Public Debt Accumulation in Hungary Outlier in what sense?

> By Réka Nagy

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Supervisor: Professor Attila Folsz

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Abstract

Exclusively looking at the last decade of public debt accumulation in European member states it seems Hungary with its increasing debt ratio before the crisis and downward trends afterwards is an absolute outlier within its region and also diverges from dominant European trends. This thesis examines whether Hungary is an outlier once the covered time period is extended, and how can we best describe with a general economic model the differences within Europe when it comes to fiscal overspending and public debt accumulation. Building on the theoretical models of Barro, Alesina and Battaglini, this study uses a time-series panel data analysis on EU member states to examine the explanatory power of different empirical models to describe the trends of public debt accumulation and the role of political distortions within this process. The statistical analysis has found strong evidence that those empirical models, which controls for the interaction effects between political distortions and the general state of the economy have more explanatory power in describing long-term public debt trends. Since the analysishas found no specific country effect in Hungary, therefore the unique features in the last decade could be attributed more to the specificity of the Hungarian political systems, its higher initial debt rate inherited from the socialism and a time lag its natural long-term cycles of public debt accumulation compared to other countries in the region.

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Introduction

I have spent most of my Bachelor studies sitting in economic policy classes, learning how the Hungarian fiscal policy diverged from regional and European trends by choosing a procyclical fiscal policy and public debt accumulation in the first decade of the new millennium. Indeed, if one looks at the fiscal trends during this period (2000-2008), is seems clear that Hungary was the only Central European member state with an increasing debt ratio and that this was a relatively rare phenomenon within the whole EU as well. Furthermore, in the Central European region gross public debt was below the level given by the Maastricht Treaty in all cases except in Hungary where the debt ratio was far above the regional average (33%) - although yearly fiscal deficits typically exceeded 3% of the national GDP in a number of countries. On the other hand, in the aftermaths of the crises when countercyclical fiscal policies were more prevalent, Hungary made efforts to decrease its public debt stock. Overall, the statement about Hungary as an outlier stands on three pillars: the extensive debt accumulation prior to the crisis, efforts towards debt reduction after the crisis and a significantly higher debt rate compared to the region.

My thesis addresses the following research questions. Firstly, it looks for a general model that can describe this relative outlier role of Hungary by analyzing processes and factors that led to extensive public borrowing before and procyclical policies after the crisis here, while other countries in the region experienced the exact opposite, namely fiscal rigor and decreasing debt rates prior to the crisis and fiscal loosening after. Secondly, it questions whether we can speak of the Central European region as one in the terms of public debt accumulation based on its common characteristics. My thesis addresses the possible explanations of this phenomenon, namely, identifying the possible factors that led to the view that Hungary is an outlier in the region when it comes to its debt accumulation. To examine whether this statement holds in an extended time period with a broader set of countries, this study uses a time-series panel data analysis to examine the explanatory power of different empirical models to describe the trends of public debt accumulation and the role of political distortions within the process. To analyze these questions, I will rely on the debt models of the positive political economy literature, because since the early nineties it has developed several general theoretical and empirical models that explains the cross-country phenomena of public debt accumulation (Alesina and Tabellini 1990, Persson and Svensson 1989)which allows to handle a larger set of countries over an extended time period. Choosing this approach has the advantage to rely on a well-established literature, both theoretically and methodologically.

Therefore as theoretical basis different models within the positive theories of the new political economy are used, with possible empirical classifications. This includes the neoclassical tax smoothing model of Barro (1973) as baseline model, and other approaches commonly used to explain the effects of institutional differences and political distortions, such as the theory of fiscal illusions (Buchanan and Wagner 1977) and rational opportunistic and partisan models (Alesina and Tabellini 1990, Persson and Svensson 1989, Alesina et al 1997, Alesina and Drazen 1991). Besides the usual models, this analysis includes the empirical test of a relatively new model by Marco Battaglini (2011) – one he identifies as the general theory of public debt. IŰ including this particular model is important as it provides an understanding of how the general economic environment and the initial level of public debt interacts with political distortions in defining present levels of government overspending. Although it is not first example of an empirical classification of this model, prior analysis focus on the US (Barseghyan, Battaglini and Coate 2013) it is also the scope of this paper to develop such an empirical model that can be used for cross-country analysis.

Although the analysis covers all member states of the European Union, the primary focus is the Central European region, and more specifically Hungary, since it is a region where the debt accumulation trends are relatively uncovered in the literature. Most literature on the ongoing sovereign debt crisis of Europe focuses on 'problem states' in the euro area, their unsustainable level of public debt, and the ways of a possible budget consolidation. However, some states in the Eastern region of the European Union had to face similar crises in public finances, even where debt levels were well below the usual rates considered sustainable. Therefore, these countries also had to commit themselves to the consolidation of their fiscal policies to maintain the funding on the international markets. As the long term trends of the accumulation and reduction of public debt is the result of several political and economic factors, the study of these effects in the past may contribute to a better understanding of the possible future path of public debt, given a certain political and economic environment. In this sense, the study of long-term trends of debt accumulation in the region is necessary to understand the underlying factors behind these budget cycles. Although empirical models of debt accumulation are relatively well covered in the literature (Alesina, Roubini, and Cohen 1997, Reinhart and Rogoff 2010),they mostly focus on the United States and OECD countries. This study aims to partially cover this gap in the literature, by providing a test for different empirical models of debt accumulation in the European Union, including several postsocialist countries.

The structure of this draft can be described as follows. The first chapter provides an overview about the existing discourses about the Hungarian case and a possible periodization of the cyclicality in public debt accumulation. Secondly, the theory chapter presents the theoretical development regarding the question of public debt and fiscal policies within the paradigm of positive political economy. Different approaches presented in this chapter are a) the Keynesian theory of public debt, b) the neoclassical tax-smoothing model of Barro, and c) concepts within the New Political Economy such as the non-rational opportunistic model of political business cycles and fiscal illusions, rational opportunistic and partisan models. The chapter also presents in detail an integrated model developed by Battaglini based on the partisan model of Alesina and Tabellini and the neoclassical tax-smoothing model. The third chapter presents a possible methodology of the empirical test of the models presented in the theory section. It firstly presents a possible conceptualization and definitions of the dependent and main independent variables and also an OLS regression model, based on the work of Alesina, Roubini, and Cohen (1997). The forth chapter summarizes the results of the empirical test by highlighting the lack of any

specific country effects regarding Hungary, a strong evidence for a unique Central European regional effect and the benefits of using the integrated model of Battaglini to describe debt accumulation in a dynamic framework.

1. Public debt accumulation in Hungary: a historical overview

The present chapter provides a historical overview about the last two decades of the Hungarian debt accumulation in three sections. It aims to describe the specific context and a historical aspect that supplements the following statistical analysis. The first section presents a general conceptualization of public debt accumulation so the readers can get familiar with the basic concepts and definitions. The second describes the post-socialist history of the Hungarian fiscal policy as a sequence of cycles characterized by increasing public debt, debt crises and fiscal consolidation by providing a possible periodization of such cycles. The third section is a comparative regional overview that aims to identify the specific nature and characteristics of the Hungarian "outlier-ness": the specific indicators and measurements to describe in what sense should we consider Hungary as an outlier, and whether there a general regional trend where Hungary does not fit?

1.1 Conceptualization of public debt

Public debt can be conceptualized in different ways, although in general it is true that it expresses the external financial needs of the public sector and that it is also related to the external financial needs of the national economy. The external financial need of the national economy equals the sum of the net lending position of each domestic sector. This is the same as the net borrowing position of the economy. In this section, I will use the concepts and definitions used in working papers written by analysts of the Hungarian Central Bank. Although this does not represent officially the central bank approach I assume that it is a close approximation. (Antal 2006)

In this sense, the net borrowing position of the national economy can be described by the following equation that in overall represents the external financial needs of the whole economy:

NB ext = NL PUBLIC + NL HOUSEHOLDS + NL CORP (NL NON-FIN; NLFIN)

If the sum of the net lending capacities (NL) of each domestic sector is negative then the national economy as a whole is in a net borrowing position (NB). In this case, the national

economy needs external funding. However, even if there is a need for external financing in the economy it does not necessarily means external debt accumulation – as one can differentiate between external funding according their consequences in debt accumulation: the ones generating debt obligation (such as government bonds, private credit, credits for the central bank) or the ones that generate no debt obligations (such as foreign direct investment).

In general, external funding of the public sector and domestic households usually creates debt obligation while the financial needs of the corporate sector can rely either on credit or investment. Credit by nature creates a debt obligation while foreign direct investments, portfolio investments, shares, and equities and other capital inflows create no debt relations and obligations within the corporate sector. External debt of the national economy is therefore arises when the external financial needs are financed through credit. Public debt on the other hand arises when the net lending position of the public sector is negative. If domestic households are incapable or unwilling to finance the financial needs of the government through investing their saving in treasury bonds then there is an increasing share of external sources within the structure of the public debt.

Based on this general overview, I argue that the main concepts defining public debt can be captured along the following terms. On the flow side, in each fiscal year governmental fiscal deficit captures the external financial needs of the government. These financial needs are generated within different parts of the public sector – general government means the public sector as a whole including the main sectors of the central government, local government and social funds. In case of a positive primary balance, the general government generates a surplus during its normal operations without the costs of debt service. Therefore in this case the government is in a financial position that reduces debt obligations in the long run. Therefore changes in public debt, as the percentage of GDP, can be described as this equation:

 $\Delta b = (Debt \ service - Primary \ balance + Other) / growth$

In years when the general government has a negative financial position there is fiscal deficit and it results in debt accumulation. The general stock of the accumulated public debt is usually divided by the maturity of government bonds and the residence of its owners. Therefore one can distinguish between short-term and long-term debt obligations as well as external and internal public debt. Also, regardless whether it is from domestic or foreign creditors, public debt can be denominated in either domestic or foreign currency. So we can speak about domestic government debt nominated in foreign currency in cases when debts issued under national jurisdiction are denominated in a foreign currency.

According to Carmen Reinhart and Kenneth Rogoff (2010) there is an additional category of debts called hidden debt. Hidden debt is not an accounting category but a concept used for contingent government liabilities. The authors differentiate between explicit guarantees, debt of the central banks, off-balance sheet debts or any other obligation, quasi-fiscal activities not included in official accounting or statistics. Hidden debt are usually realized in official statistics with a time lag, therefore it can cause some distortions in my research that aims to quantify the relationship between political distortions and the dynamics of debt accumulation.

1.2 Periodization of the Hungarian public debt accumulation and a general overview

There is seemingly consent about the interpretation of the past two decades of public debt accumulation among Hungarian scholars. As for the present situation, there is some disagreement whether we should interpret it as a sovereign debt crisis or as a debt trap accompanied with stagflation (Mihályi 2013). About the reasons there are also different views, the ones seemingly dominating the discourse are the responsibility of the ruling elites and the fiscal alcoholism theses (Kopits 2006). Within the responsibility of the ruling elites argument there are a number of phenomena listed such as political business cycles, the role of hidden debts and creative accounting (MNB 2006) or the

responsibility in spending the credits in an inefficient wasting way until a liquidity crisis appears along a similar logic as in a war of attrition game.

