

Judit Kalman
Central European University, Hungary
judit.kalman2@gmail.com

**Some Political Economy Insights to Multi-Level Government Financing Mechanisms
in Hungary**

Analysis of political budget cycles and partisanship in municipal investment activities and
central grant distribution¹

Abstract

There is a growing literature on the political economy of public finance, however most of it deals with central government behaviour. Observation of the first and second generation of the fiscal federalism literature together with the *political economy of intergovernmental grants* and the widening literature on *political budget cycles* makes it obvious that although decentralization is a continuing policy trend in reality there are institutional, political factors that can increase the chances for inefficient policy outcomes. *Infrastructure investment finances* - at all levels of government – are *especially prone to election cycles* and corruption, due to high visibility, high expenditures, lobbying by special interests, possible control by politicians, yet they strongly effect long run growth prospects and productivity of a country.

As a major political influencing factor affecting public finance decisions can come through the incentives of election cycles, this analysis finds *evidence of electoral cycle effects and partisan (political color) considerations in intergovernmental grant distribution and in municipal investment activities* – for the case of Hungary. Hypotheses on determinants of investment outlays of local governments and for partisan (political color) effects in grant reciprocity chances are tested with linear and Probit panel regressions respectively on a panel dataset comprehensive for *all* Hungarian local government budgets from 1993-2003, a period bridging *three election cycles*, linked with some demographic, socioeconomic and local election data.

Key words: political economy, local public finance, political budget cycles, infrastructure, intergovernmental grants, Hungary

JEL codes: H72, H77, D 72

¹ Working Paper to be presented at the ‘Innovation for Good Local and Regional Governance – A European Challenge’ Conference, April2-3, 2009 Enschede, the Netherlands

„Long before the appointed day [of presidential election] arrives, the election becomes the greatest, and one might say the only, affair occupying men’s minds... The President ... no longer rules in the interest of the state, but in that of his own reelection; he prostrates himself before the majority, and often, instead of resisting their passions as duty requires, he hastens to anticipate their caprices.”

Alexis de Tocqueville, Democracy in America, 1848

1. Introduction

How do political institutions affect economic policy choices? This question frames much of recent research in comparative political economy and within it, aspects of fiscal policy are a main focus. Parallel to globalizing tendencies in organization of economic activities there is a growing number of countries re-examining the roles of government and their partnerships with the private sector and civil society. This rethinking has led to a renewed recent interest in the principles and practices of fiscal federalism. In the European Union, with the return of economic growth after enlargement, institutional reforms and further decentralization are continuing, especially in the new Member States. According to recent data, *local governments have become important players in the economy*: total sub-national (i.e. local and regional) public expenditure has been increasing for many years, along with growing responsibilities transferred from central governments: 1,374 billion Euros total in Europe in year 2005, taking 12,7% of GDP (including federal states the respective numbers are 1,726 billion and 15,9%). Furthermore, *capital investment is an area where sub-national governments take the lead within the public sector*; as they were responsible for two-thirds of all public capital expenditure in 2005 in EU, with 176 billion Euros invested (DEXIA-CCRE, 2006 p. 1.)

However, observation of the first and second generation of literature on fiscal decentralization together with further branches of political economy, e.g. specifically on the political economy of intergovernmental grants and the widening literature on political business cycles makes it obvious that indeed there are *challenges to democratic governance* in this sphere: decentralization is a continuing policy trend – however in reality there are downsides², institutional, political and other factors that do interfere with decision-making and *can increase the chances for inefficient policy outcomes*. The major economic argument for decentralization - based on the very first insights provided by Oates, 1977 – is allocative efficiency, i.e. that it offers the chance to match public services more closely with local demands and preferences, thus there are possible *efficiency gains*. Whereas the political argument is to build *more responsible and accountable government* from bottom-up. Several recent cross-country empirical papers have proved a positive link between decentralization and governance³.

The actual setup of decentralized fiscal, institutional and political environment significantly influences the incentives and behavior of included actors (central, local governments, local electorate), thus also greatly affects to what extent the efficiency gains or costs of decentralization can manifest themselves. Accordingly, analyses of local government

² Several criticisms of heavy reliance on decentralization have evolved (Prud’Homme 1995, Tanzi 1996, Hommes 1996, Inman-Rubinfeld 1997, Treisman 2002 etc.) since it brings coordination problems which can result in increased disparity across regions and localities, loss of macroeconomic stability and prudent fiscal management, efficiency can be undermined due to a great need for central government intervention (“trap” of decentralization), insufficient information, incentive problems can eventually lead to strategic behavior and thus to management problems, scope of corruption within government might be increased by decentralization etc.

³ de Mello and Barenstein, (2001), Huther and Shah (1998).

policies can only be adequate if they try to account for the complexity of actors and incentive mechanisms that modern local governance exhibits in practice. This view is by now generally shared in the public economist club as well: in a review on the role of public choice considerations in normative public economics, classical public economics scholar Robin Boadway lists certain areas of research where public choice considerations cannot be avoided and among them he explicitly mentions inter-jurisdictional fiscal arrangements. (Boadway, 2002:64)⁴.

Political economy of inter-governmental grants

Decentralization outcomes depend to a great extent on the design of *fiscal transfers* from the central government (see e.g. Shah 2005, Shah 2006) – especially in countries where the majority of municipalities do not have access to substantial local own resources. The political economy approach to grants emphasizes the relative importance of political factors compared to traditional “equity/efficiency tradeoff” considerations: e.g. assuming a self-interested government, private incentives of politicians who will use intergovernmental grants to stay in power (opportunistic political budget cycles) and results of collective decision making mechanisms, such as vote trading, legislative bargaining etc become driving forces. However this literature is still much thinner than the traditional public finance one. Here *grants* are acknowledged to *provide more direct political benefits* to the recipient government politicians, as they allow them to expand on vote-generating *visible expenditure items without the pain of additional taxation*, however in exchange they deliver political capital/votes of supporters and of interest group for the higher level government and its ruling party too.

Infrastructure investment finances – at all levels – are especially prone to the effects of political considerations (bargaining, lobbying, election cycles and corruption) due to high expenditures, involvement of public procurement, higher visibility of projects, offering more transferable political capital for incumbents at next elections etc.⁵ – however they strongly affect productivity and long-run growth prospects of a country⁶. Since public infrastructure provision has truly lots of spill-over effects involved, it is a shared responsibility between levels of governments and also one major area for intergovernmental grants. Yet, surprisingly there is rather limited literature on public capital investment. A summary of the fiscal federalism perspective on infrastructure policy discussing optimal rules for the provision is given in the concise paper of Hulten-Schwab, 1997, who argue that “*theory and practice are hard to match*”. Recent new empirical literature shows that variations in intergovernmental transfers (including infrastructure related ones) to sub-national entities within countries cannot be simply explained without *political variables* representing *electoral incentives*⁷ – all coming to a conclusion that *grants are indeed determined/influenced to some extent by the political game*. Clearly, fixed formulas of unconditional grants tie the hands of the decision-maker hands more, as there is no yearly negotiation; while *more flexible formulas or conditional grants* (which infrastructure grants usually are) allow *a more discretionary*

⁴ See for example ‘Political Economy and Public Finance’, an excellent book compiled from the proceedings of a past congress of the International Institute of Public Finance, 2002

⁵ e.g. Cadot et al, 1999, Romp and de Haan 2005 etc.

