in Croatia. A total of 17 banks were in majority foreign ownership, the largest number of banks (6) belonging to Austrian shareholders. What is more, these 6 banks alone accounted for 61.6% of total assets of all banks. According to the CNB, a steady rise of NPLs in total bank loans can primarily be attributed to the worsening of the corporate loan quality (especially loans to the construction sector – where NPLs reached 37.8% in June 2012). However, currency risk is a significant issue for Croatian banks given that in, for example, the third quarter of 2012, 56% of total loans were foreign currency-indexed kuna loans, 17% were foreign currency-denominated loans and the rest (27%) were kuna loans. Non-kuna loans are dominantly euro loans, the share of which has increased since 2007 due to the appreciation of CHF/HRK exchange rate. In the third quarter of 2012, 8% of all franc-denominated loans to households were classified as non-performing, compared to 3.3% of those in euro. Finally, the Croatian banking sector is also cha-

racterized by a current halt in credit demand. The CNB states that, regardless of “a number of measures taken by the CNB to encourage more favorable financing of the economy, loans granted held steady in 2012”.

The Czech banking system grew rapidly in the run-up to the global recession, but growth has been moderate since 2009. The banking sector is concentrated; the 5 largest banks control 70% of total assets, and they are wholly or majority-owned subsidiaries of big European financial conglomerates (IMF, 2012b). Unlike the other countries in the CEE region, the Czech banking sector has a conservative balance sheet, with a high share of resident deposits and loans denominated in local currency. Credit growth is fueled mainly by domestic deposits with a loans-to-deposits ratio of 70%, and only one fifth of loans are denominated in foreign currency. All of this made the Czech banking sector one of the few in the CEE region which did not need any exceptional measures during crisis. Even though, as of 2012, banks report strong capital, liquidity, and profitability, credit growth is slow and NPLs are at around 5%, which is comparable to NPL levels in advanced economies. Slovakia is very similar to the Czech Republic – its banking sector is also dominated by foreign bank subsidiaries, but the banking system’s reliance on external funding is limited, as lending is mostly financed through domestic retail deposits. NPL ratios are relatively low – around 4% in 2012, and have been declining steadily after peaking in 2010 at 5.28% (IMF, 2012b).

The Hungarian banking system and overall financial stability were heavily affected by the global financial crisis. After a slowdown in economic activity, the Hungarian government was forced to implement some rather non-standard measures to balance the budget – such as the banking tax. In this difficult landscape, banks are, naturally, scaling down their operations. Credit growth is projected to remain negative in 2013 on the back of weak household demand and banks’ limited appetite to lend (IMF, 2013b). High levels of NPLs (over 16% since Q2:2012) are associated with a high level of Swiss franc-denominated loans and the weakening of the forint. This has prompted the Hungarian monetary authorities to undertake various “unorthodox” measures, compiled under the name of Funding for Growth (MNB, 2013). One part of this plan was to enable the replacement of foreign exchange loans with low-interest forint loans, as well as introduce a temporary exchange-rate limit program. Under the program, borrowers may cap their repayments based on the exchange-rate limit for up to five years. The difference between the capped exchange-rate and the actual exchange-rate during the period is placed in a special account, the balance of which the borrowers will repay later. Nevertheless, levels of NPLs have been increasing steadily up to the third quarter of 2012. The ratio of non-performing loans to total loans is expected to peak at the end of 2013.

Domestic banks in Bulgaria had a market share of 26.4% in 2012, whereas EU subsidiary banks’ share was 65.3%. The five largest banks held 49.5% of the

system's balance sheet assets at the year's close (BNB, 2012). Furthermore, in the same year the share of gross loans denominated in euro was 61.3%, where loans in levs accounted for 34.6% of the total loans. Bulgaria is also struggling with the decline of household credit demand, but in 2012 there was an increase in credit demand by the corporate sector. However, despite very high levels of NPLs, the IMF argues that "...macroeconomic and financial stability has been maintained in recent years" (IMF, 2012a).

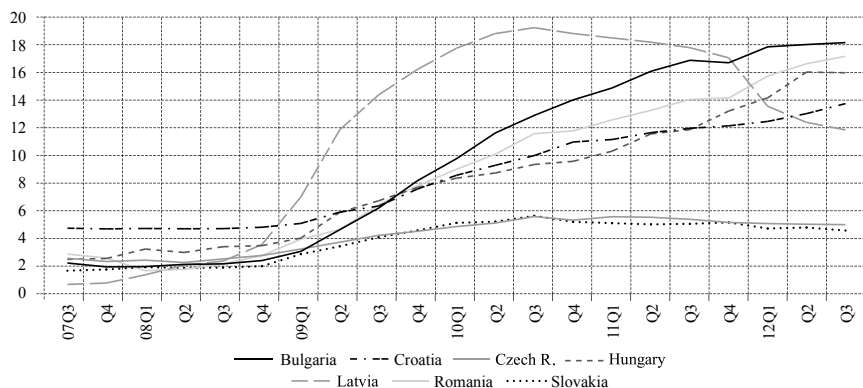
Despite the economic growth observed in Latvia in 2012, credit institutions' assets continued to shrink, primarily because of private sector deleveraging and low lending activity (BoL, 2012). Latvia had dramatically high levels of NPLs in the period observed – for example, in 2010 NPL ratio was higher than 19%, but as of that peak in mid – 2010, the banking sector has been slowly recovering. The improvement in the corporate loan portfolio has been more marked than the household loan portfolio; partly because the latter was particularly hard hit by the collapse of the housing bubble (over three-fourths of household loans comprise mortgage lending). The share of NPLs is now about 11 percent for corporate loans, but 16 percent for household loans.

At the end of 2012, there were 31 banks in Romanian banking system, with additional 8 foreign bank branches. Two of these 31 banks had fully or majority state-owned capital, and a total of 26 banks had majority foreign capital – 81.8% of the total assets was owned by foreign banks. The top five (largest) banks held 54.7% of aggregate assets in 2012. At the end of 2012, foreign currency denominated loans still held the highest share (62.5 percent) in total loans. However, in Romania the plummeting real estate prices are mentioned as the leading cause of credit portfolio quality deterioration (NBR, 2012).

Finally, to sum up, the lowest levels of NPLs in the sample are recorded in Czech Republic and Slovakia, where NPLs peaked at just over 5 percent in the third quarter of 2010. In the same quarter, NPLs in Latvia reached their highest level (19.43 percent of total loans), whereas in Croatia, Romania, Bulgaria and Hungary, NPL ratios show no sign of slowing down (peaking at 13.89 percent, 17.34 percent, 18.34 percent and 16.19 percent respectively, in the third quarter of 2012 – the last for which the data are available). Interestingly, as previously mentioned, among the countries in this study, the Czech Republic and Slovakia have the lowest levels of foreign currency loans, and the Czech Republic has also had the lowest growth of overall indebtedness over the five years to 2009. In Latvia, for example, loans denominated in currencies other than domestic made up over 92% of total loans (in the final quarter of 2009 and throughout 2010).

FIGURE 4

## Non-performing loans ratio



Source: Central banks of selected countries.

#### 4 METHODOLOGY

In this study, panel data techniques are used to analyze and quantify the impact of the macroeconomic and financial variables described above on asset quality during the period between the Q3:2007 and Q3:2012. The estimation technique used is a fixed effects model, which allows controlling for time-constant unobserved heterogeneity across countries. If the equation for the fixed effects model is:

$$y_{it} = x'_{it}\beta + \alpha_i + \varepsilon_{it} \quad (1)$$

the fixed effects approach takes  $\alpha_i$  to be a group-specific constant term in the regression model (as usual,  $\beta$  denotes the vector of parameters being estimated, and  $\varepsilon_{it}$  is the disturbance term). The term *fixed* is used to indicate that the term does not vary over time, not that it is nonstochastic, which does not have to be the case (Greene, 2002). When using fixed effects estimators, it is assumed that something within the individual entity (country in this case) may impact or bias the predictor or outcome variables, and it is necessary to control for this. This is the rationale behind the assumption of the correlation between entity's error term and predictor variables. The fixed effects estimator removes the impact of those time-invariant characteristics from the predictor variables, so the predictor's net effect can be assessed. Another important assumption of the fixed effects model is that these time-invariant characteristics are unique to each individual entity and should not be correlated with other individual characteristics. Each entity is different, therefore, the entity's error term and constant (which captures the individual characteristics) should not be correlated with others. If the error terms are correlated, then the fixed effects model is not suitable. The suitability of the fixed effects model can be assessed using the F-test. Because this analysis is limited to a very specific set of countries, and all of the observed variables are time-varying, it is reasonable

to use this particular estimation technique. Finally, dynamic panel methodology is not applied in this study, as Pesaran, Shin and Smith (1999) argue that in the case where  $T$  dimension is larger than  $N$  “traditional procedures for estimation of pooled models produce inconsistent, and potentially very misleading estimates of the average values of the parameters in dynamic panel data models”.

#### 4.1 STATIONARITY TESTING

There is a variety of tests for unit roots or stationarity in panel datasets. The Levin, Lin and Chu (2002), Harris and Tzavalis (1999), Breitung and Das (2005), Im, Pesaran and Shin (2003), and Fisher-type (Choi, 2001) tests have as the null hypothesis that all the panels contain a unit root. The Hadri (2000) Lagrange multiplier (LM) test has the null hypothesis that all the panels are (trend) stationary. The assorted tests make different asymptotic assumptions regarding the number of cross-section units in the dataset and the number of time periods for each unit.

Here, the Levin-Lin-Chu test is applied to examine whether any of the series contain a unit root. The null hypothesis is that the series contains a unit root, and the alternative is that the series is stationary. The Levin-Lin-Chu test assumes a common autoregressive parameter for all panels, so it does not allow for the possibility that some countries' data time series contain unit roots while other countries' data time series do not. The Levin-Lin-Chu test requires that the number of time periods grows more quickly than the cross-section dimension, so the ratio of cross-sections to time periods tends to zero. For this reason, this particular test is well suited for datasets with a larger number of time periods than cross-sections – such as the one presented in this paper.<sup>1</sup>

The variables are defined as follows: *nplgr* denotes the yearly percentage changes in NPL ratio, *rgdpgr* is the real GDP yearly growth rate, *unplgr* is the yearly percentage change in the unemployment rate, *hicpgr* denotes annual percentage change in inflation, *neergr* tracks yearly percentage change in the nominal effective exchange rate, *eqgr* denotes the share price indices annual percentage change and *loansgr* are the yearly percentage changes of the quarterly levels of outstanding loans for each country; *ir* are the 3 month money market interest rates.

The Levin-Lin-Chu test decisively rejects the null hypothesis of non-stationarity, at 1 percent, for all variables, except the interest rates, which are thus excluded from further analysis.

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<sup>1</sup> It should be noted, however, that the use of presented unit root tests in relatively small samples might be problematic.