In his summarizing piece Mihályi (2013) argues that the specific timing of changes in long-term public debt trends in Hungary primarily depends on the moments when the economy turns into a liquidity crisis. As he argues, since 1956 it is only the fear of a sudden sovereign default and the accompanying threats that could result in a change of the general government overspending and increasing debt paths. About general characteristics of the Hungarian public debt accumulation, based on my research, I agree that there is a general political bias towards public overspending when the economy is a good general shape and the macroeconomic variables, such as inflation, interest rates and growth are relatively stable and when the debt rate reaches an upper threshold the general increasing trend changes decreasing one. On the other hand, the nature of the political distortions that caused government overspending in "good times" is relatively under covered by Mihályi and others.

To follow the general logic of the previous section I will firstly briefly present the overall trends of external financial position of the economy, and different sectors. Secondly I will present the trend of public debt accumulation in the last two decades along with a possible periodization.





To characterize the overall external financial position of an economy, the balance of trade is a good starting point as it is often some change in the terms of trade that generates the underlying

Source: KSH

imbalances behind changing debt ratios and structure. As Figure 1 shows, before 2008 the balance of trade was mostly negative, although the trend was improving in the new millennia, that is a slightly surprising result given the growing competition the economy had to face with the EU adhesion. After 2008 the sharply declining domestic consumption led to a trade surplus as well.

When we are looking at the financial position of each domestic sector, as presented in Figure 2, it becomes clear that the external financial need of the economy stabilized on a high level before the crisis – between 5 and 10% of the GDP. The high government deficits till 1995 were accompanied by high household saving and from 2002 increasing government deficits were parallel with the sharply decreasing saving capacity of domestic households. Therefore we can imply that there was a high share of foreign assets in the public debt structure during this time that increased the overall vulnerability of the government budget.





As presented in the previous chapter and in Figure 3, changes of the Hungarian public debt rate are the results of three basic components: a) the primary balance depending on the government decision about public spending, b) real variables such as growth and interest rates on government

Source: Hungarian Central Bank

bonds that depends more on the general shape of the national and international economy. On one hand, liquidity crisis– that is most often happens because of the shock of a domestic or international economic crisis – results in a one-time sharp increase in the effects of real variables on debt rate. On the other hand, electoral cycles result in increasing primary deficits, while stabilization program means better performance in the primary balance as well. The component 'other' is usually linked to economic and liquidity crises as well, since government expenditures aimed to consolidate the financial sector or other sectors in crises are included in this.

About general characteristics of the Hungarian public debt accumulation, based on my research, I agree that there is a general political bias towards public overspending when the economy is a good general shape and the macroeconomic variables, such as inflation, interest rates and growth are relatively stable and when the debt rate reaches an upper threshold the general increasing trend changes decreasing one.





The periodization of the Hungarian debt cycles became a crucial question in the literature due to its relevance in the domestic political scene and its relation to electoral cycles. A possible

Source: Neményi (2011)

periodization of the Hungarian public debt accumulation is one that identifies it as a history of periods of debt accumulation until a critical threshold that eventually turns into a period of fiscal consolidation to avoid the escalation of a possible debt crisis.¹Based on this understanding, the longterm trends of the Hungarian public debt accumulation after the transition could be classified as the following four time periods:

- 1990-1995: intensive debt accumulation due to high deficits and hidden debts of the socialist economy (bank consolidations etc.)
- 1995-2001: decreasing public debt stocks due to fiscal consolidation and privatization incomes
- 2001-2008: debt accumulation due to procyclical fiscal policy, intensive government overspending "in good times"
- 2008-2012: consolidation of the debt accumulation due to the fiscal consolidation in primary deficits, and along with an IMF loan and "unorthodox" fiscal policies including the nationalization of private pension funds

It worth to mention that such periodization has its own limits as it has to rely on data reported in the official statistics and there is a certain political distortion that could lead to "hidden debts" that enters the official statistics with a time lag compared to its actual realization (Reinhart and Rogoff 2010). In the Hungarian case it is an additional limitation, that the country left its socialist era behind with a stock of public debt (67%) therefore the cost of debt service has a continuingly high influence on future debt trends while it is influenced more by real variables than governmental decisions. In the following, I will present the core explanatory factors of these cycles, as they appear the existing literature. The structure of this overview follows the periodization by describing the discourses around the Hungarian public debt related to each period.

Figure 4: Public debt in Hungary as the share of GDP

¹For alternative periodizations see Muraközy (2008) and Neményi (2011)



1.2.1 Socialist legacy: prior to 1990

At the time of the transition, public debt in Hungary was around 80% as a result of a decade length debt accumulation. This chapter summarizes the main factors that could possibly have resulted in this accumulation during the socialist period. There are three core approaches about the causes of the state indebtedness under socialism. The first approach identifies the consumption boosting policies under the so called "goulash communism" as the cause of government overspending in the period. The second approach argues that the reform communist system is inherently unable to adjust to changing environment or correct emerging imbalances in trade or public finances and therefore it leads to steady and massive debt accumulation over time. The third major approach blames the worldwide economic crises of the seventies that eventually resulted in the foreign trade imbalances and dramatically rising interest rates. (Lóránt, 2010) Naturally, the reality of public debt accumulation under the period was the combination of all three factors.

In the seventies the first alarming sign was the increasing import gap that led to a chronic deficit in the foreign trade balance. As we can see in Figure 1, from 1956 there was a trend of increasing volatility in the trade balance that could be described as temporal imbalances followed by consolidation measures, although the phenomenon of trade imbalances only escalated following the oil crisis in 1973. Following the oil crisis, a sharp increase in energy prices led to a growing cost of the aggregate import that eventually led to a 20% increase in exchange rate

index. Consolidation measures started only in 1978 and from that on the foreign trade balance showed stabilizing tendencies with net surplus around the transformation. (Lóránt 2010)

Despite the consolidation of the external trade balance, the external debt of the Hungarian economy kept growing in the eighties mostly because of exchange rate depreciation and the high interest rates of the era. The external debt therefore rose by 14,4 billion dollars between 1970 and 1990.

The other of the most often cited factor of the socialist legacy in relation with public debt accumulation is the unsustainable system of social benefits. Although the main factor behind growing external debt was the growing debt service, there was also a major change in the net lending position of domestic households.

Figure 2: Public expenditures (% of GDP)



After 1956 the former policy goal of reducing domestic consumption was changed to a policy promoting household consumption. The system of extensive social benefits was only established in the eighties when public expenditures related to social policies, in the percentage of the GDP, was well above the OECD average with 25.2%.

Source: Muraközy 2008

To summarize, external factors like growing energy prices and interest rates and internal factors as policies to boost domestic consumption led to imbalances in public finances and the socialist system proved unable to adjust to these changes.

1.2.2 Public debt in the transitional crisis and the following consolidation

While the socialist legacy is obviously important when it comes to the long-term trends of public debt, it is also true that the defining structural characteristics of present debt structure and path are can be trace back to the nineties. At the time of the transition the net external debt reached 70% of the GDP and public debt was close to 80%. While there were examples of the opposite strategy in the region (Das et al 2012, Mihályi 2010), the post-transition government decided to keep themselves to the original agreements without trying to renegotiate the conditions of the public debt. (Oblath and Pulai 2000).

The stabilizing trends in the trade balance turned into sharp deficits again but the integration into international capital markets led to an increase in foreign direct investments coming to the country. FDI inflows rose sharply after 1995 mostly due to privatization incomes and the positive external trade balance before 1992 was due to the delayed central bank consolidation as the central bank financed the state through government bonds with zero interest rate (Oblath and Pulai 2000).

The trend, that electoral cycles affect heavily fiscal cycles, started in the nineties as well. Although, even if I consider the trends that there is fiscal loosening before and consolidation after the elections, the primary balance showed a stabilizing pattern following the consolidation program in 1995. Therefore 1995 is considered as a turning point in the long-term public debt path with extensive debt accumulation between 1990 and 1995 and decreasing public debt between 1995 and 2002 (see Figure 4), this cyclicality with negative primary balances prior and positive primary balance after 1995 is visible in Figure 5.

As it is visible in Figure 6, in the first period, between 1990 and 1995, there was a sharp increase in public debt rates. This was related to two major factors. Firstly, the sharp decrease in the economic output after the transition from socialism into a capitalist democracy – to demonstrate this, the GDP fell by more than 18% between 1990 and 1993, that was a 4.9% fall on a yearly average – which resulted in falling revenues of the general government on one hand,

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and a decreasing projection base on the other. Secondly, consolidation programs related to the financial markets such as bank consolidation increased the debt rate by approximately 10% during the period (Oblath and Pula 2000). The terms of debt service were favorable in the beginning of the ninetieth as real interests on public debt were mostly negative due to high inflation and extensive public borrowing from the central bank that created hidden costs of the debt in central bank balances – only consolidated in 1996.





Source: MNB

Following the consolidation measures over 1995-2000 public debt reached its historic low by falling under the 60% defined in the Maastricht criteria. This decrease in the debt ratios was mostly due to privatization incomes and positive primary balances over the period. Furthermore, household consumption in this time was still below the average consumption at the time of the transition while the corporate sector covered its funding needs by mostly direct investments.

1.2.3 The Hungarian public debt after 2000

Generally speaking the Hungarian government started the new century in a favorable financial position thanks to the consolidation policies of the second half of the ninetieth. However, between 2000 and 2006 – an adequate periodization if we consider the costs of the government budget hidden from official statistics as seen in Figure 6 – the Hungarian governmental budget experienced outstanding relaxation by international standards. Following this period of relaxation, there was late and ineffective consolidation program that was unable to change the upward trends till the beginning of the international financial crisis or 2008.

This section discusses the possible reasons as they appear in the arguments of Hungarian authors. Although there was a consolidation program started by 2006 the unfavorable changes in the credit conditions following the crisis along with the fall of GDP led to a sharp increase in the public debt. There was even a threat for sovereign default just following the default of the Lehman Brothers that led to a large IMF credit to restore confidence in the country financial position. Similar crisis of trust happened in other regional countries as well but the Hungarian case was special due to its traditionally high share of foreign resources denominated in foreign currencies that caused increased vulnerability.

Generally speaking, Hungary has faced the new millennia from a relatively favorable financial position due to the fiscal rigor of the previous years. However, due to the fiscal alcoholism after 2000 the levels of the Hungarian public debt and fiscal deficits rose to unprecedented levels in a regional comparison





Source:MNB

From a comparative perspective, in the beginning of the new millennia international trends showed decreasing public debts: the EU average debt ratio decreased by policies decreased by 7% between 2000-2007 and average deficit was under 3% as well. New member states followed these trends accompanied by average debt levels well below the Maastricht criteria of 60%. On contrast, the Hungarian trend followed an outlier pattern over the period with high average deficits between 5-10%. This outlier position will be discussed in more details in the following sections.

There were two major policy shifts during the period, that both resulted in overspending: Firstly, in 2000 György Matolcsy took office as the Minister of Economy and secondly, from 2002 the new socialist government introduced policies to increase real wages, the so-called welfare regime change. As Neményi (2011) calculated the most of the increasing debt stocks could be deduced into three main factors behind this trend were: the general policy with the aim of increasing real wages (most prominent after 2002), new costs appeared in the balance that were formerly accounted separately due to creative accounting policies and the three-pillar pension reform meant a 10% increase itself. While internationally the period was characterized by cheap credit, in Hungary this was not true due to increasing political risk premium on government bonds. By 2006 the debt rate was above 66%, although until 2007 growing economic output covered the costs of debt service.