⁶ Though the magnitude of estimated elasticity of capital spent on infrastructure or the direction of causality (i.e. from infrastructure to output or from output to infrastructure) and appropriate empirical methodology is constantly debated in the so called ‘infrastructure-debate’ since the influential paper series by Aschauer (1988,1989) - see e.g. Gramlich,1994 for an overview.

⁷ Wright, 1974, Wildawsky, 1984, Inman-Rubinfeld,1997, Dixit-Londregan 1998, Inman, 1988, Grossman, 1994, Worthington-Dollery, 1998, Johansson, 2003, Pinho-Veiga, 2007

distribution and even a strategic use of resources by political parties, e.g. for the purposes of reelection or other political interests (Johansson,2003). Rules themselves can also be subject to changes in subsequent governments' budgets as part of political maneuvering.⁸ Previous research has stressed specific political roles for redistributive spending programs. In one perspective '*pork barrel*' programs⁹ serve the purpose of electoral competition among political parties through „vote-buying”. Thus such programs are usually characterized by lack of proper information about the costs. They usually provide political benefits; hence grater number and scale of projects will be chosen than would have been economically efficient.¹⁰

Political budget cycles –theory and empirical findings

Elections are meant to make officeholders accountable to the community. Barro (1973) is one of the early papers in modern economics formally dealing with the issue of how re-election chances can induce an incumbent to change his actions, though his assumption of a „representative voter” limits its applicability. Models that deal with economic cycles induced by the political cycle are called political business cycle (PBC) models. Although sometimes used interchangeably with political business cycle, originally the term *political budget cycle* referred specifically to a periodic, regular fluctuation in a government's *fiscal policies* induced by the cycle of elections.

Three generations of theoretical PBC models can be differentiated. First the literature concentrated on *outcome*, i.e. models emphasized *re-election objectives of politicians* who in order to maximize expected vote-share find it optimal to expand the economy before and tighten it after elections – irrespective of their ideological orientation. (Nordhaus, 1975)¹¹. When a policymaker can influence his chances of remaining in power, a key question is what his true objective is, simply to stay in office or to implement his specific program. Hence *opportunistic* (*office motivated*) policymakers can be contrasted with *partisan* ones (*ideologically different* program goals on issues they care for)¹². Opportunistic PBC models, like that of Nordhaus (1975) generally assume all voters to be identical, with no conflict of interests, being retrospective¹³, hence electoral manipulation is aimed at the (less than fully informed) representative voter. This model has generated a lot of subsequent research, but eventually was replaced by other models based on rational forward looking voter. It has been criticized for its assumption of naively irrational behavior of voters. The basic *partisan* model

⁸ Though of course one should keep in mind that one of the underlying classic economic arguments behind grant-financing is indeed the goal of altering local choices, in order to correct for spillover-effects, to allow fiscal equalization or foster economic development – and nothing is wrong with these cases. The focus here is rather on the issue of political and institutional factors altering the economic and especially the financing choices.

⁹ 'Pork barrel' is commonly referred to "when a collectively finance program whose benefits are concentrated in a small group is thought to have social costs that exceed the social benefits". (Drazen, 2002:327)

¹⁰ Social scientists have studied pork barrel politics in great detail, starting with seminal work of Ferejohn (1974) on politics of spending on river and harbor projects. Persson and Tabellini (2000) offer a comprehensive review and treatment of previous literature. (Weingast, 1995, Weingast, Shepsle, Johnsen, 1989)

¹¹ For a detailed, but informed description of the model see e.g. Drazen,2002:232-238.

¹² Nordhaus (1989) gives a well written, thorough summary of basic opportunistic and partisan PBC models.

¹³ In the literature on voting there is an ongoing debate as to whether voters vote retrospectively (i.e. based on past performance) or prospectively (based on promises). Keech, 1995 Ch.6. provides a careful summary on the issues and economic consequences. Interestingly, already in 1957, Downs argued that voting is mainly prospective, since the whole purpose is to select a future government, however he adds that when there is imperfect information any rational prospective voting is necessarily retrospective. Lewis-Beck, 1988 points out that there is empirical evidence for both type of behavior.

was first described by Hibbs (1977, 1987), who observed that Democrats and Republicans in the US have different positions on economic issues, such as inflation and unemployment.¹⁴

In the second generation of PBC models *signaling* is considered to be the driving force or analytical frame. Originating from Rogoff and Silbert (1988) and Rogoff (1990) these models stress the role of *temporary information asymmetries about the politicians' competence level*¹⁵. The basic idea behind this is that only someone who is very competent would put himself into the situation of worsening the budget, thereby greatly constrain a perhaps incompetent successor. Thus *deficit increases* before election-time when a competent politician is in office. However implications of this model for cycles in outcome (not policies) were ambiguous.

The third generation PBC models are based on *moral hazard* and lack such problems – examples are Persson and Tabellini (2000) and Shi and Svensson (2002), DeHaan-Mink(2005). As in the adverse selection models, each politician has some competence level, which is unknown to the electorate. But an additional assumption is also added, namely that *the politician does not know his competence level ex ante either*. The main intuition in these third generation moral hazard kind models is that the incumbent government can exert a *hidden effort*, i.e. use a *policy instrument the public cannot observe, which is a substitute for competence*. For example, if competence measures how well the politician can convert revenues into public goods, then the hidden effort is the government's short-term excess borrowing.

In empirical work (much less in quantity than theoretical.) evidence is mixed, and conclusions differ from each other, sometimes to a great extent – but there are some common lines. To better understand the empirical evidence, it is useful to divide them between studies concerning outcomes (e.g. inflation, unemployment, disposable income) and those dealing with policy instruments (transfers, money growth, other fiscal instruments)¹⁶. There is *no scholarly consensus on evidence for opportunistic cycles in the usage of policy instruments, especially fiscal transfers*, but also for monetary policy.¹⁷ The partisan PBC model has been tested much less than the opportunistic model. Generally there is agreement in the literature on the *existence of partisan effects* per se, results usually show partisan effects on measures of economic activity to be strongest in the first half of the terms; yet there is no consensus on which mechanisms (monetary or fiscal policy) really seem to be at work, i.e. are supported by the data.

There are two lines in the empirical predictions emerging from this perspective: one is that opportunistic politicians will be inclined to direct transfers towards their '*core supporters*', as they think this is the cheapest way to buy votes. The assumption is that parties will allocate more resources to the districts where they obtain higher political support. In this model, the parties' purpose is still to win the election, but because they are risk-averse they

¹⁴Hibbs responded to critics about irrational expectations with the idea of using fiscal variables (e.g. transfers) instead of monetary policy to influence economic activity.

¹⁵ As Drazen marks, competence is not to be understood as purely a characteristic of the policymaker himself, but rather is representing his relationship with his environment, e.g. how well an executive can reach his goals in a representative democracy depends crucially on his relations with the legislature. (Drazen, 2002:270)

¹⁶ A number of studies tested the opportunistic business cycle model for the US and other countries (e.g. Alesina-Roubini, 1992, Alesina, Cohen, Roubini 1992, Haynes and Stone 1989), however most of them found little or no support for the basic Nordhaus model of political cycle in economic activity outcomes, i.e. for unemployment, inflation or growth. See e.g. Alesina, Roubini and Cohen (1997) for a detailed summary of empirical research on opportunistic models.