**TABLE 1***Stationarity testing*

Variables	t-statistic	p-value
<i>nplgr</i>	-2.3394	0.0097
<i>unplgr</i>	-5.7601	0.0000
<i>rgdpgr</i>	-3.8437	0.0001
<i>neergr</i>	-5.0462	0.0000
<i>eqgr</i>	-9.0780	0.0000
<i>hicpgr</i>	-2.3952	0.0083
<i>loansgr</i>	-4.4803	0.0000
<i>ir</i>	-0.6689	0.2518

*Source: Author's calculations.***4.2 MODEL SPECIFICATION AND RESULTS**

According to the above considerations, the following equation is estimated:

$$\begin{aligned} nplgr_{i,t} = & \beta_0 + \beta_1 rgdpgr_{i,t} + \beta_2 unplgr_{i,t} + \beta_3 hicpgr_{i,t} + \beta_4 neergr_{i,t} \\ & + \beta_5 eqgr_{i,t} + \beta_6 loansgr_{i,t} + \alpha_i + \varepsilon_{i,t} \end{aligned} \quad (2)$$

All variables are expressed as logarithmic differences of the original series in order to ensure data stationarity. The  $\beta$ s are parameters,  $\alpha_i$  is the unobserved country effect,  $\varepsilon_{i,t}$  denotes the disturbances;  $i$  and  $t$  denote cross-section and time indicators, respectively.

Because of the relatively short time series, this data panel is estimated with ordinary least squares and it includes country fixed effects, which should account for all unobserved country heterogeneity.

Estimation results broadly confirm the postulated relationships between the chosen explanatory variables and the NPL ratio.

The suitability of the fixed effects model can be assessed using the F-test, which is strongly justified in this case ( $F(6, 105) = 7.55$ , p-value = 0.000). Furthermore, Wooldridge test for autocorrelation in panel data shows that at 5% the null hypothesis of no auto-relation cannot be rejected.

The estimates indicate that a 1 percentage point higher GDP growth rate lowers the NPL ratio growth rate by 3.97 percentage points. A 1 percentage point increase in the unemployment growth rate increases the NPL ratio growth rate by 1.006 percentage points. These estimates confirm the results obtained from previous empirical studies on NPLs, regarding their countercyclical nature: their levels are rising in recessions and falling in business cycle upturns. Both of these coefficients are highly statistically significant and economically very large, showing

that recent economic developments in CEE countries have a strong negative impact on their financial stability.

**TABLE 2**  
*Estimation results*

Explanatory variable	Dependent variable: <i>nplgr</i>		
	Coefficient	Std. error	t-statistic (prob.)
<i>rgdpgr</i>	-3.970	0.636	-6.24 (0.000)
<i>unplgr</i>	1.006	0.129	7.82 (0.000)
<i>hicpgr</i>	1.657	0.868	1.91 (0.059)
<i>neergr</i>	0.624	0.426	1.46 (0.146)
<i>eqgr</i>	0.083	0.056	1.49 (0.140)
<i>loansgr</i>	0.128	0.326	0.39 (0.696)
<i>cons</i>	19.122	3.358	5.69 (0.000)
Observations	118		
R-squared	within = 0.83 between = 0.33 overall = 0.77		

Source: Author's calculations.

The NPL ratio growth increases following an increase in inflation rates. This estimate indicates that in this sample of CEE countries, inflation negatively affects banks' asset quality. It can be concluded that the effect of higher interest rates due to inflation and the declining economic conditions usually associated with rising inflation prevails over the positive impact that inflation might have on borrowers' debt servicing capacities. It is important to state that the central banks of the countries in the dataset all name maintaining price stability as their principal objective, as can be verified in the national laws on the said central banks (for example, Law on the Bulgarian National Bank, Article 2: "...the primary objective of the Bulgarian National Bank shall be to maintain price stability through ensuring the stability of the national currency and implementing monetary policy as provided for by this Law."). Such an objective and the overall focus of central banks on keeping inflation low are justified by this particular result within this analysis.

It is not surprising that the coefficient on the share price index is not significant – the countries of the CEE region have small stock market capitalization, and the interactions between macroeconomic or financial sector indicators and stock markets are rarely confirmed in countries with underdeveloped financial markets. Beck, Jakubik and Pilou (2013) have shown that a decline in stock market indices can significantly contribute to an increase in NPLs, but in countries with relatively large stock markets. For countries with small stock markets capitalization relative to GDP, the effect is not statistically significant.

The effect of the growth of the current level of indebtedness is statistically insignificant. This can be attributed to the levels of outstanding loans in the observed period. The data on loan level growth covers the time between the Q3:2007 and Q3:2012 when credit growth in the CEE countries was abruptly halted due to global liquidity shocks caused by the global financial crisis. The NPL ratio in all the countries in our sample, on the contrary, grew rapidly throughout the aforementioned period.

It is somewhat surprising that the coefficient on the increase of NEER is not significant. The countries of the CEE region are characterized by high level of foreign currency loans, and it is expected that the NPL ratio will react strongly to exchange rate volatility. Exchange rate depreciations are, thus, expected to lead to an increase of NPL ratio (growth rate) in countries with a high degree of lending in foreign currency to unhedged borrowers. In this analysis, the country with the highest level of foreign currency denominated loans in total loans is Latvia. However, Latvia has maintained its currency board arrangement vis-à-vis the euro during the crisis, so the exchange rate could not have affected NPLs significantly. On the other hand, since interest rates had to increase to defend the currency board, higher lending rates might have contributed to the large increase of NPLs in that country. Hungary and Croatia are two other countries in the sample where foreign currency lending is widespread. In both countries the depreciation of the national currency against the Swiss franc was associated with the deterioration of bank assets' quality. However, NEER is calculated as the geometric weighted averages of bilateral exchange rates, where the most recent weights are based on trade in 2008-2010. For both countries, the largest weight is on the euro exchange rate (for Croatia 60.6% of the index, for Hungary 51.5%) – which has remained relatively stable during the crisis.

## 5 CONCLUSION

The econometric analysis of the empirical determinants of NPLs presented in this paper, show that the real GDP growth was the main driver of the increase of the NPL ratio during the past 5 years in CEE countries. The coefficient of the stated explanatory variable is economically large, proving that the slowdown in the economic activity has greatly affected the financial stability of the region. High levels of NPLs across the region are a legacy of the crisis, and as economic recovery came to the countries of the region relatively late and can be described as weak, they are still expected to cause problems.

Given that an increase in inflation rates is estimated to cause growth in the NPL ratio, it can be said that the central banks in the countries of the CEE region are faced with an ambiguous outcome (concerning NPLs) when trying to stimulate growth. On one hand, to support economic recovery (which would lead to a drop in NPL levels), central banks can implement expansionary monetary policy, thus, up to a certain point, increasing GDP and aggregate demand. However, this would

significantly increase inflation rates, which, as estimated, causes NPL ratios to grow. The countries of the region are, however, persistent in keeping inflation rates low, which is, of course, related also to the general economic conditions in each country (high levels of both public and private foreign currency-denominated debt, the obligation to respect Maastricht guidelines, etc.). Finally, it must be emphasized also that some of the countries of the region have very limited space for expansionary monetary policy. Slovakia is a member of the Eurozone, Bulgaria has a currency board arrangement, and some other countries in the sample have effectively pegged exchange rates, which limits the scope of monetary policy.

Except for economic growth, the solution to the problem of NPLs would be a proactive and cooperative approach of creditors, debtors and the regulatory system. This kind of comprehensive approach is particularly important in the CEE region, given that any restructuring would help spur economic recovery, thereby also helping lift the value of collateral backing other loans. Further research would require a longer time series for non-performing loans for each country, which would enable exploring country-specific determinants of NPLs. This in turn would help policy makers to get a clearer image of the steps necessary to stabilize the banking sector in the post-crisis period.

**TABLE A1**  
*Robustness tests*

Explanatory variable	Dependent variable: <i>nplgr</i>						
	1	2	3	4	5	6	7
<i>rgdpgr</i>	-3.970 [0.636]***	-3.939 [0.628]***	-3.465 [0.541]***	-3.554 [0.549]***	-3.712 [0.555]***	-3.410 [0.633]***	-3.611 [0.616]***
<i>unplgr</i>	1.006 [0.129]***	1.009 [0.128]***	1.076 [0.120]***	1.047 [0.122]***	0.977 [0.120]***	0.961 [0.124]***	0.962 [0.124]***
<i>hicpgr</i>	1.657 [0.868]*	1.831 [0.743]**	1.468 [0.704]**	1.614 [0.714]**		1.573 [0.831]*	1.112 [0.756]
<i>neergr</i>	0.624 [0.426]	0.699 [0.378]*	0.896 [0.356]**			0.872 [0.415]**	0.613 [0.366]*
<i>eqgr</i>	0.083 [0.056]	0.074 [0.050]				0.156 [0.058]***	0.166 [0.058]***
<i>loansgr</i>	0.128 [0.326]					-0.477 [0.363]	
<i>loansgr_lag</i>						0.697 [0.214]***	0.553 [0.184]***
<i>cons</i>	19.122 [3.358]	18.897 [3.296]	18.744 [3.312]	17.221 [3.323]	23.388 [1.933]	17.081 [3.276]	18.119 [3.189]
Observations	118	118	118	118	118	118	118
R-squared							
within	0.83	0.83	0.83	0.82	0.81	0.85	0.84
between	0.33	0.35	0.31	0.42	0.27	0.43	0.34
overall	0.77	0.77	0.77	0.77	0.75	0.80	0.78

Standard errors are in parenthesis. \* indicates 10% significance level, \*\* indicates 5% significance level, and \*\*\* indicates 1% significance level.

Source: Author's calculations.

Several nested models are estimated in order to test the stability of the proposed model. According to the results, in all of the specifications both the quarterly growth rate of GDP and the change in unemployment are highly significant, with expected coefficient signs. This confirms the main conclusion of the analysis, which is that the slowdown in economic activity has been the main driver of the increase in NPLs in the CEE region. The coefficient on the increase in inflation rates is also significant in every specification (at 5% and 10% significance level), but one, where lagged loans growth rate is included in the analysis. According to specifications 6 and 7 higher growth rate of loans in previous periods results in higher current growth rate of problem loans, which is in accordance with economic intuition.

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# Some evidence for implementing an enhanced relationship in Slovenia

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## Abstract

*Fostering an enhanced relationship between the tax administration and taxpayers is a promising approach for transforming traditional vertical relationships into a partnership based on trust and close, proactive cooperation. This article examines an example of such efforts, based on a pilot project in Slovenia called Horizontal Monitoring. After two years of operation, the project has justified its existence and represents a solid basis for extension to a larger group of taxpayers.*

*Keywords: enhanced relationship, horizontal monitoring, pilot project, Slovenia, voluntary tax compliance*

## 1 INTRODUCTION

The typical relationship between a tax administration and a taxpayer involves a taxpayer that completes tax returns and discloses the minimum amount of information needed to administer the required tax. However, the tax administration can demand additional information about the tax declaration and, if necessary, impose enforcement measures. In this relationship, tax intermediaries are not involved as direct parties, although they play an important role in influencing the taxpayer's behavior (OECD, 2007). Because of the prevalence of aggressive tax planning, the OECD (2008) published a report focusing on the trilateral relationships among tax authorities, taxpayers, and tax intermediaries. It recommends creating a cooperative, trust-based relationship with taxpayers, whereby tax authorities need to demonstrate certain key attributes: understanding through commercial awareness, impartiality, proportionality, disclosure and transparency, and responsiveness. This approach should lead to cooperative, trust-based relationships between tax authorities and taxpayers; that is, an "enhanced relationship."