About the reasons of this fiscal loosening there is a relative consent within Hungarian authors. As core underlying trends there are: a) policies of the welfare regime change, b) public investment policies, and c) inconsistencies between fiscal and monetary policies.

a) Welfare regime change. After 2002 most of the increasing deficits could be trace back to the welfare and public employment policies of the time. Already between 2000 and 2004 the partly state-funded housing loans meant the first step in this direction (Hegedus and Somogyi 2004) through its interest subsidies. After 2002 a large-scale wage increases in the public sector was the second pillar of the increasing welfare related expenditures. The third element

- also in 2002 – was the introduction of 13rd month long pension payments, that further increased the fiscal tensions created by the pension reform of 1998 with partly privately funds.

- b) Public investment policies. Especially after 2004 due to the available structural funds from the EU and its requirement for downpayments, public investments meant significant fiscal pressure since this part was mostly credit finances (to demonstrate this, in 2006 it was around 1600 billion HUF). (Gazdag 2008) After 2004 an intensive motorway construction program meant further burdens. Although debt financed investments are more legitimate that funding operational costs, the general financial structure of these investments, the related corruption, and the large share of foreign credits intensified structural imbalances. Other forms of incentives such as tax credits or direct substitutions were also prevalent.
- c) Inconsistent fiscal and monetary policies. While on one side the fiscal policies were characterized by intensive overspending, on the other side the monetary policy committed itself to an inflation target that in the long term contributed to increasing public debts. Firstly, due to its high fiscal deficits the risk premium on Hungarian government bonds was rising that with the currency pegging policies of the time led to increasing interest rates. As a result, high interest rates made the refinancing of public debt more expensive and this high debt service led to further increasing debt rates. (Hudecz 2012) On the other hand, there was a crowding out effect of the public sector that reduced the local sources available for domestic household credits. This phenomenon eventually led to the increasing role of household credits nominated in foreign currencies.

1.3 Comparative overview: Hungary as a regional outlier

The general view is that in East Central Europe economies are characterized by largely similar trends and structures – although embedded in various political systems and institutional backgrounds. In my research I do not argue that the Central European region should be viewed as one group characterized by similar trends in public debt. The reason of the case selection is more that

despite the differences the region is often discussed and evaluated together – by scholars and international markets as well. However, as developing economies within the European Union these countries have to face some similar conditions in their public finances. There is a returning pattern of the high share of short-term loans within the debt portfolio of the general government, high share of interest payments within public expenditures, and high real interest rates on sovereign bonds. Despite these similarities, when it comes to public debt trends, the region performs really diversely (see in Figure 7).

The argument that supports the regional outlier role of Hungary when it comes to public finances and public debt accumulation is primarily based on the trends of a relatively limited time period. It is true indeed, that in the first decade of the new millennia, prior to the crisis of 2008, Hungary was the only Central European member state within the EU with a clearly increasing debt ratio. Furthermore, in the Central European region gross public debt was typically below the level given by the Maastricht Treaty (60%) in all cases except in Hungary where the debt ratio was far above the regional average (33% in between 2000 and 2008).

Although yearly fiscal deficits typically exceeded 3% of the national GDP in a number of countries, there was an improving trend even in those countries (in Poland for instance), while the Hungarian fiscal deficits remained high without any improvements towards consolidation. On the other hand, in the aftermaths of the crises when countercyclical fiscal policies were more prevalent with 4% increase in debt ratios on an average, Hungary made efforts to decrease its public debt stock. Overall, the statement about Hungary as an outlier stands on three pillars: the extensive debt accumulation prior to the crisis, efforts towards debt reduction after the crisis and a significantly higher debt rate compared to the region.

On the other hand, an analysis with a more extended time frame – as presented in Figure 7 – reveals that the cyclicality of Hungarian public debt trends in less unique in the region. While it is still true that the Hungarian public debt fluctuates in wider range and between significantly higher debt levels (50-90%), the Polish and Slovakian public debt trends are seemingly characterized by similar

stop-and-go cycles. Another group of countries, including the Baltic States, Slovenia and in some sense the Czech Republic, kept public debt ratios constant before the crisis and performed a sharp increase in the aftermath of the crisis.





Source: Eurostat

Compared to Hungary, the Polish case was characterized by more procyclical fiscal spending with less fluctuation over time (within the 40-50% range before the crisis) that implied fiscal consolidation in an economic decline and increasing fiscal overspending when the economy turned into a growth period. The Slovakian cycles show more countercyclical patterns with increasing debt ratios when the Slovak economy was in economic downturn and decreasing public debt stocks in a growth period.

With this extended time frame, the core difference between Hungary and other countries on the region is that the Hungarian economy entered the ninetieth with a comparatively higher debt ratio (without the possibility of a similar restructuring as Poland). For this reason, the high burdens associated with public debt limits the government's room for maneuver. The costs of reducing indebtedness become politically more costly that pushes the dynamics into repeated liquidity crises and delayed stabilization. In this sense the effects of higher initial debt rates and external exposure became the one of dominant factors influencing public debt trends in Hungary, maybe even more than in the region in general.

However, there is no similar systematical difference between Hungary and the region in the overall external financial position of the economy. On one hand, this observation applies to the overall parallelism of the regional and Hungarian dynamics, meaning that in times when the net lending position moved towards the negative region then most regional countries face similar trends. On the other hand, according to the indicators of the balance of payments (Figure 8) and the net lending position of the economy (Figure 9), Hungary is positioned in the middle, between countries with high external position (such as the Baltic states) and countries with more balanced external financial needs (such as Poland, Slovenia, Slovakia and the Czech Republic). However, if we exclude the Baltic States, then the Hungarian economy still considered as vulnerable to external financial sources. Considering that a large share or this is generated through the general government budget, the Hungarian public debt trend is increasingly dependent on changes in international liquidity.





Source: Eurostat





Source: Eurostat

Therefore based on this overview the Hungary could be viewed as an outlier in some sense due to its higher initial public debt rates in the beginning of the nineties. In the other hand, if we look solely the year-on-year changes of debt accumulation, with an extended time period and not only between 2000 and 2008 than this outlierness becomes less obvious. It is also questionable whether the Central European region are characterized by similar trends, since if we are looking only on the chart in Figure 7, it does not suggest any common regional trend. However, a more in depth statistical analysis can reveal some common patterns that would legitimate to speak about the region as a whole. The aim of the following chapters is therefore to find an econometric model that can describe the regional trends within the European Union. The core questions of this analysis should be the reasons behind higher political distortional effects in some countries than other.

2. The political economy of public debt: theoretical approaches

The present chapter provides an overview about the theory of public debt accumulation to serve as a base for choosing the right empirical models later. It describes theoretical developments related to the puzzle of public debt accumulation and fiscal policies, focusing on the theories within positive political economy. Different approaches presented in this chapter are a) the Keynesian theory of public debt, b) the neoclassical tax-smoothing model of Barro, and c) concepts within the New Political Economy such as the non-rational opportunistic model of political business cycles and fiscal illusions, rational opportunistic and partisan models. The chapter also presents in detail an integrated model developed by Battaglini based on the partisan model of Alesina and Tabellini and the neoclassical tax-smoothing mode

Generally speaking, the vast amount of literature related to the political economy of public debt is closely related to global trends in a way the emergence sovereign default crises usually draws academic attention to the phenomena. Therefore – not surprisingly – shifts in the general consensus on fiscal effects are marked by major debt crises of a global scale. _

As Walter Price (2010) rightfully points out in his historic overview about theoretical developments related to fiscal cycles, it was firstly the Great Depression that resulted in a shift from the classical approach of balanced budget towards the Keynesian consensus that excessive fiscal policy is an effective tool to reduce the negative impact of economic slowdowns by increasing the aggregate demand and reducing unemployment. Secondly, this consensus were attacked by a supply side approach following the oil crises of 1973 and 1978 claiming for public sector neutrality and promoting discretionary actions and built-in fiscal stabilizers as effective tools to reduce government overspending that was seen as the result of political distortions within the governmental sector. Finally, as Auerbach (2009) pointed out the recent global financial crises marked another shift in this general consensus with the era of new fiscal

activism and the general tendencies of increasing deficits and public debts globally, this phenomenon was called as a return to Keynesianism in simple terms.

In line with these shifts in the literature, the political economy of public debt followed a similar cyclical pattern. Following the Keynesian dominance, after the oil crises of the seventieth the first neoclassical model of public debt emerged: the tax smoothing theory of Robert Barro (1979). Based on this formal model evaluated by Barro later scholars of the new political economy– relying mainly on the public choice approach – introduced political distortions and game theory to explain the large cross-country variation in the accumulation of public debt in the late eighties. This was a significant shift from the neoclassical approach of a benevolent planner used in the theory of Barro. After the financial crisis, in the general environment of growing public debts the questions of debt sustainability and the conversions between austerity measures and economic growth came into the spotlight.

Since the aim of this paper is not to present an overview of theoretical developments over time, theoretical chapter covers only the main approaches about debt accumulation in the economic and political economic literature to present the theoretical basis a later econometric model. These models focus on the specific factors that can affect public debt accumulation as a dependent variable (what is important to note since a large share of related literature analyses an inverse relationship, like how debt affect growth as an independent variable). However, the logic of this chapter follows the evolutionary path of the literature according to the following structure: Firstly, I will introduce the Keynesian theory to present the base and because Keynesian theory is in the spotlight again since the crisis of 2008. Secondly, the neoclassical theory of tax smoothing that functions as a baseline for later models and empirical research; therefore it has great importance for the understanding of later theories. The third part presents the classic approaches of the New Political Economy, such as rational and irrational partisan or opportunistic models. This is followed by a description of a new development, an integrated model of tax smoothing effects and political distortions.

2.1Keynesian theory of public debt

Although the Keynesian theory of fiscal spending roots in the works of Keynes himself, the elaborate Keynesian theory of public debt is linked to his followers, like the Keynesian economists Abba Lerner, Alvin Hansen, Paul Samuelson or Paul Krugman, Keynes pointed out that the neoclassical view about the deadweight loss related to public debts and deficits only stands for full unemployment; therefore in cases with high unemployment the gap between the actual and optimal output could be decreased by deficit financed investments. In this sense, Keynes accepted deficit to cover the costs of public investments while rejected the same to cover operation costs and social transfers. According to one of the most innovative statements of Keynes, chronic unemployment is the normal state of most economies, and – as following Keynesian economists pointed out – deficit spending is also constantly at present in order to balance this unemployment. In case of excessive debt accumulation Keynes accepts inflationary policy measures in order to decrease the relative amount of public debt by this redistribution from creditors to debtors. (Salsman 2012)

Hansen takes forward this fundamentally short-term approach of fiscal deficits by introducing the idea of secular stagnation that causes a permanent deficiency in private investments. Related to this concept, he also introduces the idea of constant deficit spending and increasing debt ratios based on Keynes. Later, it was Abba Lerner who introduced the concept of functional finance, claiming that internal public debt does not have any negative wealth effect on the national economy since "we owe it to ourselves" therefore there is also no effective burden of public debt accumulation if its financed by domestic households. According to his approach, debt finance is a direct substitute to tax revenues. The dominance of the Keynesian theory in economics is benchmarked by two widely used college economics textbooks by Musgrave (1959) and Samuelson (1985).