¹⁷ Some authors find significant political effect evidence over specific time periods (Alesina, Cohen, Roubini 1992, Grier 1989, Williams 1990), while others (Alesina, Roubini, Cohen 1997) argue about the weakness of such evidence.

find it too risky to invest in swing voter groups and prefer to invest in the safer support groups¹⁸. The alternative view holds that politicians take the core supporters for granted, and thus spending will be allocated concentrating not on partisan (loyal) districts, but on the contrary, on *swing districts*, where there are more hesitant voters. The argument here is that it is more profitable for the incumbent government to invest – either directly in the form of central investments or investment grants – in the regions where more voters are likely to swing from one party to the other. (Lindbeck and Weibull, 1987, Dixit and Londregan, 1999)¹⁹

Some *institutional arrangements* or *political and economic conditions* may make creating such cycles easier or more difficult, or more or less worthwhile. The publication of Persson and Tabellini's careful examination and claim to have "uncovered strong constitutional effects on the presence and nature of electoral cycles in *fiscal policy*" (2003a: 267) provided a big stimulus to empirical research on such *cycles*. They argued that such cycles were prominent in but not confined to *presidential regimes*. Brender and Drazen (2005) argue that until recently, a PBC was generally thought to be a phenomenon of less developed economies.²⁰ Hallerberg et al. (2002) check if political business cycles exist in East European accession countries during the period 1990–99 and they find that these governments act very much like their OECD counterparts. They also try to manipulate the economy before elections where possible, but the tools they use depend upon the exchange rate regime and upon the institutional framework.²¹ More recent studies present evidence for the existence of a PBC in both developed and developing countries.²² Brender and Drazen (2005) bring the argument however, that the results of these studies are driven by the experience of so-called "new democracies", where fiscal manipulation may be effective because of the lack of experience with electoral politics in these countries. They argue that once the "new

¹⁸ Analyzing the political determination of unsystematic intergovernmental grants in Australia, Worthington and Dollery (1998) presume that grants are used by federal politicians to purchase political capital/chances for reelection. Their results reinforce such considerations – similar to the story of Grossman 1994, states with greater "political capital" seem to receive greater transfers - and also highlight the importance of including institutional factors into explanatory models. Khemani (2003) argues similarly that transfers in India are significantly greater to those states whose governments are of the same political party as the national government, moreover even amongst the partisan states, where party controls a smaller proportion of seats (i.e. there is more to gain) receive higher amounts of discretionary transfers.

¹⁹ Following these models, more recently Johansson (2003) provides evidence from panel data on Swedish municipalities for the years 1981-1995, that grants to municipalities are targeted to those localities with the most swing voters in elections.

²⁰ For example, Schuknecht (1996) found evidence for a PBC on a sample of 35 developing countries over the period 1970-92 and Block (2002) finds evidence for government deficit increases by 1.2 percentage points in election years for a cross-section of 44 Sub-Saharan African countries. Also, Schuknecht (2000) finds that incumbent governments tend to increase public investment prior to elections on a sample of 24 developing countries for the period of 1973–1992.

²¹ If the country has a flexible exchange rate, the government uses the tool of monetary expansions, while if the country maintains a fixed exchange rate regime the government engages in fiscal expansions, i.e. running larger budgets in election years. Independent monetary authorities can eliminate such cycles in countries with flexible exchange rates. Their conditional coefficients indicate that budget deficit worsens by 1.5% in pre-electoral periods in countries with fixed exchange rates. In countries with flexible exchange rates, there is a smaller move downward, but in this case the variable is not significant. (Hallerberg et al. 2002)

²² For example, Shi and Svensson (2002) - using the GMM method - show that significant pre-electoral increases (1 percentage point of GDP) in the government budget deficit exist for their panel of 91 developing and developed countries over the period 1975-95. But even the critical Alesina et al.(1997) find – using fixed effects estimates - a 0.6 percent of GDP higher budget deficit in election years for their panel of 13 OECD countries for the period of 1961-1993. Moreover, Persson and Tabellini (2002) report statistically significant tax decreases before elections in a sample of 60 democracies over the period 1960-98.

democracies” are removed from the sample, the PBC disappears.²³. Alt and Lassen (2005) focus specifically on advanced democracies and using a sample of nineteen OECD countries in the 1990’s they argue that among these significant opportunistic electoral cycles are conditional *on the transparency of budget institutions*.²⁴ In countries with less transparent institutions, the electoral cycle in fiscal policy appears, while no such election related fiscal policy movements show up in higher-transparency countries. Furthermore, in accordance with recent moral hazard-based PBC theory, they find that electoral cycles are larger in politically more polarized countries.

PBCs and local governments finance

There was so far surprisingly little attention given in the literature to the PBC issue with different levels of government, e.g. how its size or probability varies with lower levels – by far, research mostly focused on central government behavior and macroeconomic data. Yet the Rogoff-Sibert type PBC model is perfect candidate for empirical testing at local level, since there voters judge efficiency of public service production, which is the major activity of local governments. On the empirical side, Blais and Nadeau (1992) tested the existence of political fiscal cycles in ten Canadian provinces for over 30 years - their results were significant only in the year of election and most apparent in social services and road construction. Petterson Lindblom (2001) checked spending of Swedish municipalities and found that spending is 1.5 percentage points higher, while taxes are 0.4 percentage point lower in election years. Another oft-cited paper on Swedish municipalities politically motivated spending is Shi and Swenson (2002a and b). Writing about Portuguese municipal expenditure decisions, Veiga (2004) tests and proves that local politicians increase capital expenditures before elections, particularly on roads and street construction. Her results indicate that when a mayor belongs to the party dominating the municipal assembly, capital expenditures are higher. Estimating on the same Portuguese municipal panel data, Veiga and Veiga (2004) search political business cycles at the municipal level and find clear evidence for opportunistic behavior of local governments, with expenditures increasing in pre-election periods to signal competence and improve chances for re-election.

Baleras – da Silva Costa (2002) build a model on *political business cycles at the local level tier* as an explanation for a fiscal policy cycle. They check its empirical plausibility on Portuguese municipal data for the period 1986-93 with an error components econometric framework and they find evidence that local government *investment expenditures* are indeed *determined by* several politico-economic variables, such as *electoral calendar, re-candidacy decisions, political cohesion and intergovernmental transfers*. However they argue that such expenditure fluctuations can be interpreted as the outcome of rational behavior by fully

²³ In developed countries, especially old democracies, election-year deficits actually reduce the probability that a leader is reelected, with similar negative electoral effects of deficits in the earlier years of an incumbent's term in office. Higher growth rates of real GDP per-capita raise the probability of reelection only in the less developed countries and in new democracies, but voters are affected by performance in the whole term of the incumbent rather than in the election year itself. Low inflation is rewarded by voters only in the developed countries. On a sample of 74 countries over the period 1960-2003 they find no evidence that deficits help reelection in any group of countries - developed and less developed, new and old democracies, countries with different government or electoral systems, and countries with different levels of democracy

²⁴ However DeHaan-Mink(2006) check political budget cycles in countries in the Euro Area. Using a multivariate model for the period of 1999-2004 they find strong evidence that despite the introduction of the Stability and Growth Pact, incumbent fiscal policymakers are not too much restricted in the Euro area to increase deficits for re-election purposes, though strictly for the election year, and not for the prior one.

informed agents – but since they are bad for society overall, an incentive design to minimize their occurrence would be desired.