In addition, in 2009 the OECD published a report that focuses on the role of banks in aggressive tax planning and on identifying the benefits of including banks as large taxpayers in the process of an enhanced relationship (OECD, 2009a), and another study from the same year (OECD, 2009b) extends the coverage of a special relationship from large taxpayers and banks to professional associations and government bodies. Several tax administrations have thus recently started to launch special strategies and programs aimed at managing tax compliance, especially in relation to large taxpayers (important with respect to tax revenue).

In enhanced relationship programs, the tax administration's primary goal is to stimulate the taxpayer and tax intermediary to cooperate and increase voluntary tax compliance. A high level of tax enforcement does not always increase tax compliance. In contrast, there are tax systems with a low level of tax enforcement and, simultaneously, a low level of tax avoidance. The key question for any tax administration is thus how to balance out the use of tax enforcement with stimulation for voluntary tax compliance.

The OECD (2008) has identified three basic mechanisms applicable in the adoption of an enhanced relationship: (1) a unilateral statement of the tax administration, comprising the enhanced relationship process, and the consequences for taxpayers and tax intermediaries in the event of cooperation and non-cooperation; (2) a charter adopted by the tax administration, taxpayers, and tax intermediaries, defining how they intend to work together and what they are expected to do, and setting out the consequences if they fail to do so; and (3) an agreement between the tax administration and a specific taxpayer, designed to meet their specific needs.

Supported by the OECD and other professional organizations, such as the European Commission (Fiscalis Risk Management Platform Group, 2010) and the Intra-European Organization of Tax Administrations (IOTA, 2012), the enhanced relationship programs are largely based on a series of studies devoted to tax avoidance and tax ethics.<sup>1</sup> The literature on enhanced relationships, especially research, has been very scant so far. One of the purposes of this article is therefore to present an overview of the implementation of enhanced relationships worldwide, with an emphasis on the case of Slovenia.

We also present and analyze an enhanced relationship pilot project that was implemented in 2010 in Slovenia called Horizontal Monitoring. Horizontal monitoring is an example of an enhanced relationship in line with the third mechanism of the OECD (2008) classification (given above). It was launched by the Tax Administration of the Republic of Slovenia (DURS) and includes eighteen of the largest Slovenian corporate taxpayers.<sup>2</sup> The main hypothesis of the article is that horizontal monitoring has proved to be successful, with implicit potential to be applied on a larger scale, throughout the taxpayer community. To support this idea, we introduce a survey among non-participating large taxpayers that was designed and conducted especially for this purpose. In accordance with the findings, we can conclude that the concept of an enhanced relationship is widely supported, although further promotion is needed for the mechanisms to become established in practice. A discussion of the initial implementation of an enhanced relationship and the analysis of non-participation in an enhanced relationship are thus two additional contributions from this article.

The article proceeds as follows. Section two provides an overview of the implementation of enhanced relationships around the world. Section three describes and discusses the elements involved in an introduction of an enhanced relationship in the case of Slovenia, where we focus on the agreement with taxpayers, implementation issues, and evaluation. Section four analyzes non-participation in the en-

<sup>1</sup> In addition to the economic factors, several other sociological and psychological factors determine the complex individual attitude toward taxes (Allingham and Sandmo, 1972; Torgler, 2003).

<sup>2</sup> In 2011, these eighteen taxpayers employed 20.1% of employees in large corporate taxpayers and 7.9% of all employees in Slovenia (AJPES, 2012).

hanced relationship process based on our survey. The final section concludes with the main findings.

## 2 OVERVIEW OF IMPLEMENTING AN ENHANCED RELATIONSHIP AROUND THE WORLD

Among the initiators of an enhanced relationship were the Netherlands, Ireland, and the UK. The Netherlands started an enhanced relationship program called Horizontal Monitoring in 2005, initially including twenty large corporate taxpayers.<sup>3</sup> The program represents an attempt by the Dutch Tax and Customs Administration (TCA) to build greater trust in relation to taxpayers as a mechanism to encourage greater disclosure of tax uncertainties and risks. It is based on transparency, understanding, and trust. The TCA and participating taxpayers signed a non-binding agreement obliging taxpayers to notify the TCA of any issues entailing a potential and significant tax risk. The basic requirement is that agreements are concluded with taxpayers whose tax control frameworks are solid. In exchange, the TCA assures tax certainty (OECD, 2007).

In 2007, the program was extended to medium- and small-sized companies, tax intermediaries (such as financial and tax advisors or accountants), and various professional trade and industry organizations. The next phase in the program introduces horizontal monitoring to software producers, in order to enable reliable reporting and monitoring in the entire chain from business transaction to tax return. The TCA emphasizes the importance of the attitude of participating taxpayers' top management to horizontal monitoring (the "tone-at-the-top" principle) because this is crucial for increasing taxpayers' willingness to adopt voluntary tax compliance and for improving the internal tax control framework. From the point of view of a tax administration, it is essential for employees to have excellent knowledge not only of the particular taxpayer's business, but also of its specific branch of industry in order to work with a particular taxpayer (TCA, 2008). The Slovenian Horizontal Monitoring program, introduced in 2010, is based on the Dutch experience and is being implemented with support from the TCA.

Ireland introduced its enhanced relationship program, called the Cooperative Compliance Programme, in 2005 (Revenue – Irish Tax and Customs, 2005; Griffin, 2006). It aims to include large taxpayers that exceed certain turnover and asset thresholds. This program includes comprehensive supervision of all cases related to tax compliance issues. For this purpose, a special department has been established inside the tax administration. Each participating taxpayer is assigned to a particular employee of this unit in order to enable prompt reactions.

<sup>3</sup> In the Netherlands, as early as 2002, the Scientific Council for Government Policy recommended changing the relationship between the government and citizens from vertical to horizontal; that is, a move towards more equal relationships, as a consequence of international and social development (TCA, 2008). The government included the recommendations in the Other Government (Andere Overheid) program. These principles were also a basis for TCA pilot projects for developing new forms of cooperation with taxpayers and tax intermediaries; one of these was Horizontal Monitoring in 2005.

The UK started its enhanced relationship program, called the High Risk Corporates Programme, in 2006 based on a unilateral approach; that is, the relationship arises from an assessment of the risk connected with a particular taxpayer (Freedman et al., 2012; HMRC, 2012). The High Risk Corporates Programme has three strategic aims: (1) to induce corporate customers to take a less aggressive approach to tax mitigation and tax filing positions, (2) to increase the openness with which they disclose transactions and their tax impact, and (3) to collect the correct amount of tax from their transactions and profits as effectively as possible — if necessary, determining this through litigation (OECD, 2009c). In 2009, the UK also introduced a Code of Practice on Taxation for Banks. As of 30 June 2010, over 100 banks had adopted this code and many more, including most of the largest banks, were actively working towards adopting it (OECD, 2010).

In the EU, a form of enhanced relationship is also currently being implemented in Belgium, Denmark, Germany, Austria, Spain, and Sweden (Stevens et al., 2012). The concept is also known in Switzerland (Bugnon, 2012), in southeast Europe Macedonia introduced a program of horizontal monitoring (European Commission, 2011), and the Croatian tax administration has been preparing to introduce a pilot enhanced-relationship program funded by the Matra-flex short-term program (Government of the Republic of Croatia, 2012). As in Slovenia, both southeast European projects are being supported by the TCA.

Among the OECD countries, Australia, Canada, New Zealand, and the U.S. have also introduced such programs (Stevens et al., 2012). For example, the Compliance Assurance Process (CAP) in the U.S. started in 2005 and represents a real-time, year-by-year audit program devoted to large companies. The seventy-three taxpayers participating at the time of its introduction turned into 160 participants by 2012. The program starts at the beginning of a taxpayer's financial year and finishes after its tax return is submitted. The taxpayer discloses all transactions and connected tax positions in real time, and any open issues are resolved with the tax administration before the tax return is completed (OECD, 2007; IRS, 2012).

However, there are several theoretical and practical concerns related to the enhanced relationship, deriving from constitutional (legal) and practicability issues (Burton and Dabner, 2008; Druen, 2012; Stevens et al., 2012), such as conflicts of interest or unequal treatment of taxpayers. Freedman et al. (2012) found that the enhanced relationship program overall has been successful in achieving some aims (such as better allocation of resources within the tax authority), but not others (such as moderating the tax planning of certain types of corporate taxpayers). In a similar way, Burton and Dabner's (2012) analysis of enhanced relationships in Australia, New Zealand, and the UK summarizes the difficulties in implementing the enhanced relationship as ideological tensions, legislative constraints, institutional and internal constraints, and international pressures.

### 3 THE ENHANCED RELATIONSHIP IN SLOVENIA: THE HORIZONTAL MONITORING PROCESS

In Slovenia, an enhanced relationship project started in 2010 under the title Horizontal Monitoring as a consequence of establishing the DURS strategic business plan for 2010-2013 (DURS, 2010). It became obvious while preparing the strategic business plan that a small tax administration with limited resources needs an alternative approach to the standard vertical relationship with taxpayers and tax intermediaries, especially in the context of the complex environment of the ongoing (late-2000s) economic and financial crisis.

The new business strategy has therefore set increased voluntary tax compliance as the first strategic objective (DURS, 2010). Its implementation requires the services of DURS to be provided in such a way that (Šinkovec, 2012a): (1) procedures are simplified for taxpayers that are willing to comply, (2) all necessary assistance is given to taxpayers that strive for compliance but are not always successful, (3) taxpayers that are not willing to comply are deterred from doing so with fast and effective identification of the evasion and avoidance of their tax obligations, and (4) all possible enforcement measures provided by law are applied to taxpayers determined not to comply.

In addition to the new business strategy, the initiation of the horizontal monitoring project was based on a series of studies and guidelines of relevant international organizations, such as the IOTA mentioned above, the EC/Fiscalis Risk Management Platform Group, and the OECD, as well as some domestic analyses (Filipović, 2009; Centa-Debeljak, 2010). These analyses revealed an already high level of voluntary tax compliance among the largest taxpayers. As a result, it was decided to commence a two-year pilot enhanced relationship project. From the outset, the TCA actively cooperated through the transfer of experience and know-how, resulting in many similarities between the Slovenian and Dutch enhanced relationship processes.

#### 3.1 AGREEMENT WITH TAXPAYERS

In March 2010, the first public presentation of horizontal monitoring was organized in cooperation with the TCA, followed by a public call to all large corporate taxpayers<sup>4</sup> that had already established a system of internal tax control (Centa-Debeljak, 2011) to join the pilot project in May 2010. At this stage, organizations of professions were involved, such as the Bank Association of Slovenia, to inform and motivate large corporate taxpayers to participate. In the introductory phase of an enhanced relationship project, the tax administration usually approaches large corporate taxpayers first because they are typically low-risk taxpayers with a series of external advisors that also indirectly become part of this process. In this

<sup>4</sup> There were 721 large corporate taxpayers in Slovenia in 2010, representing 1.3% of all companies. They were very important from the viewpoint of public revenues, contributing 53% of the entire amount of corporate income tax collected, 54% of revenue generated, and involving 40% of all employees (Šinkovec, 2012b).



way, all three participant groups become involved. As a result, the starting number of participating taxpayers was fairly small; out of 721 large corporate taxpayers in 2010, eighteen responded and were included in the pilot project of horizontal monitoring.<sup>5</sup> Table 1 presents the structure by industry of large corporate taxpayers in Slovenia in 2010.