In line with the Keynesian approach of active fiscal and monetary policies, advanced economies preceding the oil crises of the seventieth were characterized by high average governmental deficits and also high inflations that for a long time prevented large scale accumulation of public debt. To summarize the empirical implications of the Keynesian theory of public debt, firstly it suggest that debt finance is a direct substitute of tax revenues meaning higher debt accumulation in recessions, secondly it argues that keeping inflation high is a legitimate way to inflate away public debt, thirdly it argues that the normal state of government budget is a negative balance that leads to debt accumulation.

2.2 Neoclassical tax smoothing model

The shift from the Keynesian consensus became visible for the first time with the appearance of the supply-side economics, also known as neoclassical macroeconomics. The first model considering public debt under the neoclassical economics – the tax smoothing theory (Barro 1979, Aiyagari 2002, Stokey and Lucas 1983) – was first developed in the 1970s and functions as a baseline model since then for most models within the public choice literature. It is a model that argues for a causal relationship between economic growth cycles and public debt cycles, more specifically for growing debt rates in recessions.

According to the tax smoothing effect, budget deficit is a useful tool to minimize the deadweight loss otherwise related to changing tax rates in order to compensate to declining tax revenues during recessions. If the general government were financed exclusively by tax incomes that would need a constant adjustment of the tax rates to economic cycles and other external shocks. This would increase deadweight loss related to taxation and would lead to efficiency problems in general. In contrast, based on the assumptions of the model, it is possible to keep tax rates constant that generates net surplus in times of economic prosperity and deficit in times of recession or economic slowdown. Deficits are therefore in constant conformity with economic cycles. (Barro 1979).

This model presumes an optimal policy of public finances where the state is represented as a benevolent planner integrating all present and future costs while reaching the optimum of the fiscal balance. However, this would mean that there is an incentive for self-insurance that would lead to long-term asset accumulation (Aiyagari 2002). This would contradict to empirical evidence.

The main empirical implications emerging from this tax-smoothing model of optimal taxation are the following. Firstly, tax rates should be relatively constant over time adapting slowly to changing macroeconomic environment when we assume a benevolent planner who would like to minimize the deadweight loss. Secondly, the cycles of fiscal deficit should correlate strongly with macroeconomic cycles; therefore deficits would emerge only in case of decreasing tax revenues or temporarily high public spending. (Alesina et al 1997)

There are certain limitations of the model. Firstly, the tax-smoothing model is a relevant framework to explain growing deficits in times of recession and external shocks but cannot explain extensive financing through deficits and public debt accumulation from the 1970s. Furthermore it does not take into account that states in real life are also the subjects of political distortions as decisions are not made by a benevolent planner but by political decision-making processes. The New Political Economy from the 1980s addressed these limitations and questions related to the phenomena of debt accumulation and large variations between similar economic structures.

2.3 New Political Economy

As the tax-smoothing model proved to be insufficient to explain the international trend of large public debt accumulation that followed the oil crises of the seventieth or the growing cross-country variance, new approaches addressed these limitations. Newly emerging theories within the New Political Economy focused on the effects of political bias and structural variables to explain different fiscal policy outcomes.

The first attempts of the New Political Economy that explained debt accumulation was irrationality. Buchanan and Wagner (1977)introduced the concept of fiscal illusion to explain public finances via suboptimal processes. The basic assumptions behind the fiscal illusion theory are the irrationality of voters and incomplete information. Irrational electorates tend to overestimate their utility given by government overspending and the intertemporal budget constraint of the state. Therefore, this fiscal illusion provides an incentive for politicians who are motivated by re-election to spend more than their budget constraints. According to this scenario, politicians rationally exploit voters' ignorance by fostering economic growth and decreasing unemployment rates prior to elections through fiscal policy measures what are usually financed from external sources. (Buchanan and Wagner 1977) Based on the concept of bounded rationality, fiscal illusion is more relevant in newly democratized states and developing countries where democratic political tradition is weaker and electorates have less experience to estimate the future costs of present expenditures. There exists– although not particularly strong – empirical evidence for this irrational model of fiscal illusion and for stronger political business cycles in new democracies. (Brenner and Drazen 2005)

More recent approaches of the New Political Economy are based on the assumption rational actors and infer the political cycles of government finances from the nature of the political-institutional structure and policy processes. Different approaches focus on diverse effects of public debt accumulation. Firstly, there are partisan theories that understand deficit financing as a strategic variable for political actors (Alesina and Tabellini 1990, Persson and Svensson 1989). Then secondly, opportunistic theories understand deficit financing as a postponed strategic game where the main motivation of political actors is reelection and the manipulation through economic policies serve this goal. Thirdly, there are comparative approaches focusing on the distortions caused by different electorate systems. (Benczes 2008) In the followings I will focus on the first group.

In the 1980s two theoretical models emerged independently from each other that understood deficit financing as a strategic tool in the partisan competition with politicians caring about policies and its outcomes directly and indicating strong ideological differences within these preferences between parties. (Alesina and Tabellini 1990, Persson and Svensson 1989)

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The Persson-Svensson model (Persson and Svensson 1989)presumes a bipartite system with two competing parties: a right-wing conservative and a left-wing social democratic party. According to the model there is a direct link between party line and preferences about public debt that eventually causes various strategic outcomes. For a given conservative incumbent party the incentives for public overspending grow with the decreasing possibility of a reelection. In this way, the conservative government could devolve the costs of preferred public goods to the next government. In contrast, for a left-wing government the decreasing possibility for reelection creates an incentive to reduce overspending.

The Alesina-Tabellini model argues that there is an incentive towards deficit financing for incumbent politicians when reelection is less possible. Therefore, this effect would lead to increasing debt levels in the long run. Rational voters are represented as consumers, laborers and electorates at the same time in the model with a utility function related to these roles. This utility is given as a mixed basket of private goods gained on the markets and public goods. The government could increase the utility of its electorate by a general economic stimulation or by increasing their share of received from the public goods. Also, the model also presumes a bipartite political system with uncertain elections by the end of every electoral cycle. Further presumptions are the closed economy and non-existing financial markets.

In case of public overspending a certain share of the costs of public spending during time period t realized under time period t+1. As there is a p<1 possibility that the incumbent party will not be reelected, then a certain share of future costs will be excluded during its optimization of its fiscal policy. Therefore the incumbent party has to make an intratemporal and an intertemporal decision at the same time causing time inconsistency. Growing p-value also means a decreasing share of future costs realized in t+1 period incorporated in the strategic choice causing growing public debt. In this scenario the politically optimal level of public debt and governmental deficit will always be higher than the social optimum. Also, in this model the marginal cost of the public deficit is always lower than its marginal utility. (Alesina and Tabellini

1990)A simplified interpretation about the empirical implications of this model forecasts higher fiscal deficits in election years and growing public overspending in case of a higher possibility for a change in government.

A further model, based on game theory models, is the war of attrition model by Alesina and Drazen (1991). The model assumes that there is a political conflict over what type of stabilization to implement, in particular on the distribution of costs of the adjustment, and this conflict leads to delayed stabilization. According to this logic, stabilization occurs when one of the competing groups can impose its desired policies on the other, which have exhausted their ability to resist the undesired stabilization. The nature of political institutions influences the distribution of political "power" between competing social groups: as the "crisis hypothesis" suggests, it is easier to stabilize in times of crisis. Stabilization is also more likely in crisis with a "strong" government, meaning presidential systems, fewer institutional veto points, in case of a unified government with strong majority, or just after election. The primary cause of delay is that the rational strategy is to wait with the reforms if the marginal cost of waiting is smaller the marginal benefit of waiting. This war of attrition ends when for one of the groups the marginal benefit becomes less than the marginal cost.

I would summarize the empirical implications of these models according to the following simple expectation. Firstly, in their rational partisan model, Persson and Svensson suggest that conservative incumbent governments have higher incentives for public overspending with the decreasing possibility of reelection on one hand, and left-wing governments have decreasing incentives for fiscal overspending with a decreasing possibility for reelection on the other. Secondly, the rational opportunistic model by Alesina and Tabellini suggests that there are consistently higher fiscal deficits in election years, with a relatively higher overspending when there is a higher chance that the incumbent government will be defeated in the electoral competition. Thirdly, the war of attrition model suggest that there is a higher possibility for delayed fiscal consolidation when there is a coalition government in office; and that consolidation is more possible in a liquidity or economic crisis. Lastly, fiscal illusion also claims that overspending is higher in electoral years and it is more prevalent in new democracies. Meanwhile these models can be useful tools to explain fiscal cyclicality and cross-country differences, they have their own limitations as well. For instance, both partisan model and the Alesina-Tabellini rational actor model presented here assume the effect of electoral cycles over solely two periods whereas economic cycles and external shocks are excluded (Battaglini 2011) A possible solution to overcome this limitation is presented by Battaglini who integrated the dynamic neoclassical tax smoothing model with partisan models of the new political economy. Therefore his model is able to show the effects of economic cycles and political decision making processes that may fit to model the long term trends of public debt accumulation.

2.4Battaglini and the general theory of public debt

Marco Battaglini developed a new model based on a general positive approach with the aim of overcoming the following limitations. On the first hand, the neoclassical macroeconomic theories of public debt do not explain public debt accumulation in the long run and variations within countries while also lack the understanding of the state as an aggregation of political decisions made by rational actors. On the second hand, the models developed under the new political economy are describe debt accumulation by two-cycle political mechanisms therefore are unable to model long-term trends or to deal with the presence of economic cycles. Therefore, he develops a highly technical, dynamic equilibrium model that takes the taxsmoothing model as its baseline where the deadweight loss of taxation gives a convex curve with given tax rates. However, the model rejects the neoclassic principle that government, as a benevolent planner is able to determine the optimal policy of public finances or the optimal level of annual deficits.

The mechanism of political decision-making and therefore the phenomena of political distortion is an integral part of this dynamic model. The structure of public expenditure is given by two basic goods produced by the state: public goods and targeted transfers. The demand for public goods is the function of public debt level and an indicator signaling the economic

situation in general. It is a model of a closed economy. There are two mechanisms of decision making modeled by this approach. In the first case, the political outcome is given by a noncooperative bargaining process between regional representatives where the policy outcome is purely the function of the economic situation. In the second case there is a bipartite competition for votes and different voters are equally sensitive to direct transfers.

The main trends describing the model dynamics and also the empirical implications of the model can be described by the followings: a) In case of high levels of public debt there is fiscal austerity: the motive of self-insurance is calculated with a higher weight and the general impact of political distortion decrease as there are less resources available for direct transfers. In this case the sovereign debt decrease as a function of the overall economic performance; b) Fiscal loosening in case of low public debt levels: intensifying political competition as resources available for direct transfers increase that result growing debt levels.

There is a political equilibrium in both cases but this political equilibrium is inefficient and suboptimal considering the public good because the marginal utility of the sovereign debt exceeds its marginal cost for politicians who are responsible for the decisions. Therefore public debt tends to stabilize on a high and inefficient level. (Battaglini 2011)

To conclude, this model might be relevant to explain why the economies characterized by strong bipartite competition and higher initial debt levels – that distinguish Hungary from most cases in the region – might have different patterns in their long-term public debt accumulation than economies where these preconditions are not present.

However, the model developed by Battaglini has its certain limitations, especially if one would like to apply it for the case of the Hungarian debt accumulation. In this case, one the two most striking limitations is once the point that most models consider a closed economy while countries in the region can be more characterized as small open economies with an economic and trade structure deeply integrated in the common markets. On the other hand, markets tolerate different levels of public debts for developing countries and temporary changes in annual deficits or economic output can also generate so high debt service and risk premiums that could lead to eventual debt crisis.