Sole Olle and Navarro, 2006 test effects of partisan alignment (that is local government of the same political color as the upper tier, central or regional, grantor governments) on the allocation of intergovernmental transfers on Spanish data for 1993-2003. They find results suggesting that such partisan alignment has a sizeable positive effect on the amount of grants received by municipalities.

From this literature summary it seems clear that there is a need for further research on the area of PBCs, both theoretical and empirical, due to the sparse and somewhat controversial body of evidence. As far as PBC versus multilevel governance and local finances are concerned, the rather small pool of available results definitely points to the need for further empirical research. This paper reports on political budget cycles and partisan motives in financing of local government infrastructure policies in Hungary between 1993-2003. Tests performed reveal that Hungarian local politicians do indeed increase capital expenditures before elections, as well as they receive more infrastructure related grants from the central government in election years. These findings fit with the rational opportunistic political budget cycle models (Rogoff-Sibert,1998) where incumbents increase public spending levels prior to elections as a signal of competence in order to increase their re-election chances. Regarding partisan theory, results show that local governments where the majority of the assembly is same political color as the central government have indeed significantly higher chances for grant reciprocity – which by supporting the loyalty (core supporters) argument in grant decisions highlight that the distribution of intergovernmental transfers is by all means a political issue.

Usage of municipal data for checking the existence of rational political budget cycles provides an excellent laboratory field, since the institutional context and policy instruments available are same for all localities; election dates are fixed, same day and defined exogenously – which makes such a panel more appealing in many aspects than cross-country ones in many aspects. Furthermore the compiled data set used in this analysis is large (comprehensive of all H. municipal budgets n=3130) from 1993-2003, a period bridging three electoral cycles and these expenditure and revenue data are nicely detailed, linked with some demographic, socioeconomic as well as election data.

The remainder of this paper is organized as follows: Section 2 discusses some background facts, determinants of local infrastructure financing in Hungary, Section 3 elaborates on data and estimation methods used in this analysis, Section 4 summarizes the empirical results and finally Section 5 gives some concluding remarks.

2. Some background facts on the Hungarian local government infrastructure policy

Hungarian local governments have a broad service provision responsibility, yet most of them are rather small (under 5000 and even a lot under 1000) – this way the system is a mix of large service provider Nordic and small, restricted responsibility Southern municipal traditions. The legal and financial framework established for fiscal decentralization in Hungary in 1990 set the basis for local autonomy and enables municipalities to establish local spending priorities, and to make the financing and tax decisions necessary to carry out these policies. The sources of revenue available to local governments are: own revenues; shared central taxes; and transfers and subsidies from the central government, including normative, targeted and other earmarked transfers. Own revenues include local taxes and fees, profits, dividends, rent and lease, duties, share of environmental protection fines and other revenues.

The largest source of local government revenues is *transfers* from the central government²⁵, but their share has declined from an earlier 64 to the current 51-53 percent. The share of *own revenues* has increased from 23 to 35 and then back to 30 percent in the second half of the 1990s, *shared revenues* (essentially the Personal Income Tax) have also risen, from 9 to 15 percent of the total. Taking both transfers and shared revenues into account, *roughly two-thirds of local government revenue still originates from the central government* – which curbs their financial autonomy to some extent. Hungarian local governments have legal autonomy in their operation and infrastructure spending decisions, irrespective of the source of revenues (i.e. they receive funds from different kinds of transfers but can use those freely), yet throughout the 1990s there was a significant shift from a general purpose grant allocation system toward a more rigid task financing system²⁶. One positive impact of the overall tightening of public finances and the decreasing share of the public sector in GDP throughout transition is that with less central support, local governments are somewhat forced to improve both their own revenue collections and local service efficiency. Nevertheless, the frequent changes of priorities, grant sharing, normatives and targets made it quite difficult for municipalities to forecast their budgets and use sound financial planning.

1. Table: Profile of subnational revenues: Composition by revenue source

Country / Year	Composition of subnational revenues (%)								
	tax revenues			non-tax revenues			grants		
	1997	1998	1999	1997	1998	1999	1997	1998	1999
Czech Republic	54.9	55.6	47.7	26.4	26.8	36.3	18.7	17.5	16.0
<i>Hungary</i>	<i>28.1</i>	<i>30.6</i>	<i>33.0</i>	<i>18.1</i>	<i>18.0</i>	<i>17.0</i>	<i>53.7</i>	<i>51.3</i>	<i>50.0</i>
Poland	37.6	36.4	24.5	28.0	27.8	24.2	34.3	35.8	51.3
Estonia	64.6	67.7	68.4	12.9	9.3	9.1	22.5	23.0	22.5
Latvia	53.9	54.0	56.0	20.7	21.4	20.4	25.3	24.6	23.6
Lithuania	65.7	74.1	91.0	4.7	4.0	4.8	29.6	21.8	4.1
OECD.Unweighted average. (Unitary states)	43.4	-	-	21.7	-	-	38.3	-	-

Source: OECD, Fiscal Design across Levels of Government, Paris 2001

²⁵ The share of revenues from transfers is *high* in Hungary, even by the standard of transition countries (higher than the Baltic countries, though lower than Bulgaria, Romania and Poland). One justification given for such a large component of Hungarian local government finance coming from transfers is that *local governments are responsible for health care and education* and wages for these sectors are financed from the national budget. Thus transfers include e.g. hospital financing from the Social Security Fund, which is of a special purpose type, i.e. it cannot be spent by the municipality on any other goal.

²⁶ Central government can have the most direct influence over local investment activities through its investment grant programs. Besides these, it has several important indirect effects on the environment of local investments: through current operational grants, it can influence the magnitude of the operational surplus of local governments or their credit ratings; for reasons of macroeconomic stability it can set limits to local government borrowing, and it can boost local investment borrowing by giving state guarantees or helping establishing municipal guarantee funds and last but not least it can accept or reject/give or withhold additional funding for their project proposals for EU Structural Funds, which are becoming the major investment financing sources in these years.

Regarding infrastructure Hungary's first ten years of transition meant major changes in the structure, ownership, organization, financing, investment and employment levels in infrastructure and services. Many of Hungary's fixed networks which imply no negative externalities and are characterized by low unit costs, e.g. natural gas distribution, electrical power and telephones were privatized and operate on a regional basis. Since 1990, Hungarian local governments have been responsible for investments in services according to their expenditure assignments; which meant serious tasks in maintenance and development, however they can identify priorities other than along the lines of mandatory or non-mandatory services. Some local government investment needs are related to the deferred replacement needs of the properties they inherited in the early 1990s, some are basic (line) infrastructure needs (these were especially so in the first half of the 1990s), some projects are to serve local economic development needs (e.g. industrial parks) or to fulfill local citizen/business priorities and a few prestige projects, usually before elections. While communal infrastructure investments not only serve to increase the standard of living of local citizens (or regional, for that matter); but also have a significant role in economic development as well. They can influence location choices of businesses and thus local employment possibilities, the magnitude of the local government tax base and ultimately the country's economic growth.