**TABLE 1**

*Structure of large corporate taxpayers by industry in Slovenia, 2010*

Industry	All large corporate taxpayers		Included in horizontal monitoring	
	Number	Percent	Number	Percent
Finance and insurance	90	12.5	13	72.2
Pharmaceuticals	2	0.3	2	11.1
Others	629	87.2	3	16.7
Total	721	100.0	18	100.0

*Source: Own calculations.*

Once the responses were obtained, meetings took place between the top management of those taxpayers and the management of the tax administration, where details of the project were presented. From the very beginning, the project was based on the following grounds: (1) taxpayers joined the program with the expectation that horizontal monitoring would increase tax certainty, which is required for everyday business; (2) the tax administration made it clear from the outset that during the program it would not perform tax advising in the sense of optimizing tax liabilities; and (3) rights and obligations deriving from existing regulations would remain unchanged.

Based on these initial meetings, cooperation agreements were signed with the participating taxpayers. The taxpayers thereby committed themselves to informing the tax administration about issues related to their operations that may involve tax risks. On the other hand, the tax administration offered to provide prompt opinions based on existing regulations and to monitor internal control mechanisms of the participants.

The agreements do not interfere with the ongoing tasks of the tax administration.<sup>6</sup> However, the Horizontal Monitoring pilot project may lead to potential amendments to the tax regulation, enabling the project's permanent implementation.

<sup>5</sup>In 2011, there were 695 large corporate taxpayers, their share in total turnover amounting to 54.4% and employing 39.2% of all employees in Slovenia (AJPEŠ, 2012). Of the eighteen large corporate taxpayers that responded to the public call, thirteen were financial and/or insurance companies with 11,427 employees, two were pharmaceutical companies with 6,136 employees, and three were other companies with 17,774 employees altogether (Šinkovec, 2012c).

<sup>6</sup>During the Horizontal Monitoring project, the tax administration performs all of its ordinary services, such as supervision procedures or interpretation of tax legislation. Should the tax administration and taxpayer disagree about the interpretation of tax laws, a supervision procedure can be carried out according to the provisions of the Tax Procedure Act.

Compared to tax audits, which are retrospective in nature and concentrate on irregularities in tax returns already submitted, Horizontal Monitoring focuses on the present and future operations of taxpayers and their interactions with the tax administration. Horizontal Monitoring is derived from business processes and ongoing transactions; it examines the existence and efficiency of internal tax controls and focuses on risks that appear before taxpayers submit their tax returns. Current issues related to the project are resolved at meetings with members of working groups. Where such topics are relevant to other taxpayers, the results are published on the tax administration's website.

Operating in a complex environment that is subject to changes, these issues are especially significant for large corporate taxpayers. They have to operate internationally and face complex financial and fiscal structures related to tax risks in areas such as transfer prices, permanent establishments, and offshore activities. They encounter constant amendments to legislation, which they need to comply with and adjust to by changing their business processes, computer software, or even complex information systems. Due to these ongoing changes, possible subsequent audits performed by DURS represent a great burden on taxpayers that are generally willing to voluntarily comply with tax regulations.

Therefore, following the introduction of horizontal monitoring, taxpayers expect a (limited) tax audit, primarily based on a review of the operations of internal tax controls. Instead of extensive and time-consuming audits, covering several years in the past, accuracy controls should be performed to a small extent, based on sampling.

Based on the results of the horizontal monitoring process so far, the advantages that taxpayers perceive in the enhanced relationship are: (1) a reduction of time-consuming components of tax compliance, (2) updated and improved knowledge, and (3) greater tax certainty. Taxpayers expect better responsiveness from DURS to their questions and a confirmation of having accurately understood explanations of the legislation, which holds consequences for management's decisions regarding the financial and tax statements of their companies. They also expect proposals for the improvement of processes and internal control systems. They are willing to participate in preparing proposed amendments to legislation and would like to play an active role in formulating tax standards and legal bases.

### 3.2 IMPLEMENTATION ISSUES OF HORIZONTAL MONITORING

Agreements signed between DURS and the participating taxpayers represented a basis for setting up three working groups for implementing horizontal monitoring in the tax administration (Šinkovec, 2012a): (1) a finance and insurance companies group, (2) a pharmaceutical companies group, and (3) a group for other large companies.

Finance and insurance institutions were selected as the first target group based on the studies of international organizations already mentioned because they form the most appropriate group for the pilot project. The mandatory application of International Financial Reporting Standards, the supervision of the Bank of Slovenia, membership in the Bank Association of Slovenia, and statutory internal audits provide for a high level of tax transparency. This was backed by the DURS analysis for tax audits in banks from 2005 onwards (Centa-Debeljak, 2010), where a relatively low number of tax irregularities emerged in comparison to other industries. The selection of pharmaceutical companies to participate in the pilot project is due to their international status regarding taxation and associated risks (presence on the global market, transfer pricing, and residency status), and the third group includes the remaining large corporate taxpayers, including Mercator,<sup>7</sup> the biggest retailer in Slovenia.

Each working group consists of tax administration staff members, who are tax auditors with long-term experience in working with large taxpayers. On the other hand, participating taxpayers also appoint a contact person to communicate with the relevant working group. These working groups perform the project in four steps: (1) they prepare and continue to update the taxpayer's profile, (2) they conduct the introductory interview, (3) they monitor the taxpayer's internal tax controls, and (4) they are in charge of continuous monitoring of each participant taxpayer.

The purpose of a taxpayer's profile is to inform working group members about the taxpayer's business and tax compliance records. It includes data from tax administration databases (register of taxpayers, tax returns, control data for assessing personal income tax, implemented audit procedures and controls), data from other supervisory authorities, publicly available data about the taxpayer (i.e. from annual reports, newspaper articles, websites), and data submitted by the taxpayer itself. This last element is particularly important because in the cooperation agreement the taxpayer accepts the responsibility to inform the tax administration about all potential tax risk activities substantially and in a timely manner. The taxpayer's profile is used by the working group's members to define the critical segments of the taxpayer's activities that their attention should focus on.

Equipped with the taxpayer's profile, the working group organizes an introductory interview in order to establish personal contact with the taxpayer's representatives and obtain additional internal data on business details, strategic goals, and existing

<sup>7</sup>Mercator d.d. is one of the largest Slovenian companies, with 12,000 employees in 2010 (AJPES, 2012). In October 2010, Mercator signed an agreement with DURS to take part in the Horizontal Monitoring pilot project. The company's participation in the pilot project started on 1 January 2011 and will presumably last for two years. The main benefit the company expects from taking part in the project is greater certainty regarding taxation. In 2011, the operation of internal controls was reviewed in value-added tax accounting. In addition, DURS responded instantly and professionally to questions submitted by the company, and thus contributed to mitigating tax risks regarding major business decisions. For 2012, an audit of internal controls is planned in personal taxes and corporate income tax (Mercator, 2012).

external and internal control mechanisms so as to further extend its profile. Based on the TCA experience, the introductory interview opens a discussion in five crucial areas: (1) the strategic goals of the taxpayer, (2) the internal tax control framework, (3) the information system, (4) tax functions, and (5) external supervision.

The key topic related to strategic goals is the participant's long-term commitment to voluntarily compliance with tax legislation. At this stage, the top management of the taxpayer is usually included. It turns out that only a few participants (banks) officially accepted the internal tax policy act as an independent document devoted to tax activity (Šinkovec, 2012b). Discussions about the internal tax control framework seek to determine how the taxpayer administers its tax risks. Here the condition that the tax administration set out in the first public call becomes relevant, that is, that taxpayers must already have an appropriate internal tax control framework in place. It turns out that companies that are subsidiaries of multinational corporations generally have a professional approach to tax policy. Several multinationals have introduced codes of conduct and demanded that all members of the group (including Slovenian subsidiaries) comply with specific standards and models (COSO, the Sarbanes-Oxley Act, and the Savings Law). The information system represents the technical basis and as such plays an important role in exercising tax functions within a taxpayer. Emphasis is thus placed on controlling mechanisms of the information system such as level of risk regarding data loss or accessibility of the information system.

In the introductory interview, the organization of tax functions is also presented. It may be organized in many different ways, depending on the taxpayer's size and the complexity of its tax obligations, and is usually implemented in several organizational units (accounting, HRM, or sales). It turns out that almost all participants employ at least one tax specialist. During the interview, there is an emphasis on how the company transfers knowledge of tax changes and the tax strategy among its employees, along with how tax risks are recognized and controlled for. It is thus important to find out how tax returns for different taxes are completed.

Another integral part of the introductory interview is obtaining information on the roles of external auditors, advisors, and supervisors in the process of monitoring and facilitating tax compliance at the taxpayer level. This includes information about the frequency of their services (regularly vs. occasionally, or only in the case of difficulties); about the supervision of their performance, and what their attitude is to the taxpayer's participation in the Horizontal Monitoring program.

The analysis of a taxpayer's internal tax controls is the most important step in the horizontal monitoring process because its key principle is that the tax administration will rely to the greatest extent possible on the internal tax controls established by the taxpayer. It includes the examination and testing of tax control mechanisms

already established within a particular taxpayer, definition of potential risks regarding these mechanisms, and their evaluation. Internal tax controls are evaluated with respect to their accuracy, timely tax reporting, and tax payments, and focus on the following issues (Šinkovec, 2011): (1) who is responsible for various internal controls in the company (including tax controls), (2) how the company examines implementation of the internal control procedures, (3) the level of cooperation among internal “controllers”, i.e. the tax specialist, the accountant, and the internal auditor, (4) the approach to tax risks (how often the company discusses them), (5) the relationship between tax compliance and ethics (tax morality), and (6) the degree of tax transparency within the company.

Internal tax control mechanisms are examined for all tax types. Due to its relevance among government revenues, its complexity, and the numerous taxpayer questions about its implementation, value added tax (VAT) was covered for all participants as the first tax in this step. The examination includes checking internal control mechanisms for sales and purchase of goods and services (resulting in output and input VAT), verification of VAT documentation, and, finally, the accuracy of the VAT returns. The selection of documentation for testing purposes is performed with the help of Audit Command Language (ACL) software, such that standard verifications are performed and documents with risks detected are submitted to the taxpayer. Internal controls in VAT go hand in hand with the information system due to the volume of VAT transactions.

Following the analysis and testing, final reports are prepared by the working groups. Apart from findings of irregularities and deficiencies that may influence tax compliance, final reports include recommendations to the taxpayer’s management in areas that may influence tax compliance.

The last step in implementing horizontal monitoring is the ongoing process of the continuous monitoring of a taxpayer, based on the taxpayer’s profile already established and updated, and on access to its internal tax control mechanisms. It includes checking whether the recommendations have been adopted (e.g. establishing additional control points). The scale of continuous monitoring performed by the working group thus mostly depends on the level of internal and external control mechanisms provided by the taxpayer. The more it is able to monitor its processes, the less intensive the tax administration’s activity.

In line with these steps, the tax administration provides tax certainty to the participating companies because the cooperation agreement obligates the tax administration to respond promptly to every question regarding current legislation. From 1 January 2011 to 30 September 2012, DURS provided 131 answers to the eighteen participating taxpayers, with the majority referring to VAT (42.7%), followed by personal income tax (24.4%) and corporate income tax (16.8%), as shown in table 2. During the project, regular meetings between the management of the tax

administration and the management of taxpayers are organized to promptly review and assess phases of the project already performed.