Therefore, based on the existing literature, I presuppose that in emerging countries the debt ratios tolerated by the markets are significantly lower. (IMF 2003) In the case of emerging market economies both analytical and empirical models of sovereign debt crisis should include the question of debt sustainability, debt service and the sensibility of this indicator to external shocks into its observations, rather than just focusing on the general level of gross debt. The main reasons are that risk premiums and the relative amount of debt service are more relevant in calculating the sustainability of sovereign debt in developing countries. For an empirical test of this assumption see the work of Baldacci and Kumar (2010)

Overall, the empirical implications relevant from the perspective of an econometric analysis the four basic model could be summarized as following:

- 1. Both the Keynesian fiscal theory and Burro's tax smoothing model suggest a link between business cycles and fiscal policy and in a similar. The Keynesian theory suggests that debt finance is a direct substitute of tax revenues; therefore there is higher debt accumulation in recession. Barro suggest the same that there are relatively constant tax rates over time where the cycles of fiscal deficit correlate strongly with the macroeconomic cycles in the long run.
- 2. Fiscal illusion claims that overspending and the level of debt accumulation is higher in electoral years and it is more prevalent in new democracies.
- 3. The war of attrition model suggest that there is a higher possibility for delayed fiscal consolidation when there is a weaker government in office that is interested in reelection; and that consolidation is more possible in a liquidity or economic crisis.
- 4. The rational opportunistic model of Alesina-Tabellini suggests that there are consistently higher fiscal deficits in election years, with a relatively growing

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overspending when there is a higher chance that the incumbent government will be defeated in the electoral competition

- 5. The rational partisan model of Persson and Svensson suggest that for conservative incumbent governments there are higher incentives for public overspending with the decreasing possibility of reelection, while for left-wing governments the decreased possibility for reelection creates incentives for reduced fiscal overspendings
- 6. Battaglini model suggests high level of public debt (or unsustainable debt levels) makes pork barrel politics costly and results in decreasing political distortion, while low level of public debt (or stable debt structure) results in increasing political bias.

3. Methodology

The following chapter introduces the methodology used during the analysis about the effects of political factors on government debt accumulation. During my analysis I will use a dataset about all EU member states in the time period between 1990 and 2012. As an adequate statistical method to analyze a group of countries over a longer time period, I will use time-series panel data analysis with independent country and time effects.

To evaluate whether the model introduced by Battaglini has higher explanatory power in these cases compared to previous models, my empirical models could be sorted into two groups. Firstly, there are standard time series regressions to measure the estimated effects of different political variables and other variables measuring the general macroeconomic performance of economy in different time periods. Secondly, there are models where there is an interaction term introduced within the model. I assume that the first group is a useful test for the effects of different political distortions presented in Chapter 2.3, such as electoral and partisan effects or the effect of government composition. Meanwhile, the second group of models with the interaction terms tests for the effect of the same political distortions but not in a linear model. Since the central claim of Battaglini is that the effects of political distortions depend on the general state of the economy and the existing level of public debt rate, with interaction terms it is possible to capture this non-linear relationship.

The structure of this chapter is as follows. The first section discusses my choice for year-on year changes as a dependent variable, including its justification and possible limitations. The second section presents the independent variables included in the models. The third section discusses the data collection methods and the forth section introduces the general model applied in each specific cases, while the forth section summarizes the specific models.

3.1 Dependent variable: Conceptualizing public debt

During the empirical test of the theoretical models presented above, this paper primarily relies on the changes of gross public debt as a dependent variable, meaning the total debt liabilities of a government for both domestic and foreign creditors. Therefore the dependent variable is the year-on-year change in the gross public debt $rate(db_t)$ measured as the changes in gross public debt during given t year.

I have chosen this variable because of a number of reasons. For instance, there was available longterm data for most countries covered in the analysis during the selected time period. There are still certain data limitations but there are still less differences in the accounting methods across time and across countries compared to annual data in general government deficits. Furthermore, there is less fluctuation in this variable that makes it easier to analyze long-term trends. However, in the following paragraph I will discuss alternative choices as a dependent variable taking their advantages and disadvantage into account.

Another possible operationalization of the dependent variable can be the primary balance of the general government. By choosing the primary balance as a dependent variable it is possible to control to the changes in debt service (the effects of changing exchange rates or government bond yields) and to examine the fiscal effects exclusively of policy choices, as basically the primary balance shows that part of the balance sheet that could be determined by actual fiscal policy rather than by external shocks. Operationalize the dependent variable as annual deficits, can also show a more direct link with the present policy choices. Besides the already mentioned measurement problems, it is also a problem that the quasi-fiscal activity of governments and hidden deficits could lead to a bias in the data that affects towards growing deficits in election years. The public debt is a better measurement because it can capture the effects of prior policies as it a stock and not a flow variable.

3.2 Independent variables: Possible factors behind public debt accumulation

According to our hypotheses based on the general model of public debt by Battaglini, there are some independent variables affecting towards the optimal strategy of government finances referring to external factors such as the existing stock of public debt and an index describing the general state of the national economy. One way to measure the sustainability of public debt and debt service, is to use a variable that is built up as the change in the real interest rate minus the GDP growth rate times the lagged debt to GDP ratio $(b_{t-1} *d (i -y)_t)$. It is also possible to use only the consolidated gross debt as the percentage of GDP in the beginning of each t period (b_{t-1}) , as this is the usual measurement unit used by the decision makers both in politics and business. The change in the real interest rate measured as long-term government bond yields minus the GDP growth rate $(d (i -y)_t)$ is a variable to measure the risk and instability emerging due to the existing stock of public debt. Another possibility is to use only the existing stock of government debt as the percentage of GDP (b_{t-1}) as Battaglini suggest in his model.

To control to the general state of the economy it is possible to introduce variables such as unemployment rate (dU_t) and change in the GDP growth rate (dy_t) . Another way could be an index consisting factors such as employment (in percentage of domestic population) and unemployment rates (in percentage of the domestic population), GDP growth (% per year), consumption growth (% per year). The index is built up by these variables, as these are the main indicators of possible cyclical changes of government revenues and expenditures.

To measure the effect of political bias I would introduce different political variables, generally in the form of dummy variables. For these political variables I would use election data, the dates of changes of government and the political orientation of the governments. It is also possible to create a further variable measuring how close the electoral race is in a given time is there are sufficient poll data available.

As I already mentioned Hungary is a small open economy therefore it is necessary to control for the effects of the world economy. To reach this Alesina and others (1997) mentions three possible ways. Firstly, it is possible to add a proxy for the OECD average growth rate (y_w) as an independent variable to the regression. Secondly, one could create a new growth variable as the difference between national growth and OECD average. The third way is to add a time

dummy to the regression that would signal the years when the world economy had higher than average growth.

Finally, since there is a time difference between the dependent and independent variables, one can assume that the correlational relation would show also causal relation. Although it is still possible that changes in a country's public debt rate can affect macroeconomic indicators as growth or inflation even in this case. Keeping this possibility in mind, I would conclude, that if the regression based on Battaglini's model shows strong evidence, there is a high possibility that there is also causal relationship between the variables.

Based on this argument, here are the core independent variables I have used during my empirical analysis. First of all, there are a number of variables measuring the effects of the general economic performance on debt accumulation:

- The variable *spiral* measures the sustainability of public debt and debt service, it is built up as the change in the real interest rate minus the GDP growth rate times the debt rate (bt1 *d (i -y)t).
- Variable *lb.* refers to the government consolidated gross debt as the percentage of GDP in the beginning of each t period (bt-1), as this is a usual proxy used by the decision-makers both in politics and business
- To control to the general state of the economy we have introduced variables such as unemployment rate (*dU*), GDP growth rate (*growth*) and inflation measured as GDP deflator.

In order to measure the effect of political bias, we introduce different political variables, generally in the form of dummy variables. For these political variables we used election data about the dates of changes of government and the political self-position of the cabinets. The political variables are the followings:

- *Election*: dummy variable that equals one in the years when parliamentary elections were held
- *Left:* dummy variable that refers to the ideological position of incumbent governments.
 Based on the Manifesto data it is calculated as the weighted average of coalition partners regarding of the variable *rile,* recoded into a binary variable
- *Caretaker:* a dummy variable signaling the periods when caretaker governments held office
- *Minority:* a dummy variable signaling the periods when caretaker governments held office

Since most European countries are small open economies, it is necessary to control for the effects of the world economy. I will measure this as by adding the OECD average growth rate (*oecd*) in given t period as an independent variable to the regression.

- Oecd: the average growth rate of OECD countries in each year, and
- *EU:* a dummy that signals the periods when given countries were already EU members, therefore subjects of the common fiscal regulation

Panel data methods are particularly useful to analyze regional effects and the outlierness within a group of countries since in this case unobserved country effects are included in the regression. I also introduced a regional variable to control for a regional effect.

- CEE: a dummy that signals the whether a selected country is in the CEE region or not
- CZ, EE, HU, LV, LH, PL, SK, SLO: country dummies controlling for unobserved country effects of the countries within the region in the following order: Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovak Republic, Slovenia

Table 1 summarizes the all variables used during the regression analysis.

Table 1

DEPENDENT VARIABLE									
db	year-on-year change in the gross public debt rate (dbt)								
INDEPENDENT VARIABLES CONTROLLING FOR SUSTAINABILITY									
spiral	Debt service: change in the real interest rate minus GDP growth rate times the debt rate (bt1 *d (i $-y$)t).								
lb	government consolidated gross debt as the percentage of GDP in the beginning of each t period (b_{t-1})								
INDEPENDE	NT VARIABLE CONTROLLING FOR THE ECONOMIC ENVIRONMENT								
dU	Changes in unemployment rate compared to the previous year								
growth /y	DP growth rate								
dinfl	Changes in inflation rates, measured as GDP deflator, compared to previous year								
INDEPENDE	NT VARIABLES CONTROLLING FOR POLITICAL DISTORTIONS (PDUM)								
election	dummy variable, equals one in the years of parliamentary elections								
left	dummy variable, measures the ideological position of incumbent governments								
caretaker	dummy variable signaling the periods when caretaker governments were in office								
Minority	dummy variable signaling the periods when caretaker governments held office								
INDEPENDE	INDEPENDENT VARIABLES CONTROLLING FOR INTERNATIONAL ENVIRONMENT								
Oecd	the average growth rate of OECD countries in t year								
EU	dummy variable, equal 1 in years when countries were already EU members								
CEE	Central Europe variable, controlling for regional effects								

3.3 Data sources

Since there is no single database that would include all the data needed, I have collected macroeconomic and political variables from different sources. The study covers the time period from 1990 till 2012 and the database focuses on all EU member states that joined the

European Union till the adhesion of 2004. The following sources have been used for macroeconomic variables:

a) World Bank World Development Indicators (2013)²

b) Government finance statistics (GFS 2012) by Eurostat

c) OECD National Accounts; Central government debt statistical yearbook (OECD 2012)

d) IMF: World Economic Outlook; Government finance statistics of the IMF (IMF GSF 2012)

For political dummies, I have primarily used the dataset from Manifesto Research Group/Comparative Manifestos Project (MRG/CMP) and the ParlGov database. These sources provide a quantitative content analysis of election programs of competing parties. There are several concerns about the operationalization of political variables, some of which are already discussed³. There were some changes in the variables compared it the original Manifesto dataset. I have used the following variables during my analysis:

a) Variable *edate*: date (year and month) of national election

² The World Bank World Development Indicators was selected as the core source of data as it proved to be the dataset with the widest coverage and it also a standardized structure suitable for cross-country comparison. Other sources were used when World Bank data was not available.