Capital investment of the overall local government sector has remained relatively stable at between **15-20% of total expenditures**. However, its ratio to GDP has fallen due to the decrease of local government share in GDP as a whole. The magnitude of basic infrastructure services (percentage of connectedness to gas, electricity and water) in Hungarian municipalities did indeed increase considerably between 1993 and 2003. At present local investment expenditures go to **five main sectors**: *water and sewage services, solid waste deposit and treatment, education, health care and administration*. The newest challenges concern wastewater collection and treatment, solid waste handling and *road construction*, the first two lie in the domain of local governments, the latter being an utmost priority of the *central government*. All three areas are important for meeting EU standards – and in fact already were in the focus of pre-accession and later Structural Funds provided by the EU – however these services involve large unit costs and externalities, hence increasing the level of service provision requires considerable investments.

Local government investment resources are still fairly **fragmented**, several aspects of the Hungarian local government finance system influence the evolution of investments. From local own revenues and grants given for current operational purposes, local government might have some *operational surplus*, which they can decide to use for investment purposes. Further possible sources for investment are *central investment subsidy programs, EU transfers, investment loans, local government bonds, citizen contributions and privatization revenues*. The central budget provides two major types of investment grants: addressed and targeted grants, there are sectoral programs run by ministries plus funding from EU Structural Funds. From the nature of investment projects, it follows that these grants are available and are given for a multi-year period, which also means that quite a significant portion (usually 80-90%) of the yearly planned total amounts in the central budget are already determined by ongoing projects. The central government transfers are **matching grants**, the grant element varies by sector but averages around 50% of project cost across sectors (increased by 10% of project cost if several local authorities jointly undertake a project) but can go up to 80-90% at certain programs for large projects. A basic issue is how the local government financing system joins with the *sectoral funding programs* - segmented decision making, lack of willingness for cooperation, conflicting interests between ministries cause efficiency losses. (Hegedüs et al 1996, Pires, 2001, World Bank, 2000).

The procedure to start new infrastructure investment projects is a complex and costly procedure, however the almost universal dependency on investment grants and problems in anticipating their future amounts or changing matching ratios makes it difficult for municipalities to plan these projects fully autonomously. (Jokay - Kalman-Kopany, 2004) Due to growing fiscal pressure in the local budgets (along with the tightening of public finances overall) the role of these investment transfers is large and has risen. According to policy analyses, the system encouraged LGs to adopt “*grant-seeking*” *behavior* and also several case studies (e.g. Jokay et al, 2004, Garzon, 1999) have shown how most local governments prioritize planned investment projects along the lines of grant or private sector financing availabilities and not along a long-term local economic development plan – which reflects how local autonomy is curbed.

2. Table

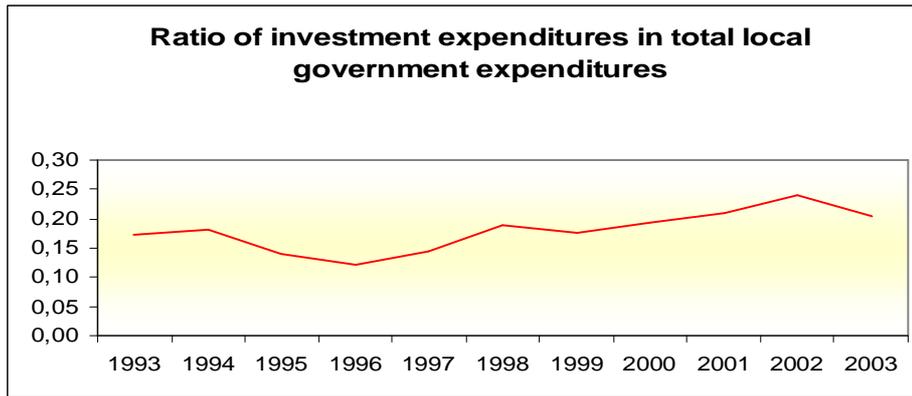
The Financial Sources of Local Government Capital Investment (1994–2001) [%]

	1994	1995	1996	1997	1998	1999	2000	2001
Loans	26	14	10	8	16	8	7	11
Revenue from privatization, property, shares etc.	31	54	67	67	30	40	45	31
Capital grants to local governments	33	34	35	37	36	39	42	50
Other (operating surplus)	9	-2	-13	-12	18	13	6	7
Total investment	100							

Source: Ministry of Finance.

Central government capital grants given to municipalities are more discretionary than operational ones (not all localities receive them), hence strategies for application/non-application and possibly lobbying can become important. Also precisely due to the discretionary nature there is supposedly more *room for bargaining and political considerations*, e.g. the literature on political budget cycles points out that they are much more visible in the investment side (and not so much in the operation one) of the budget (Romp de Haan, 2005). As the chart below for investment expenditures within total local government expenditures shows, election years (1994, 1998 and 2002) do in fact stand out, investments always start to increase even two years prior, then get really to their peaks in election years. There are no political economic type empirical analyses of these issues for Hungary yet, solely public finance and policy driven ones, which reinforce my choices in the empirical analysis to attempt to explicitly test some of these political variables, namely presence of election cycles and partisan aspects in local government investment outlays and investment grants given.

1. Chart: % of investment expenditures in total local government expenditures



source: own calculations – RPAA database

3. Data and estimation methods

For this analysis a *panel dataset* was built from the Regional Public Administration Authority database, which is *comprehensive for all Hungarian local government annual budgets* and balance sheets for the years 1993-2003, linked with some demographic and socioeconomic data from the “TSTAR” territorial database of the Hungarian Statistical Office and raw local election data from the Hungarian Ministry of Interior. All the financial variables are shown in *thousand HUFs and have been recalculated at 2003 prices*. In case of current expenditures, this recalculation for same prices has been based on the GDP deflator, while that of the investment expenditures was based on the price-indices of investments. For analytical purposes, the *city of Budapest*, local governments of capital districts and counties are *deliberately left out of the dataset, due to their very special status* in the institutional and budgeting structure. This practice is commonly followed by researchers dealing with Hungarian municipal data. Thus the final number of local governments included in the panel is $N=3130$. After several checkups and corrections, this database handles problems from different budget structures throughout different years, hence contains same data content for all years. The often yearly changing data-definitions of the TSTAR database of Hungarian CSO greatly constrain the number of variables that can be used for the whole term of 1993-2003. Definitions and descriptive statistics of variables used in regressions are given in the next section.