**TABLE 2**

*Answers provided by DURS to participating taxpayers, 2011-2012*

Area of interest	Number	Percent
Value added tax	56	42.7
Personal income tax	32	24.4
Corporate income tax	22	16.8
Tax procedure	8	6.1
Double taxation avoidance	8	6.1
Financial instruments	1	0.8
Interests directive	1	0.8
Insurance contracts tax	1	0.8
Pension insurance	1	0.8
Real property transaction tax	1	0.8
Total	131	100.0

Source: Šinkovec (2012c), own calculations.

### 3.3 EVALUATION OF HORIZONTAL MONITORING

Following the OECD's Tax Intermediaries Study of team requirements for successfully engaging taxpayers within enhanced relationship programs (OECD, 2007), we can perform a qualitative evaluation of the Slovenian Horizontal Monitoring project.

Regarding the first requirement (i.e. commercial awareness), we can conclude that DURS has made its best efforts to achieve this first by dividing taxpayers in the pilot project into three groups (finance and insurance, pharmaceuticals, and others), and then by appointing the most experienced tax auditors as members of each of these working groups. In so doing, the tax administration increased its ability to understand the given business, the major characteristics of the taxpayer's industry, and its risk appetites. However, the need for additional knowledge and experience, which mainly refers to particular features of individual industries, still increases.

The second requirement is an impartial approach to the resolution of potential disputes. This is reflected in the reasonable expectation of the participant taxpayer that, if disagreements arise as a result of voluntarily disclosed information in the course of the program, the tax authority will act objectively and fairly, and exercise its discretion in a considered, revenue-detached, and proportionate manner. The next requirement, connected to the previous one, is proportionality, aiming to assess whether the total amount of tax declared in the participant's tax return is in line with the tax authority's understanding of the underlying tax regulations. Because enhanced communication is an important tool for reducing potential uncer-

tainties and misunderstandings of the tax duties imposed, the program is believed to have been successful in these respects, although the results are difficult to measure.

Disclosure and transparency are also essential elements of the reciprocity of the relationship. As stated above, the increased number of questions from taxpayers and opinions answered by DURS in the course of the pilot project reflect a mutual readiness for open discussions, a higher level of mutual trust, and to some extent an influence on drafting amendments to the existing tax regulations. The last requirement on the OECD (2007) list is responsiveness. Notwithstanding its limited resources, DURS is taking important steps to improve its promptness and efficiency, as well as the professional level of its operations during the program, partially due to the incorporation of the experiences of other European tax authorities and a more focused, hands-on approach and communication with individual participants.

#### 4 NON-PARTICIPATION IN THE ENHANCED RELATIONSHIP

After the public call to all 721 large corporate taxpayers initiated in May 2010 ended, and the eighteen large corporate taxpayers that responded to the call were included in the pilot project of horizontal monitoring, the remaining 703 large corporate taxpayers were subject to a survey of non-participation, designed and implemented in order to determine the reasons for non-participation, the attitude towards horizontal monitoring, and willingness to participate in the future. In line with the experience of TCA with implementing the enhanced relationship, the survey was addressed to the senior management of a company, and this was verified in the questionnaire<sup>8</sup> with a question on the position in the company of the actual respondent to the survey. Due to questions on willingness to fulfill tax liabilities and to cooperate with the tax administration, the anonymity of the respondent was ensured by a return envelope being enclosed.

In order to minimize the costs of the survey, 20% of the non-participating large corporate taxpayers were randomly selected, resulting in a sample of 140 large corporate taxpayers<sup>9</sup> to whom the questionnaires were sent. Out of 140 companies, fifty-one responded, with a response rate of 36.4% and covering 7.3% of all non-participating large corporate taxpayers in Slovenia. Table 3 presents the structure of the sample of non-participating large corporate taxpayers by industry. The information on the industry of a large corporate taxpayer that responded to the survey was gathered by introducing a corresponding question in the survey questionnaire.

<sup>8</sup>Due to obvious spatial limitations, the survey questionnaire is not included in the article, but it is available upon request. In this article, only the results of the most relevant questions are addressed.

<sup>9</sup>In 2011, the 140 large corporate taxpayers from the survey sample had a 10.6% share in total turnover and employed 7.6% of all employees in Slovenia (AJPES, 2012).

TABLE 3

*Structure of the sample of non-participating large corporate Slovenian taxpayers by industry, 2010*

Industry	Included in the sample		Responded to the survey	
	Number	Percent	Number	Percent
Finance and insurance	11	7.9	6	11.8
Pharmaceuticals	0	0.0	0	0.0
Others	129	92.1	45	88.2
Total	140	100.0	51	100.0

*Source: Own calculations.*

The structure of the actual respondents according to position in a particular company was as follows: 27.5% of respondents belonged to the top management (CEO, chairman of the board, or general manager), 31.4% were members of the board (CEO, or deputy CEO), and 41.2% were from the lower positions (assistant director, director of finance and accounting, CFO, administration assistant, accounting manager, head of auditing, tax specialist, or accountant). We can thus observe that many CEOs still transferred the questionnaire to subordinates that cover tax in their companies, at least in the non-participating large corporate taxpayers. There is probably still room (and need) for awareness-raising in Slovenian companies with respect to horizontal monitoring, although this could also be a sign of senior management's trust in its subordinates.

The survey included questions related to companies' familiarity with horizontal monitoring in the Netherlands and Slovenia, and the mode of acquaintance with the pilot project in Slovenia. Only 33.3% of respondents were aware that the TCA enters into agreements with taxpayers based on mutual cooperation, and only 23.5% of the non-participating large corporate taxpayers knew that a similar pilot project was introduced by DURS in 2010. Most of the latter received information on the DURS website, followed by the media, professional organizations, and various workshops and seminars. These responses support our previous finding that greater and better-targeted effort should have been invested in promoting the project.

Regardless of whether the company was familiar with the pilot project, the process of horizontal monitoring in Slovenia was then briefly presented. The respondents were asked whether they would be willing to participate in the future, should the pilot project of horizontal monitoring prove to be successful. Some 86.3% of the currently non-participating large corporate taxpayers responded affirmatively, stating the main reasons for doing so as: (1) tax certainty (26 respondents), (2) support of the tax administration in introducing internal tax controls (22 respondents), and (3) reduced likelihood of tax inspections (16 respondents). The seven



respondents that would not like to participate in the project justified their response with: (1) distrust of DURS (three respondents), (2) possible costs related to introducing internal tax controls (two respondents), (3) insufficient information about the project (five respondents), and (4) lack of resources in general (two respondents).

There was also a question in the survey about the importance of internal tax controls. Some 35.3% of respondents found them important and stated that they are already established in their companies, and another 41.2% thought that internal tax controls are important and would like to receive support from DURS in order to establish them. Moreover, an additional 11.8% of non-participating large corporate taxpayers deemed internal tax controls important, although they would like to establish them with the support of external experts. The responses demonstrate a high level of readiness of taxpayers to establish a system of internal tax controls, which is an important condition for voluntary exercise of tax liabilities.

The results presented in this section provide important information for future decision-making by the tax authorities with respect to horizontal monitoring. Alongside more and better-targeted promotion of the project in the future, DURS should probably place more emphasis on the particular benefits of participating in horizontal monitoring, with demonstrations of existing good practices in Slovenia.<sup>10</sup>

## 5 CONCLUDING REMARKS

The enhanced relationship represents a modern approach of the tax administration to taxpayers and tax intermediaries. Even though this concept is relatively new, it has already proven successful in several countries, and it is leading to improved cooperation between tax administrations and taxpayers. It is resulting in better supervision and a higher level of voluntary tax compliance. With the cooperation of the TCA, in 2010 DURS launched a pilot version of an enhanced relationship project called Horizontal Monitoring, with the main purpose of improving the relationship with a selected group of large taxpayers that are willing to comply voluntarily. The key characteristic of such an enhanced relationship is that it transforms the standard methods of vertical taxpayer supervision into a horizontal partnership.

So far, horizontal monitoring has proved to be successful. Based on experience and evidence to date, taxpayers are showing greater willingness to cooperate with DURS and disclose their operations related to tax risks. They benefit from greater tax certainty through prompt and regular two-way communication with DURS. Both parties thus benefit from experience and mutually recognized know-how because the project has already induced additional training of employees in charge

<sup>10</sup> The outlook is nevertheless encouraging because DURS has been receiving many inquiries, especially in 2012, from companies for inclusion in the project (Šinkovec, 2012c).

of individual tax procedures. DURS employees are benefiting not only from the new type of relations with taxpayers that are more willing to openly discuss sensitive tax issues, but also from cooperation with the TCA. In addition, the results of the project have already enabled improvement of the system of internal tax controls for some participating taxpayers. In the long term, DURS expects to spend fewer resources supervising taxpayers, and thus be able to direct resources to other areas of its work.

Nonetheless, the project has also revealed some shortcomings. The greatest challenge for the participating taxpayers is the implementation of internal tax controls, because this is a time-consuming and expensive process. Some participating taxpayers might also understand horizontal monitoring as a free “tax optimization service” provided by DURS, without implementing the disclosure of tax risks. Others are concerned about the disclosure of sensitive data related to their day-to-day business. In addition, some concerns have emerged that participation in the project may violate the principle of equality with respect to tax authorities’ treatment of participating and non-participating taxpayers (Hauptman, 2011). The results of the survey revealed that DURS should improve promotion of the project in the future, and place more emphasis on particular benefits of participating in horizontal monitoring.

The key elements of the pilot project – transparency, trust, and understanding – have nevertheless been fulfilled, and the project represents the right direction for further development of DURS. Because the final phase of the incipient implementation of enhanced relationship has passed (December 2012), the tax administration must determine whether the Slovenian tax environment is sufficiently developed to allow the general introduction of such an approach, whereby all taxpayers that are willing to comply voluntarily disclose their risks and establish an effective system of internal tax controls. Given the experience and evidence from the pilot project to date, it would be reasonable to include (at least) other appropriate large taxpayers.

However, several legal amendments would be necessary for the large-scale introduction of horizontal monitoring, and even amended legislation cannot cover all taxpayers, although it could definitely include additional groups of suitable and motivated companies. Based on existing Slovenian experience and following the TCA approach, serious long-term candidates include consulting and accounting companies. It is also planned that at the end of the pilot project DURS will publish new recommendations for taxation standards, in cooperation with external experts. In the long run, the project is contributing to an improved tax culture and to the tax system in general, and is thereby increasing the international tax attractiveness of the country.

However, despite our best efforts to analyze and evaluate the process of horizontal monitoring, these conclusions are still based on mostly qualitative findings. The literature on the topic, especially research, has been very scant so far, and quantitative measurement of the project effectiveness is still lacking. This is nevertheless an issue related to horizontal monitoring in general (Stevens et al., 2012). This article is thus only an attempt to narrow the gap between ongoing practical implementation and research on horizontal monitoring, and for the long-term success of this concept, first and foremost, a set of well-founded measures (performance indicators) should be designed and enforced.