³The database consists of yearly data whereas elections are held at different times of the year across countries. I registered governments taking office till September to the year of the elections and governments taking their office later to the year after the elections. The ideological, partisan positions of the governments were measured as the weighted average of governing parties on the left-right scale measured by the variable rile in the original Manifesto dataset, as I assumed that the weight of a party in the legislative body is a good proxy for its bargaining power within the government, although there are other possible estimations like their weight within the government. Using the variable rile to measure the left-right position of a selected party may seem adequate, however ideological cleavages between left and right are less clear in these young democracies especially if it comes to economic policies. Therefore including the variables measuring the economic policy preferences of given parties – also included in the Manifesto dataset – might result in more explanatory power in the models.

 b) Variable *rile*: Right-left position of party as given in Michael Laver/Ian Budge (eds.):
 Party Policy and Government Coalitions, Houndmills, Basingstoke, Hampshire: The MacMillan Press 1992

These variables were transformed and implemented in the following form:

- a) election: preelectoral dummy, taking the value 1 in the year of the elections and 0 otherwise
- b) left: left-right placement of the government, as the weighted average of variable *rile* during the last elections for the parties participating in the government coalition in a given time period. The weights were measured as the shares of the seats in parliament within all the seats held by governing parties.

3.4 Empirical model: the regression

In their large scale work, "Political cycles and the macroeconomy" Alberto Alesina, Nouriel Roubini, and Gerald D. Cohen (1997) evaluated an empirical test of different partisan and opportunistic models as well as tested Barro's tax smoothing model for fiscal policy cycles in the United States. In the following, I present the regression they developed to test these models for the United States as it serves as a model for the empirical models used during this study. They used a cross-section time-series regression to measure

the effect of political factors on the level of public debt by using the following model:

$$db_t = \alpha_0 + \alpha_1 db_{t-1} + \alpha_2 (b_{t-1} \pi^{\epsilon_t}) + \alpha_3 YVAR_t + \alpha_4 GVAR_t + \alpha_5 PDUM_t + \epsilon_t$$

Where *db* is the change in the stock of public debt held by the public as a share of GDP, *YVAR* is a variable measuring macroeconomic performance that could be replaced by the deviation of the unemployment rate from its trend value (*du*) or by the percentage change of the real GDP (*y*), GVAR is the deviation of government spending (as a share of GDP) from its trend value, $b\pi^{\varepsilon}$ is a term representing the effects of expected inflation (π^{ε}) on the public debt to GDP ratio (b), and *PDUM* is a political dummy capturing the effects of partisan or electoral effects.

It is possible to use different dummy variables to control for political distortions. A possible variable to measure the effects of politics on public debt is pre-electoral dummy that signals election years over the sample – based on the presumption that government overspending is higher in election years. A partisan dummy showing whether left or right wing governments are in office can measure the effects of partisan bias. In addition to the political variables mentioned by Alesina, Roubini and Cohen (1997), it is possible to add further variables as a political dummy for caretaker governments, minority governments, or coalition government versus one party dominated governments. A variable measuring voter turnout could be a good proxy for the magnitude of electoral competition.

Although this equation generated by Alesina and others is sufficient to test for the taxsmoothing model of Barro, it is necessary to introduce some changes to make it suitable to test for the Battaglini model as well.

The empirical implications of Battaglini's model presented in the previous chapter highlight that high level of public debt (or unsustainable debt levels) stimulates fiscal austerity and results decreasing political distortion, while low level of public debt (or stable debt structure) results increasing political bias. Therefore, it is necessary to introduce an interaction term between the two variables in the baseline equation of the model. It is also possible to expand the scope of this test to the countries of the East Central European region with an unobserved effects model applied for panel data, to test for the effect of institutional factors like the difference between coalition governments and two-party systems, or the legal limitations of deficit financing. In this case, the underlying empirical model of our analysis is the following:

$$db_{it} = \delta_1 + \delta_2 D91_t + \dots + \delta_{23} D12_t + \alpha_1 b_{t-1,i} + \alpha_2 \pi_{it} + \alpha_3 y_{it} + \alpha_4 dU_{it} + \alpha_5 b_{t-1,i} * d(r-y)_{it} + \alpha_6 PDUM_{it} + \alpha_7 PDUM_{it} \times db_{t-1,i} + a_i + \varepsilon_t$$

Where a variable with subscript *i* is the value for state *i* in time period *t*. There are year dummies included in the model for each year except the first observed period 1990 and an

unobserved country effect a_i measuring those country characteristics that are not included in the model but still correlated with the dependent variable db or any explanatory variable. db_{it} means the change in government gross debt for country i in time period t, π_{it} means the inflation for country *i* in time period *t*, while *y*_{it}, dU_{it} real GDP growth rate and the change in unemployment rate respectively. The political dummies are discussed in the following chapters. The unobserved country effect a_i should be excluded from the equation with fixed effects or first differencing methods. The results of a fixed effects panel data regression are presented in the following chapter.

3.5 Empirical models

During the empirical analysis I will test for the following nine unobserved effect models based on the general models presented in the previous chapter. The empirical implications relevant for our major theoretical models can be summarized in the following main points.

- Barro's tax smoothing model suggests relatively constant tax rates over time where the cycles of fiscal deficit correlate strongly with the macroeconomic cycles in the long run. The Keynesian theory suggests similar trends.
- 2. The rational opportunistic model of Alesina-Tabellini suggests that there are consistently higher fiscal deficits in election years, with a relatively growing overspending when there is a higher chance that the incumbent government will be defeated in the electoral competition. The fiscal illusion model comes to similar conclusions.
- 3. The rational partisan model of Persson and Svensson suggest that for conservative incumbent governments there are higher incentives for public overspending with the decreasing possibility of reelection, while for left-wing governments the decreased possibility for reelection creates incentives for reduced fiscal overspendings.

- 4. The war of attrition model suggests that there is a higher possibility for delayed fiscal consolidation when there is a weaker government in office that is interested in reelection; and that consolidation is more possible in a liquidity or economic crisis.
- 5. Battaglini's model suggests high level of public debt (or unsustainable debt levels) makes pork barrel politics costly and results in decreasing political distortion, while low level of public debt (or stable debt structure) results in increasing political bias.

During this test I will rather use growth rates to control for the general state of the economy, compared to the original model of Battaglini. The reason for this change is that changes in debt levels are evaluated differently by the financial market for each country; therefore it is a biased variable to use for cross-country analysis. In this sense, the empirical implications if this slightly moderated model is:

5.b In times of economic prosperity (or low debt levels) there is an increasing effect of political distortions. On the other hand, in economic recession pork barrel spending are more costly that results in decreasing political distortion.

To summarize, in this test the variables on macroeconomic performance control for the tax smoothing effects, pre-electoral dummies for the Alesina-Tabellini model, partisan dummies on left-right party position aim to test for the Persson-Svensson model, variables showing whether there is a minority or caretaker government in office control for the war of attrition model, and the interaction terms for Battaglini's general model. The models in question are the following:

General model:

 $db_{it} = \delta_1 + \delta_2 D91_t + \dots + \delta_{23} D12_t + \alpha_1 b_{t-1,i} + \alpha_2 \pi_{it} + \alpha_3 y_{it} + \alpha_4 dU_{it} + \alpha_5 b_{t-1,i} * d(r-y)_{it} + \alpha_6 PDUM_{it} + \alpha_7 PDUM_{it} \times db_{t-1,i} + a_i + \varepsilon_t$

Model 1: Baseline model without political distortions

 $db_{it} = \delta_1 + \delta_2 D91_t + \dots + \delta_{23} D12_t + \alpha_1 lb_{ti} + \alpha_2 \pi_{it} + \alpha_3 y_{it} + \alpha_4 dU_{it} + \alpha_5 bt-1, i * d (r-y)it + \alpha_6 oecd + \alpha_7 EU + \alpha_i + \varepsilon_t$

Model 2: Linear model for electoral cycles

 $db_{it} = \delta_1 + \delta_2 D91_t + \dots + \delta_{23} D12_t + \alpha_1 lb_{ti} + \alpha_2 \pi_{it} + \alpha_3 y_{it} + \alpha_4 dU_{it} + \alpha_5 bt-1, i * d (r-y)it + \alpha_6 oecd + \alpha_7 EU + \alpha_8 election + a_i + \varepsilon_t$

Model 3: Model of electoral cycles with an interaction term (based on Battaglini)

 $db_{it} = \delta_1 + \delta_2 D91_t + \dots + \delta_{23} D12_t + \alpha_1 lb_{ti} + \alpha_2 \pi_{it} + \alpha_3 y_{it} + \alpha_4 dU_{it} + \alpha_5 bt-1, i * d (r-y)it + \alpha_6 oecd + \alpha_7 EU + \alpha_8 election + \alpha_9 election * y_{it} + a_i + \varepsilon_t$

Model 4: Linear model for partisan bias

 $db_{it} = \delta_1 + \delta_2 D91_t + \dots + \delta_{23} D12_t + \alpha_1 lb_{ti} + \alpha_2 \pi_{it} + \alpha_3 y_{it} + \alpha_4 dU_{it} + \alpha_5 bt-1, i * d (r-y)it + \alpha_6 oecd + \alpha_7 EU + \alpha_8 left + a_i + \varepsilon_t$

Model 5: Partisan bias model with an interaction term (based on Battaglini)

 $db_{it} = \delta_1 + \delta_2 D91_t + \dots + \delta_{23} D12_t + \alpha_1 lb_{ti} + \alpha_2 \pi_{it} + \alpha_3 y_{it} + \alpha_4 dU_{it} + \alpha_5 bt-1, i * d (r-y)it + \alpha_6 oecd + \alpha_7 EU + \alpha_8 left + \alpha_9 left * y_{it} + a_i + \varepsilon_t$

Model 6: Linear model measuring the impact of caretaker governments

 $db_{it} = \delta_1 + \delta_2 D91_t + \dots + \delta_{23} D12_t + \alpha_1 lb_{ti} + \alpha_2 \pi_{it} + \alpha_3 y_{it} + \alpha_4 dU_{it} + \alpha_5 bt-1, i * d (r-y)it + \alpha_6 oecd + \alpha_7 EU + \alpha_8 caretaker + a_i + \varepsilon_t$

Model 7: Caretaker government model with an interaction term (based on Battaglini)

 $db_{it} = \delta_1 + \delta_2 D91_t + \dots + \delta_{23} D12_t + \square lb_{ti} + \square \pi_{it} + \square y_{it} + \square dU_{it} + \alpha_5 bt-1, i * d (r-y)it + \alpha_6 oecd + \alpha_7 EU + \alpha_8 caretaker + \alpha_9 caretaker^*y_{it} + a_i + \varepsilon_t$

Model 8: Linear model measuring the impact of minority governments

 $db_{it} = \delta_1 + \delta_2 D91_t + \dots + \delta_{23} D12_t + \alpha_1 lb_{ti} + \alpha_2 \pi_{it} + \alpha_3 y_{it} + \alpha_4 dU_{it} + \alpha_5 bt-1, i * d (r-y)it + \alpha_6 oecd + \alpha_7 EU + \alpha_8 minority + a_i + \varepsilon_t$

Model 9: Minority government model with an interaction term (based on Battaglini)

 $db_{it} = \delta_1 + \delta_2 D91_t + \dots + \delta_{23} D12_t + \alpha_1 lb_{ti} + \alpha_2 \pi_{it} + \alpha_3 y_{it} + \alpha_4 dU_{it} + \alpha_5 bt-1, i * d (r-y)it + \alpha_6 oecd + \alpha_7 EU + \alpha_8 minority + \alpha_9 minority * y_{it} + \alpha_i + \varepsilon_t$

Where db_{it} is the percentage change in gross government debt per GDP in country i in time period t and lb_{ti} is lagged debt ratio or the stock of government gross debt as a percentage share of GDP in country i in time period t-1. There are time dummies labeling the twenty-two years within the analyzed time period and a_i is a parameter measuring the unobserved effect of country i. The general macroeconomic performance in given t year for country I is measured by the GDP deflator inflation rate π_{it} , the percentage value of GDP growth rate y_{it} , the percentage change in the rate of unemployment in the percentage of total labor force dU_{it} , and the variable *spiral* the $b_{t-1} d(r-y)$ *t value.