For reasons of easier comparison across municipalities, all variables are transformed to *per capita values* in the analysis, along with which the population of the municipality can be used as a size indicator as well as an indicator for congestion. Although theory would justify usage of logarithmized data as well, in this analysis I opted not to do this transformation, because *central investment grants (‘addressed and targeted grants’) are received by only a portion of municipalities* and for non-recipient municipalities (0-s in the gotgrant dummy variable used), the usage of logs would not make sense. Unfortunately very little data is available for public utility companies operating communal services in Hungary – only their relationship with local government balance sheets appears in the database used. This is an important limitation that has to be taken into account when evaluating results.²⁷

When analyzing macroeconomic time-series data from transition countries, a usual important aspect is to check for structural breaks due to changes in transition phases. Throughout transition, the Hungarian public household has undergone constant changes

²⁷ Total investment expenses of such utility companies do not show up in the local government balance sheets (although they are eligible for municipal investment grants from the center), hence the incentive effects of grants can be under-estimated based on balance-sheet data.

parallel to the macroeconomic conditions. The system of central investment grants to municipalities (addressed and targeted grants) was similarly characterized by constant changes (mostly of grant goals and matching ratios); however, the basic elements (e.g. eligibility criteria and matching nature) of the system remained unchanged in the whole period. One important change is noticeable throughout this time frame: except for the smallest local governments, the ratio and role of local own investment revenues (i.e. privatization revenues, asset sales, citizen contributions and investment loans) has increased in financing local infrastructure investments for all settlement types. This however is not considered a structural break, but rather a shift in the usage of different funds available for investment purposes.

Variables considered

Driven by hypothesis formulated from my literature review and also interviews with Hungarian experts and government officials I will concentrate on *partisan benefits and political budget cycles* in the local infrastructure policy context. Such arguments are often raised in Hungarian political discourse with respect to different colored central cabinets, but so far no systematic empirical investigation tried to check for its validity and possible extent. My estimates are a first attempt towards this direction.

“Political color same as central government” variables for the *mayor, absolute or relative majority of local assembly* are constructed from raw election data for the three election cycles involved. Election years were 1994, 1998 and 2002 – when national elections were always held in the spring and local elections followed a few months later the same year. Thus the political variables at my disposal are measured only when one election is held (at time $t=k$) and are constant until the next election (at time $t=k+4$), therefore, these are assumed as *a priori* known by the central government during the electoral mandate. Drawn from the partisan model, I expect a positive effect of these variables on investment grant reciprocity chances; the central government will invest more in those municipalities where the support of the local governments will ensure that this improvement will be easily capitalized in increased political support for the next elections.

For picking up the position in the *electoral cycle* (after checking for simple year-dummies, which always came out significant), I constructed a variable on *election distance* (el_dist) that takes values 3,2,1,0 and dummies for an *election year* (el-year) or *one year before election* (el_befor), which I use alternatively with election distance. Election distance is expected to have negative sign, while I expect election year and year before elections to have positive signs in both investment outlays and grant equations.

In order to include some *control variables* accounting for the *budget constraint* of each local government, in local investment equations *per capita municipal own current income* (pcmcinc), *per capita municipal own investment revenues* (pcmiinc) and *per capita investment transfer revenues* (pcgr1) are included, which are three distinct categories, hence the problem of multi-collinearity is avoided. In grant reciprocity equations, per capita municipal own current income (pcmcinc) and per capita own capital revenues (pcmiinc) are used. In the second round of model search, I changed these per capita controls with a decentralization measure that is percentage of own revenues in the local government budget due to the significant but more or less zero coefficients of the previous.

Yet, it should be noted that some of these variables are possibly endogenous ones, especially the municipal own investment revenues²⁸, as they can play a key role in a local government's decision on investment. To some extent, it can also be argued that grants can be considered endogenous, as they can alter a local government's project selection, and this way the same underlying factors determine the choice to apply for a grant and also the magnitude of total investment expenditures. On the other hand, however, grant allocation decisions made at the central government are after all out of the scope of local governments, hence I decided to treat the per capita amount of grant variable as exogenous²⁹. Nevertheless, I ran several model specifications, checked also reduced ones without the possibly endogenous controls and found basically the same results regarding the political variables of main interest.

Finally, I used several *socioeconomic control* variables in different combinations in the models, trying to capture equity and efficiency considerations. Ultimately, what should define investment activities of local governments are the kinds of local needs they face and available resources they have to fulfill the former. Needs are affected by the development level of the inherited infrastructure and that of the local economy as well as the needs of the citizenry. For example, I included an *indicator on local infrastructure level* (ind_infr : a composite indicator created from ones on percentage of flats connected to gas, electricity and water networks in municipalities) for need-based investment, expected with a negative sign both in investment as well as grant equations. Further possible *need indicators on education* (ind_okt), *social* (ind_szoc) and *health services* (ind_eu) were used, expected with positive signs. Share of *young population* (fiatal) and *old population* (oreg) were included to control for demographic variances in need for services, both expected with a positive sign for investments, but the latter I rather expected to be negative for grant reciprocity models, as I suspected that local health and recreational services were not among the highest-ranked goals for central grants. The *per capita personal income tax base* of the municipality (pcinc1) tries to control for the "wealth" of localities (or rather for their inhabitants, but since local governments still do receive a portion of the PIT collected at their territories, this variable is also a budget constraint one). I also checked some models by using *regional dummies* for the seven statistical (NUTS2) regions of Hungary.

3. Table: Description and expected signs of variables used in panel estimations

Variable	Description	Expected sign for LG investment	Expected sign for Grant reciprocity
pcinv1	per capita municipal inv. expenditures	Dep var	
pcinc1	per capita local PIT base	+	-
pcmcinc	per capita municipal current own income	+	-/+
pcmiinc	per capita municipal investment income	+	-/+
pcgr1	per capita investment grants received	+	n.a.
decentr1	% of own resources in LG budget	+	-/+
popul	population	+	+
ind_infr	indicator of local infrastructure endowment	-	-
ind_okt	indicator of local education demand	+	+
ind_eu	indicator of local health service demand	+	-/+
ind_szoc	indicator of local social service demand	+	+

²⁸ These can be coming from using/selling assets, financial investments etc.

²⁹ Running simultaneous equations could be another approach to treat this possible endogeneity, perhaps in a future version, subsequent research I will try that too.

young	% of young population	+	+
old	% of old population	+	-
<i>Dummies:</i>			
cl1_lgcg	local government political color same as central (absolute OR relative majority)		+
cl2_lgcg	local government political color same as central (absolute majority)		+
cl1_m_cg	mayor political color same as central government	+	+
el_year	election year	+	+
el_befor	year before election	+	+
el_dist	distance from next election year	-	-
gotgrant2	received central investment grants (addressed and targeted)		Dep.Var.

Estimation methods

As far as estimation methods are concerned, for investment equations (dependent variable *pcinv1*: per capita local investment expenditures) I used linear pooled OLS³⁰ and *panel regressions with fixed effects* which performed and fit quite well.³¹ The advantage of panel (also known as cross sectional time series) models over simple cross section data is the unique possibility to include and disaggregate dynamic relationships to cross sectional data, since one of the primary reasons for heterogeneity among individuals is the different history each has – thus panel data give greater flexibility to examine this *heterogeneity* across units (Greene, 2002:283). The most common model for analysis of panel data is the linear model, in which explanatory variables are taken to be exogenous. They allow the unobserved heterogeneity to be modeled with fixed effects or random effects³², or with no heterogeneity at all. In the case of fixed effects models, the intercepts are assumed to vary across individuals at the same point in time and, possibly, over time for all individuals together, while there are individual specific error terms across time. In the case of the random effects models, the variations are assumed to be random and uncorrelated with both explanatory variables and the latent disturbance term in the equation (Matyas-Sevestre, 1992 : 7-17).