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# Statistical detection of fraud in the reporting of Croatian public companies

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## Abstract

*Statistical methods based on Benford's distribution, Z- and  $\chi^2$ -statistics are being successfully applied to detect likely accounting and reporting fraud, for example in the daily usage of the Internal Revenue Service in the USA, and in historical analysis of Greek macroeconomic reporting. We adapt and apply the methodology to the analysis of the reporting of some leading Croatian public companies. We find indications of reporting fraud in several of the companies analyzed. In particular we find correlation between the likelihood of reporting fraud, measured as a deviation from Benford's law, and reported net income losses, for companies large enough (with a revenue of at least 1 billion kuna). Finally, we suggest application of the methodology to improve the internal processes, efficiency and effectiveness of the State Auditing Office.*

*Data availability: The data used in the study are corporate data in the public domain. For legal reasons, however, the identities of the companies are disguised. Contact the first author for the sanitized data sets that can be used to verify and replicate the analysis.*

*Keywords: Benford's law, public companies, reporting, fraud detection, auditing*

## 1 INTRODUCTION

The usage of statistical methods in the analysis and detection of fraud in financial reporting is becoming widespread and necessary. Perhaps the simplest and best known, but still effective test is based on Benford's law. Newcomb (1881) and later Benford (1938) noted that in a sufficiently large collection of numerical data expressed in a decimal form, the distribution of occurrences of first digits is not uniform (we explain Benford's distribution in more detail in section 2). Many authors, including Carslaw (1988), Guan et al. (2006), Kinnunen and Koskela (2003), Nigrini (2005), Niskanen and Keloharju (2000), Skousen et al. (2004), Thomas (1989) and Van Caneghem (2002, 2004) investigated the applicability of this fact in accounting and auditing, and specifically in the detection of "cosmetic earning management". It has been shown that the distribution of first digits in financial reports normally complies with Benford's law. If, however, there have been a-posteriori "cosmetic interventions", then for both statistical and psychological reasons, the distribution of first digits changes. As a result, the likelihood of "cosmetic earning management" can be statistically verified, and at least theoretically, the reliability of a specific financial report can be quantified.

In Croatia, we applied these statistical fraud detection tools to the financial reports of 7 large Croatian public and state-owned companies, and one publicly traded company with a substantial share owned by the state of Croatia. By analyzing publicly available data for the years 2010 and 2011, we found that at a level of significance 1% and less, the financial reports of 7 (out of 16) annual reports deviate from Benford's law.



While these statistical results are not conclusive evidence of accounting and reporting fraud, they should be used as an indication for further focused investigation of the State Auditing Office (SAO).

We explain the methodology of application of Benford's law and its limitations in section 2, including the discussion on why Benford's law is expected to appear in annual reports for companies large enough. We also put our research in the context of similar analysis done, e.g. by Nigrini and Mittermaier (1997) for accounting data, and by Rauch et al. (2011) in analyzing reported Greek macroeconomic data. We then present our findings in section 3.

In section 4, we consider whether our suggested tests and other more sophisticated statistical tools could be used by the State Auditing Office when planning audits, managing internal resources, and performing actual audits. We also propose some changes to the processes and applicable laws regarding SAO in section 4.

## 2 THE APPROACH, METHODOLOGY AND EXAMPLES

### 2.1 BENFORD'S DISTRIBUTION IN FINANCIAL REPORTS

Perhaps counter-intuitively, the frequency of occurrence of first digits in a random collection of data is very often not uniform. It was noted first by Newcomb (1881) that "how much faster the first pages [of logarithmic tables] wear out than the last ones", with a heuristic explanation in the form of Benford's law. Physicist Frank Benford (1938) rediscovered the law. Benford showed that in 20 different tables, "including<sup>1</sup> such diverse data as areas of 335 rivers, specific heats of 1,389 compounds, American League baseball statistics and numbers gleaned from Reader's Digest articles", the occurrence of first digits obeys Benford's law. Several authors, most rigorously Hill (1995a, 1995b) with an explicit statistical derivation, demonstrated that in a collection of approximately independent data of different orders of magnitude, the frequency of the first digit  $d=1, \dots, 9$  is approximately

$$\pi(d) = \log_{10} \left( \frac{d+1}{d} \right) \quad (1)$$

(see table 1 for the actual values).

We can thus observe Benford's distribution of first digits in many statistical samples, e.g. the heights of the tallest buildings in the world; the production of copper/country, and so on. Benford's distribution does not occur if the observed values are from a relatively small range, or if the numbers are assigned (e.g. telephone numbers) or fabricated by people, cf. Nigrini (2000). The theoretical reason for this is that the Benford distribution is the only distribution of first digits (see Benford, 1938) invariant for scaling; that is, the distribution does not change if we for example change the currency. This was rigorously shown by Pinkham (1961).

<sup>1</sup> Summary from Hill, 1995b.

Hill relatively recently gave a more precise theoretical foundation for the ubiquity of Benford's law (Hill, 1995b). He proved that the sum of independent random variables, which themselves have different (random) distributions, has Benford's distribution for sufficiently large samples and collections of random variables. Mathematically, the distribution of the sum of random variables converges in distribution to Benford's distribution, which is a form of the Central Limit Theorem (Hill, 1995b:360)<sup>2</sup>. Hill then concludes (1995b:354) that "This helps explain why the significant-digit phenomenon appears in many empirical contexts, and helps explain its recent application to computer design, mathematical modeling, and detection of fraud in accounting data."

The methods of application of Benford's law in auditing and tax auditing have been developed by Möller (2009), Nigrini (1996), Nigrini and Mittermaier (1997) and Watrin et al. (2008). As a result, today these statistical methods are actively used for example by the Internal Revenue Service in the USA, by the "big four" international auditing companies, and have been implemented as a standard tool in market-leading auditing software tools (e.g. "ACL data analytics"). While these statistical methods cannot prove fraud in financial reporting conclusively, as it is not *a-priori* clear (though probable as explained below) that a financial report obeys Benford's distribution, it can be at the very least used as a "warning tool". Tax offices and auditing companies use it to identify areas where detailed analysis is required, and so manage its resources and accuracy with much more efficiency.

For companies large enough, financial reports are typically assembled as a collection of individual financial reports of different company units. These units are typically of different sizes, have different business scopes, thus the individual distributions of first digits in financials by business unit is expected to be different. By the Hill criterion (1995b), the cumulative financial reports for the entire company should then comply with Benford's law if the company is large and complex enough.

**TABLE 1**

*Benford distribution of first digit,  $\pi(d)=\log_{10}((d+1)/d)$*

D	1	2	3	4	5	6	7	8	9
$\pi(d)$	0.301	0.176	0.125	0.097	0.079	0.067	0.058	0.051	0.046

The statistical tests developed to analyze Benford's law typically start with testing the following standard criteria for the applicability of Benford's distribution (Nigrini and Mittermaier, 1997):

- median is smaller than the arithmetic mean,
- skewness is positive.

<sup>2</sup>Hill, 1995b, p. 360: "Roughly speaking, this law says that if probability distributions are selected at random and random samples are then taken from each of these distributions in any way so that the overall process is scale (or base) neutral, then the significant-digit frequencies of the combined sample will converge to the logarithmic distribution."

Following that, various statistical tests measure the discrepancy of data sets from Benford's law. Given a particular sample, such as a collection of financial numbers from a financial report (balance sheets, profit and loss accounts, cash flows, notes to the report), the appropriate statistical test for the Benford distribution fit is the Pearson  $\chi^2$ -statistics with 8 degrees of freedom (Ramachadran and Tsokos, 2009, section 7.6.3).

$$\chi^2 = n \sum_{i=1}^9 \frac{(\pi(d) - r(d))^2}{\pi(d)} \quad (2)$$

here  $n$  is the size of the sample,  $\pi(d)$  is the Benford probability of occurrence of the digit  $d$ , and  $r(d)$  is the actual relative frequency of occurrence of the digit  $d$  in the data sample. The  $\chi^2$  statistics is then used to verify the hypothesis of Benford data fit and report reliability. Thus the null hypothesis is rejected at 5% significance if the  $\chi^2$  statistic exceeds 15.51, 1% significance, if  $\chi^2$  exceeds 20.09, and at 0.1% significance, if the  $\chi^2$  exceeds 26.13. An illustrative but not entirely accurate interpretation is that it represents 95%, 99%, respectively 99.9% likelihood of fraud.

Another statistics, standardly used for verification of whether the frequency of certain digit significantly varies from Benford's law is  $Z$  statistics:

$$Z_d = \sqrt{n} \frac{|\pi(d) - r(d)| - 1/(2n)}{\sqrt{\pi(d)(1 - \pi(d))}}, \quad (3)$$

where  $d=1, \dots, 9$  is a fixed digit, and  $n$ ,  $\pi(d)$ ,  $r(d)$  is as above. This is for example used in Nigrini and Mittermaier (1997), and further explained in Durtschi, Hilison and Pacini (2004). As checking and analyzing the values of  $Z_d$  statistics for each value of  $d$  is beyond the scope of this communication (this is, for example, typically used to pinpoint locations of possible fraud more precisely), we consider the average of  $Z$  statistics for all digits

$$Z = \frac{1}{9} \sum_{d=1}^9 Z_d. \quad (4)$$

Here the hypothesis rejection values are as they usually are for  $Z$ -statistics.

It is noted for example by Rauch et al. (2011) that  $\chi^2$  statistics is also typically larger for larger samples. To compensate for this and verify the methodology, we also calculate  $\chi^2/n$ , where  $n$  is the size of the sample for each country. In addition, we consider an alternative statistics, the normalized Euclidian distance measure

$$d^* = \frac{\sqrt{\sum_{d=1}^9 ((\pi(d) - r(d))^2)}}{\sqrt{\sum_{d=1}^8 \pi(d)^2 + (1 - \pi(9))^2}} \quad (5)$$

as in Cho and Gaines (2007) and the distance measure

$$a^* = \frac{|\mu_e - \mu_b|}{9 - \mu_b} \quad (6)$$

where  $\mu_e$  and  $\mu_b$  are the average of the first digit in the data and for Benford's distribution respectively, as in Judge and Schechter (2009).

Several authors (e.g. Nigrini and Mittermaier, 1997) also use analysis of frequencies of second, third digits, etc. The Benford distribution of second digits is also non-uniform, and is expected to appear in data samples by the same argument as in Pinkham (1961) and Hill (1996). (One of the authors in Slijepčević (1998) explicitly calculated second digit Benford's frequencies, and proved that they appear in certain series of numbers.) However the variation in Benford's frequencies of second digits is much smaller than the variation of first digits (and this difference diminishes with the third digit and so on), and typically requires large data samples (over 10,000 data points in individual samples in e.g. Nigrini and Mittermaier, 1997).

Finally, we note the similarity of our techniques to those of Rauch et al. (2011), who studied macroeconomic data for various European Union (EU) companies. In a way similar to ours, Rauch et al. (2011) studied a limited set of publicly available (mostly) financial data of different meanings and types, and obtained results quantitatively close to ours. This is similar to our approach to the outside-in analysis of published financial reports, and differs from e.g. Nigrini and Mittermaier (1997), a work analyzing confidentially obtained data of the same type.

## 2.2 THE METHODOLOGY

We focus in our analysis on publicly available data, obtained from annual reports of large companies. Our approach, partially by necessity-driven by the availability of data, differs somewhat from the typical approach in the literature when accounting data are statistically checked for fraud. Typically authors analyze large data sets of transactions of the same or similar type obtained from the companies themselves and not publicly available. For example Nigrini (1996) analyzes the amounts of total interest paid from 200,000 tax returns; and Nigrini and Mittermaier (1997) consider the sample of over 30,000 invoices paid by the same company.