4. Findings

4.1 Empirical relevance of the theoretical frameworks over time

This chapter provides a general overview about the main trends characterizing the Hungarian public debt accumulation after the transition and the possible explanatory power of the theoretical models presented in the previous chapter. Based on the previous description the long-term trends of the Hungarian public debt accumulation after the transition could be classified into the following four time periods:

- *1990-1995*: intensive debt accumulation due to high deficits and hidden debts of the socialist economy (bank consolidations etc.)
- 1995-2001: decreasing public debt stocks due to fiscal consolidation and privatization incomes
- 2001-2008: debt accumulation due to procyclical fiscal policy, intensive government overspending "in good times"
- 2008-2012: consolidation of the debt accumulation due to the fiscal consolidation in primary deficits, and along with an IMF loan and "unorthodox" fiscal policies including the nationalization of private pension funds

Table 1 summarizes the estimated empirical relevance of each theoretical model prior to the detailed statistical analysis. In the first period the counter-cyclical hypothesis of the tax-smoothing model stands, as there is extensive borrowing in a deep economic downturn due to the transition crisis. The electoral cycle seemingly has only moderate effect during the period, therefore the fiscal illusion hypothesis or its rational alternative, the assumptions of the Alesina-Tabellini has only weak support. On the other hand, the assumptions of the Battaglini-Coate model has relatively strong support over the period, since there is an intensive fiscal consolidation taking place once the debt ration reaches a critical threshold (90%). In the 1995-2001 period there are signs for the tax

smoothing effect to hold, since in this period the Hungarian economy experienced economic stabilization and growth that was accompanied with fiscal consolidation and declining debt ratio. There are also some support for the fiscal illusion and the Alesina-Tabellini thesis with relatively higher spending in election years. Overall, in support for Battaglini, during this period the fiscal discipline seems to dominate over political distortions, when the debt ratio is high the electoral cycle has only moderate effects of the fiscal policy.

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	1990-1995	1995-2001	2001-2008	2008-2012
Tax smoothing	++	++	0	0
Fiscal illusion	+	+	+	+
Alesina-Tabellini	+	++	++	0
Battaglini	+++	++	+++	++

On the other hand, the self-insurance motive seemingly lost ground after 2001 when extensive government overspending became the norm both in election years and between them. Generally, electoral cycles also intensified and overspending in election years were not followed by a consolidation period. This phenomenon started once the declining debt ration of the previous period reached a sufficiently low level, therefore the intensified effect of political distortions over the debt cycle, described by Battaglini, can be assumed prior to any statistical analysis. Furthermore, since the crisis of 2008 caught the Hungarian economy with a relatively high public debt ratio, therefore countercyclical fiscal policies could take no place while there is also no sign of fiscal loosening in the electoral year.

4.2 Cross-country analysis about the effect of political factors on public debt

First of all, to summarize the previous chapters before an in-depth analysis of the results, it is necessary to reiterate the research questions in order to keep the focus of further analysis. The first question this thesis addresses is whether there is a common regional pattern of long-term public debt accumulation in East Central Europe (defined as the countries that joined the EU in 2004 except Malta and Cyprus) and whether Hungary should be considered as an outlier within the region or not. The second question addressed by the thesis is whether the dynamic integrated model developed by Marco Battaglini claiming for a nonlinear relationship between political distortions, business cycles and debt accumulation is a more relevant framework to explain the trends of debt accumulation in the selected group of countries.

The statistical analysis that aimed to answer these questions was made on the sample of all EU member states till the 2007 adhesion of the European Union and considering the time period between 1990 and 2012. The selected methodology was a panel data analysis including unobserved fixed effects for each year and each member state.

Based on theoretical overview and the empirical implications derived from each model, it is possible to make assumptions about the expected direction of the coefficients in each model. My assumptions are summarized in Table 3. In general in expect countercyclical fiscal policies: decreasing public debt when the economic growth is higher or the international economic environment is favorable and increasing public debt when the unemployment rate is growing. The expectations related to inflation rate are mixed because it can inflate debts when the share of domestic sources is high but it can also signal economic problems that would imply increasing debt rates. According to the theoretical overview about political distortions I expect increasing debt in election years and during minority governments and decreasing public debt during left wing and caretaker governments. Furthermore, based on my interpretation of Battaglini's dynamic model I expect higher effects of political factors when the scope of this study, I expect that membership in the EU also leads to decreasing public debts since it means external fiscal regulations for the member states. I have no prior expectations about the direction of the regional effect, since my research question only address its presence not the direction.

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Variable	Expected direction	Reasons						
SUSTAINABILITY								
spiral	+	Growing debt service leads to higher debt when not compensated with growth						
lb	-	High levels of public debt creates incentives for consolidation						
ECONOMIC EN	VIRONMENT							
dU	+	High unemployment leads to higher social transfers, and a need for government intervention in the economy (Keynes)						
growth	-	Countercyclical fiscal policy, higher debt accumulation in recession (Barro, Keynes)						
dinfl	-	High inflation can inflate public debt and signal economic or liquidity crises(Alesina- Drazen and Keynes)						
POLITICAL DIS	TORTIONS							
election	+	Fiscal overspending is higher in election years (Alesina-Tabellini)						
left	-	Less debt accumulation during left wing governments (Persson-Svensson)						
caretaker	-	Caretaker governments are not motivated by reelection meaning less political bias						
Minority	+	Less likely to adapt reform based on the war of attrition model (Alesina-Drazen)						
PDUMxgrowth	+	The effect of political distortions are higher in economic prosperity (Battaglini)						
INTERNATIONA	AL ENVIRONMENT							
Oecd	+	Similar as domestic growth						
EU	-	European fiscal regulation						
CEE	+/-							

The outcomes of the analysis are presented in Table 4, unobserved country are only presented for Central European countries and sequencing effects are also not presented in the table although they were included during the calculations for all member states and all time period.

The outputs suggest that there is strong evidence that macroeconomic factors have effect of the dynamics of public debt accumulation. Economic growth, unemployment, inflation and the spiral of dept. service proved to be statistically significant in all models and the direction of the estimated effects are consistent across all models as well. Comparing the results with the expectations I made based on the related theory overview, most results supports the theories presented in this study:

- *Growth*. According to seven out of nine models, it can be stated with 99% confidence that 1% percentage point growth in the national economy reduces public debt rate by an estimated 0.4-0.48 percentage point in member states. This supports the countercyclical fiscal policy hypothesis.
- Unemployment. According to all models covered in this analysis, we can say with at least 95% confidence that 1 percentage point increase in unemployment rates results in 0.45-0.57 percentage point increase in public debt levels on average in the member states. This supports the countercyclical hypothesis as well.
- *Inflation*. According to all models, we can state with at least 95% confidence that one percentage point increase in the inflation rate results in an estimated increase between 0.19 and 0.33 percentage point in public debts on average in the member states. This contradicts to the Keynesian theory of inflating public debt away, possibly because of the high share of foreign sources in the average public debt portfolio.
- *Debt spiral*. Based on the analysis, we can state with at least 95% confidence that one percentage point increase in the variable spiral (that is the level of debt service not compensated by economic growth) generates 0.21-0.72 increase in public debt levels.
- OECD. Not surprisingly the average OECD debt rate has decreasing effect on the public debt rates on average. According to seven out of nine models, it can be said with at least 90% confidence that 1 percentage point increase in the average growth rates of OECD countries results in an estimated 0.39-0.42 percentage point decrease in average public debt rates.

Existing levels of public debt also have statistically significant effect on future debt accumulation based on the analysis. According to seven out of nine models, it can be stated with 99% confidence

that 1 percentage point higher debt rates in the beginning of the year results in an estimated 6-7 percentage point decrease in average public debt rates in the given period. This implies that there is an upper threshold for public debt rates in most countries. Not surprisingly, debt accumulation slowed down in periods when the initial debt rate was already higher and in periods of higher growth. This suggests that in Europe countercyclical fiscal policies characterized the period of interest where the estimated debt accumulation was higher during economic slowdowns. On the other hand, the estimated negative effect of initial debt levels on further debt accumulation suggest that stabilization policies were also important during the period. Therefore, countercyclical and stabilization effects affected in a parallel fashion, and there is no necessary contradiction between the two. The positive estimated effects of inflation and unemployment on the level of debt accumulation also suggest countercyclical trends in European fiscal policies. Not surprisingly, increased debt service, measured by the spiral variable, resulted in an increase in the debt level as well.

While there is strong evidence supporting the relationship between macroeconomic variables and public debt accumulation, the results suggest less clean-cut relationship between political variables and public debt accumulation. The analysis found evidence for the linear relationship between public debt accumulation and political variables only in two cases: the party position of the incumbent government and the presence of a caretaker government.

- *Left.* According to the interaction model of party positions (Model 5), it can be said with 95% confidence that public debt increases by 1.6 percentage point more in years when left wing governments are in office. This contradicts to the assumptions of the Persson-Svensson model.
- *Caretaker*. According to the models measuring the influence of a caretaker government on public debt accumulation trend (Model 6 and Model 7) the average government debt rate decreases by 2.2-2.6 percentage point more on average in years when a caretaker government holds office (at 95% confidence level). This evidence supports the assumption that

governments less accountable by the electorate are more committed towards fiscal consolidation.

These are impressive results but from the perspective of this paper the most important variables are the interaction terms between political distortions and economic growth and the unobserved regional and country effects.

Looking on the interaction terms, we can find consistent supporting evidence for Battaglini's thesis that the political bias is stronger under favorable economic conditions in all four models involving interaction:

- The estimated effect of electoral years on public debt accumulation is 0.2 percentage point higher in years when the economic growth is 1 percentage point higher (with 90% confidence)
- The estimated effect of left wing governments on public debt accumulation is 0.3 percentage points smaller when the growth is 1 percentage point higher. This supports the argument that left wing governments are more likely to generate deficits in recessions. This contradicts to Battaglini's thesis, although it is not such a surprising result. It reflects the fact that during economic downturn leftwing governments might face contradictory pressures for macroeconomic stabilization and sheltering the society. Therefore leftwing governments might tend to implement more countercyclical policies during economic downturn and thus cause rising debt later.
- The estimate effect of a caretaker government in office when the growth rate is 1 percentage point higher is 0.8 percent (with 99% confidence)
- The estimated increase of public debt rates is 0.2 higher during minority governments when the economic growth is 1 percentage point higher (with 90% confidence)

Moreover, the models based on Battaglini have consistently higher explanatory values, measured by R-squared. Here I have to note that we tested for the interaction between political dummies and the

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initial level of public debt as well (as suggested by Battaglini) but growth rates proved to be better proxies for measuring the general economic environment. The reason is that capital markets allow for different debt levels in different countries; therefore it is not a suitable measurement for comparative analysis. Consequently, we can conclude that the models supplemented with interaction terms (that is our preliminary added value to the literature about the empirical test of public debt accumulation) proved a systematically better way to understand the dynamics of debt accumulation and the political bias affecting that. Typically, political bias have significantly higher effect on debt accumulation during periods of higher growth, consequently there is more evidence in favor rather than against the thesis of Battaglini.