The general specification for fixed effects panel models is the following:

$$y_{-it} = a_i + x_{-it} * B + u_{-i} + e_{-it}$$

where

x_{-it} are the time-varying explanatory variables

u_{-i} is the time-constant fixed error-component (individual-specific - of a municipality in our case)

e_{-it} is the overall error component

³⁰ Wooldridge (2002:256) states that under certain assumptions, the pooled OLS estimator can be used to obtain a consistent estimator of β s, but for inferences the usage of robust variance matrix estimator and robust test statistics are needed.

³¹ According to Matyas-Sevestre (1992:27) “when the sample is closed and exhaustive (like in the case of geographical regions or industrial sectors), fixed effects are natural candidates.” However, I also tried random effects, but the Hausman test always clearly indicated the usage of fixed effects regressions – thus the RE specifications results are not included in the summary tables.

³² In modern econometric language, “random effects” refers to zero correlation between the observed explanatory variables and the unobserved effect, while “fixed effects” means that we are allowing for some correlation between the unobserved effects and the observed explanatory variables (x_{-it}). (Wooldridge, 2002:252).

α_i (the constant) is also individual specific, and picks up information from unobserved heterogeneity or from omitted variables.

Estimations were carried out on the whole sample containing all the local governments, but to gain more insight on the details, they were also conducted for subsamples created along size categories (size), along categories of share of own revenues in the local budget (own_rev) – a kind of decentralization indicator and in the case of investment outlays for those only who did indeed received investment grants (with a dummy called gotgrant). Local government tasks and budgeting possibilities differ greatly among different settlement-types and sizes in Hungary, which justify this step of searching for the details from the big picture.

For grant equations however, which basically represent a discrete choice between getting or not getting investment grants, and we are most interested here in probabilities for these in different settings, I decided to create a binary variable called gotgrant (1= if LG has received central investment grants in that year, 0= otherwise) and use probability models for a limited (binary) dependent variable. Estimations were done using the Linear Probability Model (OLS estimations) as well as Probit (maximum likelihood estimations), both repeated in their panel form too (fixed effects for the linear model and random effects in the case of Probit. In binary response models, the primary interest is to explain the effects of various values of x on the response probability:

$$P(x) = p(y=1|x) = P(y=1 | x_1, x_2, \dots, x_k)$$

In the linear probability model, (LPM) β_1 is understood as the change in the probability of success, given a one-unit increase in x_1 .

$$P(y=1|x) = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \dots + \beta_k x_k$$

In the Probit model for binary response, the nonlinear functional form is the standard normal density and Probit estimates are calculated using Maximum Likelihood estimation. When using binary response models with panel data, it is necessary to note that probits can give reliable estimates only with random effects specifications. (Wooldridge, 2002:461)

The form for Probit model is the following:

$$\text{Prob}(Y = 1 | \mathbf{x}) = \int_{-\infty}^{\mathbf{x}'\boldsymbol{\beta}} \phi(t) dt = \Phi(\mathbf{x}'\boldsymbol{\beta}).$$

where function Φ is a commonly used notation for the standard normal distribution.

For modeling such binary responses (where by tradition $y=1$ means a success and $y=0$ a failure usually), discreteness of y does not necessarily mean that a linear model is inappropriate. Linear models have some drawbacks – heteroscedasticity can be present (except if all the slopes of the β s are zero), however we cannot get all β s to fall between 0 and 1 - hence a usual way is to apply heteroscedasticity-robust standard errors to avoid the first. Yet, econometricians agree that even with such weaknesses, the LPM can often give good estimates for the partial effects on the response probabilities, comparable with those obtained from nonlinear Probit and Logit models – the case for LPM being even stronger if most of the x -s are also discrete and take on only a few values. (Wooldridge, 2002:455) When using binary response models with panel data, it is necessary to note that probits can only give reliable estimates with random effects specifications. (Ibid. 461)

In order to avoid the usual econometric caveats, I was very careful with variable selection and model design strongly linked to theory and economic sense, and also before making any interpretation based upon the regression results, I checked for the following problems and made the necessary corrections.

a) *multicollinearity problem*: The greater the inter-correlation between the independent variables, the greater the problem of multicollinearity and the more difficult it is to obtain numerical values for each parameter separately; under full multicollinearity the least squares estimation does not work. As mentioned, the problem of possible multi-collinearity between different independent variables was excluded here by careful variable selection, besides which I also checked for correlations – a commonly used method for detecting multicollinearity – and found that explanatory variables in the equations are free from the multicollinearity problem.

b) *Heteroskedasticity problem*: If the error variance is not constant for all the observations, the heteroskedasticity problem is encountered. In the presence of this problem, parameter estimates are consistent, but usual standard errors and t-ratios will be incorrect and should not be used for inference. If the heteroskedasticity problem is detected, several corrective strategies are available such as transforming the data from the level form to a logarithmic form or by using per capita figures. For this reason and also for easier comparability, I opted to use per capita figures in this paper.

c.) *autocorrelation* (correlation with lagged values): “Autocorrelation is usually found in time-series data. Economic time series often display a “memory” in that variation around the regression function is not independent from one period to the next. Panel data sets, consisting of cross sections observed at several points in time, may exhibit both heteroscedasticity and autocorrelation.” (Greene, 2002:192) Autocorrelation staying in the residuum refer to not using some dynamic information, which can often be the case for panel data. Investment decisions and related financial flows are necessarily results of dynamic processes, however the estimation of a true dynamic model would be overly complicated for this database, hence I chose to rerun several of the linear and also the panel FE regressions using the Baltagi-Wu type of “one-step” AR(1) control process (first order autoregressive disturbance), as a second best solution. This resulted in some variables (year before elections and the need controls for social, health and educational services) losing their prior significance – see details in Table 1 in the Appendix – but generally my major findings remained the same.

4. Empirical Results

In this paper hypotheses on determinants of investment expenditures of local governments and chances for grant reciprocity were tested with several model specifications on a panel dataset *comprehensive for all Hungarian local government annual budgets and balance sheets for the years 1993-2003*. For investment equations estimations were carried out on the whole sample containing all the local governments, but to gain more insight they were also conducted for sub-samples created along categories of size, share of own revenues in the local budget – a kind of decentralization indicator and for the sub-sample of those only who did indeed receive investment grants. For *grant equations* however, which basically represent a discrete choice between getting or not getting investment grants, I used probability models for limited (binary) dependent variable. For these grant equations too, several models have been tested with different sets of control variables including decentralization ratio, regional dummies and even a version without any controls.

The following table gives the short summary of my most important findings (estimations on groups by size and own revenue categories are not summarized here for space reasons, but are provided in the Appendix in Tables 2,3 and 6,7.