We, however, choose to use all financial data<sup>3</sup> from publicly available financial reports. We then test the hypothesis  $H_0$ : the distribution of first digits in financial reports obeys Benford's law.

<sup>3</sup>In practice, we data mined all the numbers from financial reports (available in pdf format), and then manually excluded all non-financial data (such as years, numbers of employees, etc.).

We explained in the previous section why financial data of large companies should obey Benford's distribution. A valid question is whether the companies in our sample are large enough for a meaningful statistical analysis. We argue that this is indeed the case. In section 4 we show that we obtain statistically similar discrepancies from Benford's law for 4 smaller companies in our sample (defined in accordance to revenue, as these with annual revenue less than 1 billion kuna), and for 4 larger companies. If the studied companies had been too small for this analysis, the statistical deviation would have been significantly higher for smaller companies, as we would not have reached the threshold for which the Hill argument (1995b) applies.

Our approach consisted of five steps: (1) data mining, (2) descriptive statistics and verification of Benford's law in the entire sample, (3) application of  $\chi^2$  statistics, Z statistics and other tests to individual financial reports, (4) ranking of the companies according to  $\chi^2$  and  $\chi^2/n$  statistics, and finally (5) consideration of correlations of findings with the company size, the amount of data, and reported financial results.

Our intention was to analyze all available data for Croatian public companies and institutions, with at least several hundred (in our case at least 300) financial data points. Only 7 public companies satisfied that criteria. We also added one publicly traded company with a large share owned by the State of Croatia (the State is the controlling shareholder), to the sample.

For legal reasons, we do not reveal the names of the companies. In this analysis we denote them consistently with letters A, B, C, D, E, F, G, H. We sorted them so that A is the largest company by annual revenue, and H the smallest. Here A, B, C, D are the "larger" companies, with annual revenues exceeding 1 billion kuna, and E, F, G, H are "smaller" companies, with annual revenues less than 1 billion kuna; but in no case less than 300 million kuna. The companies in the sample cover a range of industries, including financial services, energy, transport and infrastructure, and consumer goods.

Unfortunately, available data for some major Croatian public companies, including Hrvatske šume (National Forests), Hrvatske vode (National Water Company), Hrvatska lutrija (National Lottery), and HAC (Croatian Motorways), were not sufficient, as the published annual reports typically include only sparse balance sheet and profit and loss summaries without details. The published reports on audits of various ministries, public institutions and companies on the web page of the State Auditing Office ([www.revizija.hr](http://www.revizija.hr)) contained in all instances we looked into also too few data points. We would be happy to extend our analysis if given access to further information.

The first step, data mining, included developing a simple software tool to extract all data from an annual report in a PDF format, downloaded from web pages of respective companies. All the data had to be manually checked for consistency. We had to manually verify that the extracted data contain only financial information, and exclude numbers such as years, percentages, etc. We then applied several tools of descriptive statistics as a first check of applicability of Benford's law. We first noted that the cumulative data ( $n=24,596$ ) from the financial reports for all eight companies for years 2010 and 2011 indeed fit Benford's distribution as expected. We also demonstrate that all data sets pass the median vs. arithmetic mean, and skewness tests.

We then ranked the companies and reports (all 16 data samples), in accordance to all five statistics  $\chi^2$ ,  $Z$ ,  $\chi^2/n$ ,  $d^*$  and  $a^*$ . Our analysis will show that rankings are consistent.

We also considered testing the frequency of second (and later) digits. However as explained in section 2.1, our data samples are too small to statistically significantly detect variations in these distributions.

We finally consider as the final step whether our analysis can be interpreted in such a way as to indicate likelihood of fraud. More precisely, our hypothesis is  $H_0$ : discrepancy from Benford's law is not correlated with the reported net income; while its alternative is  $H_1$ : discrepancy from Benford's law is positively correlated with reported losses. The rationale for this is that both the accounting fraud, and reported losses of public companies are expected to be correlated with less competent management and corruption. In other words, we conjecture that public companies reporting losses would report even worse financial results without "cosmetic management" of reports.

We analyze this by first considering the correlation of deviation from Benford's law, measured by  $\chi^2$  and  $Z$  statistics, with the company size. Then we consider the correlation of likelihood of fraud and reported net losses. As our data set is limited and the actual net income numbers are disguised in this analysis, we study correlation by comparing rankings rather than more precise tools such as regression.

### 3 FINDINGS: STATISTICAL ANALYSIS OF ANNUAL REPORTS

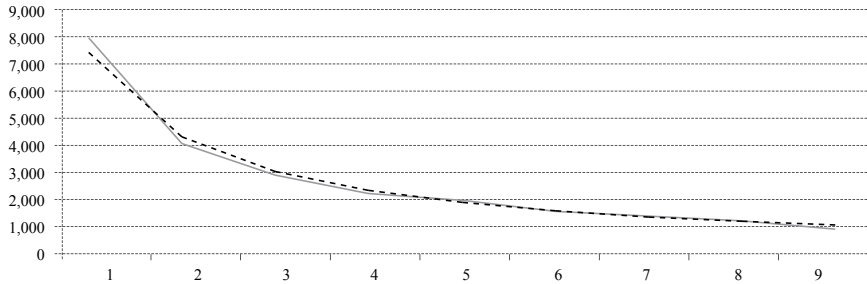
#### 3.1 APPLICABILITY OF THE METHODOLOGY

Prior to applying the statistical tests to the analyzed financial data of eight large public companies in Croatia, we confirmed that Benford's law statistical tests are probably applicable. Firstly, each data set contained at least 300 individual numbers (see  $N$  in table 4). Here we included only financial data, and excluded as

required all other numbers from the financial report. In each instance, we verified that the financial data in the sample indeed includes the values of several (at least four) orders of magnitude.

**FIGURE 1**

*First digit frequency in the cumulative sample (below)*



*Note: We plot the frequency of first digits in the cumulative data set ( $n=24,596$ ) – full line, compared with the expected Benford's law frequency – dashed line.*

We then showed that the aggregate data set, that means all the financial data from all 16 financial reports, complies fairly well with Benford's law, as shown in figure 1 and table 2.

**TABLE 2**

*First digit frequencies in the aggregate data sample (observed and predicted by Benford's law)*

<b>d</b>	<b>Observed</b>	<b>Benford</b>
1	7,911	7,400
2	4,084	4,328
3	2,944	3,071
4	2,280	2,382
5	2,019	1,946
6	1,627	1,646
7	1,459	1,426
8	1,275	1,257
9	982	1,125
Total	24,581	24,581

We compared for each of 16 data sets whether the arithmetic mean is larger than median, and whether skewness is positive, as these are standard "tell-tale" signs for Benford's law (Nigrini and Mittermaier, 1997). As shown in table 3, each of 16 data sets satisfies these criteria. In table 3 we also for illustrative purposes show these numbers for the aggregate data set, and for the actual theoretical Benford distribution. In addition, we list ratios of frequencies of digits 1 versus 2, and 1 versus 9, confirming Benford-like behavior.

**TABLE 3**

*Arithmetic mean, median, skewness, ratios of frequencies if 1 vs. 2, 1 vs. 9; all for 16 data samples, the aggregate data sample, and the Benford distribution*

Company	Year	Mean	Median	Skewness	1 vs. 2	1 vs. 9
A	2010	3.20	2.0	0.91	2.3	11.2
A	2011	3.38	3.0	0.78	2.1	9.6
B	2010	3.30	3.0	0.90	1.7	7.6
B	2011	3.27	2.0	0.86	1.9	8.9
C	2010	3.39	3.0	0.80	1.9	7.4
C	2011	3.47	3.0	0.74	1.8	7.6
D	2010	4.13	3.0	0.41	2.0	2.5
D	2011	3.30	3.0	0.80	2.8	26.3
E	2010	3.72	3.0	0.56	2.0	7.0
E	2011	3.78	3.0	0.58	1.9	4.6
F	2010	3.41	3.0	0.77	2.0	8.4
F	2011	3.57	3.0	0.70	2.0	5.9
G	2010	3.77	3.0	0.63	1.1	3.8
G	2011	3.40	3.0	0.80	1.5	7.7
H	2010	3.02	2.0	1.04	2.0	13.3
H	2011	3.10	2.0	0.95	2.2	13.1
Aggregate		3.38	3.0	0.80	1.9	8.1
Benford		3.44	3.0	0.80	1.7	6.6

### 3.2 STATISTICAL RESULTS AND RANKING

As we show in table 4, we found out by applying the  $\chi^2$ -test, that the annual reports for four companies deviate at the significance level of 0.1% from Benford's law. The same 7 data sets deviate from Benford's law by the average Z statistics at the average significance level of 5% (significance of selected individual digits is thus smaller). We see that in our sample, the  $\chi^2$ -test and the average Z-test "flag" the same data sets, and also have completely consistent rankings.

An additional argument in favor of the possible unreliability of some financial reports is the relative consistency in the ranking of the 16 analyzed financial reports in accordance with all five statistics considered ( $\chi^2$ , Z,  $\chi^2/n$ ,  $d^*$  and  $a^*$ ). Table 4 shows that the annual reports of H and D relatively consistently lead the ranking for all the considered statistics. We conclude that the financial reports of H, D, and F for both years 2010 and 2011, and A for the year 2010 should be scrutinized by the authorities.

In table 5 we compare the size of data set and the values of  $\chi^2$  and  $\chi^2/n$  statistics with the aggregate values from Rauch et al. (2011) and find out that our data behave similarly, as the key values are within the factor 2 of the ones reported in Rauch et al. (2011), as shown in table 5. This is relevant, as Rauch et al. (2011) report on data with known "cosmetic management" of reports, and as such a useful benchmark.



TABLE 4

Results of statistical tests and ranking

Company	Year	N	$\chi^2$	Z	chi/n	Ranking				
						$\chi^2$	Z	chi/n	d	a*
H*	2010	2,120	111.7	3.02	0.053	1	1	4	5	3
H*	2011	2,230	84.8	2.54	0.038	2	2	5	6	4
D*	2011	294	67.3	2.45	0.229	3	3	1	2	10
D*	2010	293	59.0	1.97	0.201	4	4	2	3	2
F*	2010	2,353	37.0	1.88	0.016	5	5	10	11	15
A*	2010	1,135	32.2	1.70	0.028	6	6	7	7	8
F*	2011	2,577	29.8	1.65	0.012	7	7	12	1	1
E	2010	641	23.3	1.23	0.036	8	8	6	8	7
A	2011	1,272	19.9	1.24	0.016	9	9	11	12	12
G	2010	275	18.6	1.25	0.068	10	10	3	4	6
E	2011	751	16.9	1.17	0.022	11	11	8	9	5
C	2011	4,216	16.1	1.02	0.004	12	12	15	16	16
B	2011	891	14.7	1.03	0.016	13	13	9	10	9
C	2010	3,709	10.9	1.02	0.003	14	14	16	15	13
G	2011	1,027	7.9	0.80	0.008	15	15	14	14	14
B	2010	812	7.7	0.80	0.009	16	16	13	13	11

Note: N – the size of the sample. Statistical tests and their ranking as explained in section 2.2.

\* Companies and reports deviating from Benford's law at significance level of 0.1% ( $\chi^2$  test), respectively 5% (the average Z test).