Furthermore, the estimated effect of the membership in the European Union is that in periods when the countries were already EU members the estimated debt accumulation was 2,1-2,7% lower than in years prior to EU membership. This result suggests that the fiscal austerity measures on the EU level are indeed

There is also strong evidence, that the Central European region has some unobserved unique characteristics when it comes to debt accumulation and it involves similar patterns across the countries in the region. Once I have controlled for the unobserved regional effect with the *CEE* variable, the previously significant unobserved country effects lost their explanatory power. This implies that regional characteristics cover most of the deviation between the public debt trend in the region and in other EU member states. According to the statistical outputs, it can be stated with 99% confidence that the estimated public debt accumulation was 6.3-8.5 percentage points higher in Central Europe compared to other member states. This robust difference could be the result of significantly lower initial debt rates in CEE countries in the beginning of the nineties than in other member states, therefore there was more room for maneuver. On the other hand, there is no statistically significant unobserved country effects in Central European member states despite the seemingly divergent trends we can see in Figure 7, including Hungary.

Therefore there is strong statistical evidence that public debt accumulation can be explained by similar factors in the Central European on one hand. On the other hand, based on the results of this empirical test, we have to reject the hypothesis, that the Hungarian case would be so specific in its nature once we control for the regional effect of CEE countries, since I have found no evidence that there would be some unobserved country effect that would support the specificity of the Hungarian case.

Estimated country effects outside the Central European region, although not presented in the table also have some interesting features. On one hand, it is striking that in the case of member states usually described as "problem states" within the euro zone (such as Ireland, Italy, Spain, and Greece) there are significant unobserved effects in place.

To summarize, my results provide strong support for my hypothesis that empirical models based on Battaglini have a higher explanatory power when the aim is to capture the relationship between the features of the political system and public debt trends. It also true based on the analysis, that there is a significant partisan effect with higher government spending during left wing governments. I have also found significant effect of EU membership on the accumulation of public debt due to the impact of fiscal regulations on the European level. On the other hand, I have found an existing regional effect for Central Eastern Europe but no evidence for unobserved country effect in Hungary or any other central European states. In overall, I have found evidence that political factors affect debt accumulation significantly more under favorable economic environment characterized by higher growth and that the Hungarian case fits the long term trends of the central European region.

	Baseline	• 1	Election	1	Election	2	Left1		Left2		Caretaker	1 (Caretaker2	2	Minority		Minority2	2
PDUM			.00467		0018		.0068		.01629	***	0228	**	0261	**	00428		01059	
			.0042		.0056		.0044		.00556		.0106		.01058		.00539		.00649	
DPUMxgrowth	1				.0024	*			0034	***			.00845	***			.00218	*
					.0014				.0012				.0032				.00126	
EU	0273	***	0274	***	0287	***	0228	***	0212	***	0267	***	0261	***	02618	***	0258	***
	(.0073)		.0073		.0074		.0076		.0076		.0073		.00729		.00734		.0073	
lb	0608	***	06036	***	0587	***	0154		01309		0608	***	0513	***	06753	***	0700	***
	(.0168)		.01689		.01689		.0178		.01769		.0168		.01709		.01704		.01705	
growth	0044	***	0044	***	0048	***	0032	**	0022		0043	***	0040	***	0044	***	00478	***
	(.0011)		.00115		.0012		.0013		.00135		.0011		.00115		.00115		.00116	
du	.0045	**	.0045	**	.0045	**	.0056	***	.00568	***	.0047	**	.0052	***	.0044	**	.00511	**
	(.0019)		.0019		.0019		.0020		.00199		.0019		.0019		.00194		.00198	
dinfl	.0019	**	.0019	**	.0020	**	.0033	***	.00307	***	.00209	***	.00249	***	.00187	**	.00212	***
	(.0007)		.0008		.0007		.00088		.00088		.00078		.0008		.00078		.00079	
spiral	.0021	**	.0021	**	.0022	**	.00718	***	.00699	***	.0026	**	.00408	***	.0021	**	.00218	**
	(.0010)		.0010		.0010		.0015		.0015		.0010		.00115		.00099		.00099	
oecd	0039	*	0042	*	0042	*	0017		00089		0039	**	0039	**	00390	**	00387	*
	(.0023)		.0024		.0024		.00247		.00247		.0023		.00233		.00234		.00234	
CEE	.0838	***	.0822	***	.0828	***	.07119	***	.0633	***	.0833	***	.0827	***	.0847	***	.08543	***
	(.0151)		.01517		.0151		.0185		.0185		.01505		.01495		.0145		.01504	
CZ	01019		0102		0104		01259		0111		00668		00559		00738		00637	
	(.0148)		.0148		.0148		.01829		.0181		.01489		.01480		.01453		.01494	
EN	0238		0236		0244		0201		0215		02418		0239		02348		02252	
	(.0154)		.0154		.0154		.0183		.0181		.0154		.0153		.01490		.01543	
HU	0012		0014		0027		0216		0212		.00028		0006		.00256		.00512	
	(.0167)		.0167		.0167		.0205		.02036		.0166		.0166		.01678		.01680	
LV	0012		0015		0028		0		0		00135		00139		0		00179	
	(.0158)		.0158		.0158	((omitted)	(omitted)	.01577		.01567		(omitted)		.01573	
LH	0		0		0		0042		.00248		0		0		.00129		0	
	(omitted))	(omitted)	(omitted)	.01908		.0191		(omitted)		(omitted)		.01577		(omitted))
PL	.00437		.0039		.0032		0028		00227		.00496		.0042		.0070		.00836	
	(.0155)		.0155		.0155		.0189		.01875		.0155		.0153		.01535		.01549	
SR	.0051		.0048		.0038		00168		00105		.0067		.00503		.00659		.00703	
	(.0148)		.0148		.01485		.0183		.01814		.0148		.0147		.01459		.01481	
SLO	.0003		.0000		0002		0041		00501		.0003		00019		.00154		.00218	
	(.0152)		.01517		.0151		.0186		.01845		.0151		.01501		.01479		.01511	

* if p<0.1 ** if p<005 *** p<0.01

Conclusion and discussion

The starting point of my thesis was the returning argument that Hungary is some kind of regional outlier, the "sick man" of the Central European region when it comes to public finances and public debt accumulation. While my analysis supported this argument, if one looks at the fiscal trends during the first decade of the new millennia, since in this period (2000-2008), is seems clear that Hungary was the only Central European member state with an increasing debt ratio and it is characterized by higher overall debt rates compared to the region. I have argued that the statement about Hungary as an outlier stands on three pillars: the extensive debt accumulation prior to the crisis, efforts towards debt reduction after the crisis and a significantly higher debt rate compared to the region.

The first aim of this thesis was to examine the long-term trends of Hungarian and regional public debt accumulation, to find out whether we there are any common characteristics within the region and how does Hungary relate to the rest of the region. The second aim was to find an empirical model that captures the relationship between the features the political system in a given country and the characteristics of its public debt accumulation.

The first chapter provided a historical overview about the two decades of the Hungarian debt accumulation in a comparative perspective. It addresses the possible explanations of the unique features of the Hungarian case, namely, identifying the possible factors that led to the view that Hungary is an outlier in the region when it comes to its debt accumulation.

The second chapter discussed the literature about the political distortions affecting public debt accumulation. I mostly relied on the debt models of the positive political economy literature, because since the early nineties it has developed several general theoretical and empirical models that explain the cross-country phenomena of public debt accumulation (Alesina and Tabellini 1990, Persson and Svensson 1989), which allows handling a larger set of countries over an extended time period. Therefore as theoretical basis different models within the positive theories of the new political economy are used, with possible empirical classifications. This includes the neoclassical tax smoothing model of Barro (1973) as baseline model, and other approaches commonly used to

explain the effects of institutional differences and political distortions, such as the theory of fiscal illusions (Buchanan and Wagner 1977) and rational opportunistic and partisan models (Alesina and Tabellini 1990, Persson and Svensson 1989, Alesina et al 1997, Alesina and Drazen 1991). Besides the usual models, chapter introduced the empirical test of a relatively new model by Marco Battaglini (2011) – one he identifies as the general theory of public debt. Including this particular model was important as it provides an understanding of how the general economic environment and the initial level of public debt interacts with political distortions in defining present levels of government overspending.

The third chapter introduced methodological issues, including the classification of the dependent and independent variables, description of the data used during the analysis and the specific models I used during the statistical analysis. The methodology of this analysis can be described as a time-series panel data analysis to examine the explanatory power of different empirical models to describe the trends of public debt accumulation and the role of political distortions within the process.

Although the analysis covers all member states of the European Union, the primary focus is the Central European region, and more specifically Hungary, since it is a region where the debt accumulation trends are relatively uncovered in the literature. Most literature on the ongoing sovereign debt crisis of Europe focuses on 'problem states' in the euro area, their unsustainable level of public debt, and the ways of a possible budget consolidation. However, some states in the Eastern region of the European Union had to face similar crises in public finances, even where debt levels were well below the usual rates considered sustainable. Therefore, these countries also had to commit themselves to the consolidation of their fiscal policies to maintain the funding on the international markets. As the long term trends of the accumulation and reduction of public debt is the result of several political and economic factors, the study of these effects in the past may contribute to a better understanding of the possible future path of public debt, given a certain political and economic environment. In this sense, the study of long-term trends of debt accumulation in the region is necessary to understand the underlying factors behind these budget cycles. Although empirical models of debt accumulation are relatively well covered in the literature (Alesina, Roubini, and Cohen 1997, Reinhart and Rogoff 2010),they mostly focus on the United States and OECD countries. This study aims to partially cover this gap in the literature, by providing a test for different empirical models of debt accumulation in the European Union, including several postsocialist countries.

The forth chapter summarized the results of the empirical test by highlighting the lack of any specific country effects regarding Hungary, a strong evidence for a unique Central European regional effect and the benefits of using the integrated model of Battaglini to describe debt accumulation in a dynamic framework.

The core finding of my analysis could be summarized along the following terms. I have found strong support for my hypothesis that empirical models based on Battaglini have a higher explanatory power when the aim is to capture the relationship between the features of the political system and public debt trends. It also true based on the analysis, that there is a significant partisan effect with higher government spending during left wing governments. I have also found significant effect of EU membership on the accumulation of public debt due to the impact of fiscal regulations on the European level. On the other hand, I have found an existing regional effect for Central Eastern Europe but no evidence for unobserved country effect in Hungary or any other central European states. In overall, I have found evidence that political factors affect debt accumulation significantly more under favorable economic environment characterized by higher growth and that the Hungarian case fits the long term trends of the central European region.

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