TABLE 5

Comparison of the aggregate data sets in our sample and Rauch et al.

Aggregate data set	Size of the sample	$\chi^2$	$\chi^2/n$
Our analysis	24,596	80.87	0.0033
Rauch et al. (2011)	39,691	69.64	0.0018

### 3.3 CORRELATIONS OF RESULTS

As discussed in section 2.1, it is a valid question whether the analyzed companies and data samples are large enough for them to be expected to comply with the Benford distribution. Extrapolating from our limited data sample, it seems that in Croatia, companies with at least 1 billion kuna annual turnover are large enough for meaningful analysis. In table 6, we show the number of data samples identified as significantly deviating from the Benford law, as explained in the previous section (7 in total). We sort them by company size. We see that, at least in our small data sample, there seems to be no significant correlation of company size and compliance with Benford's law. We conclude that at least the four larger companies in our sample are large enough for this type of scrutiny. If this were not the case and the companies in our sample were not large and complex enough for Benford's law to occur (in accordance with Hill's argument discussed in section 2.1), we would have observed a significantly better Benford fit for larger compa-

nies. We note that these conclusions are preliminary, and we plan to study them further on larger company samples.

**TABLE 6**  
*Number of data sets/reports, by company size*

	Small companies**	Large companies**
Not Benford*	4	3
Benford*	4	5

\* *Not Benford: seven reports in the table 4, significantly deviating from Benford's distribution.*

\*\* *Small companies: up to 1 billion kuna annual turnover. Large companies: over 1 billion kuna annual turnover.*

Finally, we consider whether there is a correlation between the deviation from Benford's distribution and reported net losses. As already explained in section 2, such correlation would indicate that our method of fraud detection is effective. We focus on 4 larger companies, named A, B, C, D, as the previous discussion suggests they should be large enough to comply with Benford's law. In table 7 we list rankings of all eight reports for these companies, in terms of  $\chi^2$ -test of compliance with Benford's distribution (1 being the most deviant one). We compare this with the ranking of their (pretax) net income/annual revenue ratio (I/R), where 1 correspond to the company with the largest reported losses. Here companies A and D reported losses in both years 2010, 2011; while companies B and C reported positive results. Finally, we rank it in accordance with the reported pretax net income.

**TABLE 7**  
*Rankings of companies A-D with respect to  $\chi^2$ -test compliance with Benford's distribution, pretax net income/annual revenue (I/R), and the pretax net income (I)*

Company	Year	Ranking		
		$\chi^2$	I/R	I
D	2011	1	1	1
D	2010	2	2	4
A	2010	3	3	2
A	2011	4	4	3
C	2011	5	8	7
C	2010	6	5	5
B	2011	7	6	6
B	2010	8	7	8

*Note: For  $\chi^2$ -test, companies ranked from the most deviant from Benford's law (1) to the least (8). For I/R, I, the companies ranked from these with the largest reported losses (1) to the ones with the most positive result (8).*

We find it significant and revealing, that indeed the rankings in table 7 seem to be correlated. In particular, the 4 reports with the largest deviation from Benford's

law are also the 4 reports with annual net losses, and their rankings of  $\chi^2$ -test (and average Z-test) and I/R coincide. A possible interpretation is that the losses of companies A and D were even larger than reported, and then cosmetically reduced in the final published reports. Again, this analysis is preliminary, and we hope to study it further and confirm for sets of more companies, large enough for a more precise analysis (e.g. linear regression, etc.).

#### 4 SUMMARY AND CONCLUSION

Accounting data are collected from a wide variety of sources. Benford's law, which defines the empirical distribution of first digits in diverse data sets, can be used to detect manipulated data in financial reporting. We showed that the financial data of large Croatian public and state-owned companies do on average comply with Benford's law, while we found indication of reporting manipulation at the significance level of 1% and less for several of them. Furthermore, we found indication of correlation of deviation from Benford's law, and reported losses, which is a further indication of reporting fraud.

Here we outline possible implications and recommendations regarding the operations of the State Auditing Office in Croatia. In table 8 we list the year for which SAO completed the audit for the considered companies. It is perhaps striking that for the eight analyzed companies, we found in total only 5 SAO audits for the last five full reporting and audited years 2006-2011. The only company from the considered ones audited for 2011 is company D, where SAO had a qualified opinion.

**TABLE 8**

*The last years audited by the State Auditing Office*

Company	Year
A	2009
B	N/A
C	N/A
D	2011
E	2009
F	N/A
G	2006
H	2007

*Source: Državni ured za reviziju.*

Independent auditors, however, audit yearly financial statements of the analyzed companies. The auditors auditing analyzed companies include Ernst&Young, BDO Croatia and Deloitte. We found audited annual reports for 7 companies from our sample; and for one of them we could not find a report.

We believe there is a need for more frequent and thorough audits by SAO. We give a few supporting facts. SAO audited in 2012 (i.e. for the year 2011) 23 state owned

companies, and issued only 2 unqualified opinions, 20 qualified opinions, and one adverse opinion, as reported in the State Auditing Office (Državni ured za reviziju, 2012). In the specific comparable case of company D, its auditor issued in the annual report an unqualified opinion for 2011, contrary to the SAO opinion. The company management chooses the independent auditor, thus possibly it may have some influence over its opinion in particular in the current challenging market conditions in Croatia. In any case the scope of the SAO audit is typically wider than that of the independent auditors, as it includes for example verification of compliance with public procurement procedures.

SAO audits only the most important and largest public institutions annually and all the others much less frequently, as noted in table 8 and clearly visible in the list of executed audits on [www.revizija.hr](http://www.revizija.hr).

We believe that incorporation of the statistical methods including but not restricted to Benford's law  $\chi^2$  and  $Z$  statistics could improve effectiveness and efficiency of SAO. For example, SAO could:

- more frequently (at least once annually), in a relatively automated way, look for statistical indications of “cosmetic manipulations” for all public institutions and companies,
- focused audits could then be performed for the subjects with significant deviations,
- statistical methods could also assist auditors in focusing their work when auditing a specific subject.

We believe in such a way SAO could, even with the existing, surely limited and constraining, resources, perform better its public service.

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# Global Financial Development Report 2013: Rethinking the Role of the State in Finance

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Book review by MARIJANA BAĐUN\*  
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Both markets and governments fail. Government intervention is most often advocated in order to correct market failures but government officials can use state power to achieve different goals: help friends, families, cronies, and political constituents. When this occurs, the government can do serious damage in the financial system.

The World Bank's first-ever *Global Financial Development Report* re-examines a basic question highlighted by the crisis: what is the proper role of the state in financial development? In the Report the state includes not only the country's government but also autonomous or semiautonomous agencies such as a central bank or a financial supervision agency. As it is usually the case with World Bank publications, the Report is very user-friendly. It is organized in five chapters and each of them has the main messages highlighted at the beginning. Moreover, there is an "Overview" that summarizes the whole Report. The publication also has an accompanying website (<http://www.worldbank.org/financialdevelopment>) that contains new datasets and research papers.

What are the main messages highlighted by the authors in the Report? Firstly, there should be caution when it comes to the state's role in financial development. Active state involvement may be helpful in the short run but there is also evidence of potential longer-term negative effects. The state has an important role in providing supervision, ensuring healthy competition and strengthening financial infrastructure, but direct interventions are less welcome. Secondly, incentives are crucial in the financial sector. Policies aimed at the financial sector should better align private incentives with public interest without taxing or subsidising private risk-taking. Thirdly, when it comes to regulation and supervision, the basic ingredient is a solid, transparent and not too complex institutional framework. Supervisory action should be strong, timely and anticipatory.

Fourthly, competition is good; it can improve efficiency and enhance access to financial services without necessarily undermining financial stability. Instead of restricting competition, it is necessary to deal with distorted competition, improve the flow of information, and strengthen the contractual environment. The state should encourage contestability through the healthy entry of well-capitalized and the timely exit of insolvent institutions. Fifth, lending by state-owned banks can play a positive role in stabilizing aggregate credit in a downturn, but it can also lead to resource misallocation and deterioration of the quality of intermediation due to the serving of political interests. Oversight of state banks is challenging, especially in weak institutional environments. Finally, the state's role can be useful in promoting transparency of information and reducing counterparty risk, particularly when there are significant monopoly rents that discourage information sharing. These are the common lessons and guidelines but appropriate policies differ across countries and time.



The Report makes it clear that the main reasons, besides macroeconomic factors, behind the global financial crisis were major regulatory and supervisory failures. The main weakness in the pre-crisis approach was that it focused on risks to individual institutions and did not sufficiently take into account systemic risk. The second weakness was that regulation and supervision of banks, insurance and securities markets was not complemented by strong oversight at the financial group level. This enabled transactions to be carried through entities that were subject to weaker regulation, or even to completely avoid regulation. Third, some regulations were poorly designed, for example the Basel capital adequacy measures considerably misrepresented the solvency of banks. Fourth, implementation of the rules was constrained by the capacity and incentives of regulators and supervisors. Financial institutions grew too complex and became interconnected. Some regulators lacked independence and others found it difficult to resist pressures and temptations coming from the financial industry.

Common features of non-crisis countries were: a more stringent definition of capital, higher capital levels, and a less complex regulatory framework. They had stricter auditing procedures, limits on related party exposures and asset classification standards. In addition their supervisors were more likely to require shareholders to support distressed banks with new equity. Furthermore, non-crisis countries were also characterized by better quality of financial information and greater incentive to use that information – among other reasons because they had relatively less generous deposit insurance coverage.

The Report stresses that “finance is central to development”. In other words, “finance matters, both when it functions well and when it functions poorly”. Almost the same message was given in the Foreword of another World Bank (2001) report published more than a decade ago. The authors of both reports claim that finance causes economic growth and even though they acknowledge that there are different opinions on this issue, the references they quote are from the last century (e.g. Lucas, 1988; and Robinson, 1952). The authors ignore a vast recent literature that casts doubt on finance as an engine of growth (for a literature review see Badun, 2009).

Researchers working at the World Bank must be given a lot of credit for collecting and organizing data in a new *Global Financial Development Database* (available online), which is a great supplement to previously released *Financial Development and Structure Dataset*. The former has data organized in four main categories: financial depth, access, efficiency, and stability. It shows that financial systems widely differ.

Even though conclusions and policies from the Report seem straightforward, an impression stays that it is all easier said than done. The introductory sentence from the 2001 Report was: “As the dust settles from the great financial crises of 1997-

98, the potentially disastrous consequences of weak financial markets are apparent”. The dust has still not settled from the last financial crisis, far from it, but the mere fact that it happened again shows that John Steinbeck was partly right when in *The Grapes of Wrath* he wrote: “The bank is something more than men, I tell you. It’s the monster. Men made it, but they can’t control it.” However, the same could be said about government.

It seems that the relationship between government and banks/financial sector will always be strong because history shows that crises are inherent to the financial sector, which means that bankers will always be looking for a safety net and rescue by the government. In addition, bankers have a vested interest in promoting government deficits, which they finance and earn interest on that. Furthermore, the government has a constant conflict of interest since it both regulates banks and uses them as a source of finance. Also, government officials are not benevolent social planners and they will try, if not prevented by law, to maximize their own wealth, not social welfare. Finally, banks can capture the regulators. In the end, the taxpayers or future generations of taxpayers “foot the bill” of this complex relationship.

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