4. Table: Summary of most important estimation results

Variable	Description	Models for per capita LG investment expenditures			Models for grant reciprocity (probability models)		
		Expected sign	Result (pooled OLS/ panel FE)	Result on subsample: received central inv.grants	Expected sign	Result LPM (pooled OLS/panel FE)	Result Probit (pooled/ panel)
Dep.vars:							
gotgrant2	received central invest. grants (addressed and targeted)				Dep.Var.		
pcinv1	per capita municipal inv. expenditures	Dep var			∅		
Political Dummies:							
el_year	election year	+	+++	+++	+	+ /not sign.	+
el_befor	year before election	+	+++	+++	+	-	-
el_dist	distance from next election year	-	---	---	-	Not sign.	Not sign.
cl1_lgcg	local government political color same as central (absolute or relative majority)				+	+	+
cl2_lgcg	local government political color same as central (absolute majority)				+	++	++
cl1_m_cg	mayor political color same as central government	+	+++	Not sign.	+	+	+
Other Expl. vars:							
pcinc1	per capita local PIT base	+	+	Not sign.	-	* 0 / ∅	* 0 / ∅
pcmcinc	per capita municipal current own income	+	++ / ∅	++ / ∅	- / +	* 0 / ∅	* 0 / ∅
pcmiinc	per capita municipal investment income	+	+++ / ∅	+++ / ∅	- / +	* 0 / ∅	* 0 / ∅
pcgr1	per capita investment grants received	+	+++	+++	∅	∅	∅
decentr1	% of own resources in LG budget	+	+++	+++	- / +	++ / +	++
lakos	population	+	* 0	* 0	+	* 0	* 0
ind_infr	indicator of local infrastructure endowment	-	--- / +++	Not sign. / +++	-	+ / -	+
ind_okt	indicator of local education demand	+	* 0	∅	+	* 0 / ∅	* 0 / ∅
ind_eu	indicator of local health service demand	+	* 0	∅	- / +	* 0 / ∅	* 0 / ∅
ind_szoc	indicator of local social service demand	+	* 0	∅	+	* 0 / ∅	* 0 / ∅
fiatal	% of young population	+	Not sign.	Not sign.	+	+	++ / +
oreg	% of old population	+	+++	Not sign.	-	--	-- / -

+/- : low positive /negative effect (coefficient or marginal effect under 7-10%)

++/-- : medium positive/negative effect (coefficient or marginal effect between 7-10 to 20-25%)

+++ / --- : strong positive/negative effect (coefficient or marginal effect above 20-25%)

not sign.: statistically not significant

* 0 : significant, but close to 0

∅ : not used in analysis

Political cycle considerations are present in local investment decisions - Linear Pooled OLS and Fixed Effects Panel Regressions

First I constructed several specifications, where the dependent variable per capita municipal investment was explained by the political cycle variables of most interest and also included different sets of control variables for local revenues and different need indicators. Estimations were carried out as simple pooled OLS and with panel fixed effects (FE), plus panel fixed effects corrected for autocorrelation (FE+AR) regressions. Tables in the appendix show the most successful ones.

After year dummies showed strong significance, political cycles were operationalized with variables for election year, the year before election and election distance separately included in models where the dependent variable was per capita local investment expenditure. The data covers three full cycles; hence significance and positive sign for the first two, and negative sign for election distance are taken as verification of the presence of political cycles. My variable for *election year is positive, as expected, and with very high coefficients*, strongly significant in all models and all (OLS, FE, FE+AR) specifications explaining per capita municipal investment expenditures i.e. my hypothesis that *municipal investment activities culminate in election years* – just prior to elections in order to please voters and improve re-election chances of mayors and local assembly – is accepted (Table 1). *Election distance is negative, as expected*, significant in all models and specifications and its coefficients are smaller, though one has to take into account that this variable is distributed over 4 years. Regardless, it clearly demonstrates that the further away the next elections are the less investments take place. The variable for the *year before elections* is most significant and positive in OLS and FE models, as expected, however loses its significance when panel FE regressions are corrected for autocorrelation. From these results, I can safely infer on the first hand, that indeed *political business cycles do exist in capital investment activities of Hungarian municipalities*.

Size. (Table 2) Checking *sub-samples* for size groups³³ reveals that *election cycles do matter for timing infrastructure investments in all size categories*: investments in the middle sized (15-40 000) cities do actually flourish in election years, for the groups of 4-10000 and under 4000 municipalities both political cycle variables are very significant and with the expected signs³⁴, while for the largest cities (above 40 000 – there are only 23 of them) neither election distance nor election year are significant in the OLS setup, however in panel FE regressions election year becomes significant and highly positive again.

Degree of decentralization. (Table 3) Checked for *groups by share of own revenues in the local budget*³⁵, it has to be noted that political cycle variables remain significant with relevant signs for all but the first group with the highest share of own revenues (above 40%). I

³³ Here the cut-points are for cities above 40 000, cities between 15-40 000, between 4-15 000 and under 4 000 - they were selected to ensure large enough case numbers in all categories.

³⁴ That the R² does improve considerably as we go towards the groups of smaller localities is not surprising, as the number of observations or number of LGs within each size groups also increase considerably – i.e. the overall model fits better in explaining per capita investment of smaller municipalities.

³⁵ It is a kind of *decentralization measure* (the ratio of own current and capital revenues in the total local budget) - a variable often used in the literature to reveal different patterns among localities. I created four categories: own resources in the LG budget above 40%, between 20-40%, 10-20% and under 10%, and redid the regressions for these groups in both pooled OLS and panel FE forms.

vaguely translate this result as follows: those who are decentralized enough to stand on their own and have sufficient own resources basically have the freedom to invest whenever they wish, or can even do so continuously, and do not necessarily need to time investments in visible, vote-generating projects for around election times.

Grant status. (Table 4) Rerunning the investment models on the sub-sample of those who received some grants throughout all of the 11 years, the number of LGs involved decreases to 2057 (and more than possibly there are repetitions in this, i.e. there are ones who received in all, but at least for several years, as these grants are given for more than one year). On this sub-sample however, the explanatory strength of my model improves to an almost suspicious 0.90 R²; I had expected it to improve, but not to this extent. The *most interesting election cycle variables all remain strongly significant and with very high coefficients* (now even that of year before election is a high positive one), i.e. ***in the group of those who did get grants for their investments, the political cycle remains very important in timing projects, and determining investment expenditures.*** This result confirms my assumption that I will find election cycle considerations important not only for investment per se, but for grant distributions too – see next section.

Political cycle considerations affect the central distribution of investment grants

For checking partisan effects in grant allocation, I have constructed separate probability models for central investment grant reciprocity chances, where I included variables of political color similarity for local assembly and mayor, however also some of the political cycle variables. In these *grant-probability models*, the election distance variable did not seem to work, though it did in the previous linear investment models. Election year definitely works fine and comes out significant and positive in all LPM and Probit, pooled and panel model specifications. Across the models, its coefficients or marginal effects show a **+2.5-4% more chance for grant receipt, if there is an election year.** Moreover, aggregate yearly data on new projects granted and grant amounts allocated show that indeed political cycles/election years are important in grant reciprocity, so all in all my hypothesis is highly reinforced.

Similarities of political color matter for central distribution of investment grants

In the above mentioned *investment cycle equations* (dependent variable: per capita investment expenditures) the only political color variable included was that of the mayor same as that of the central government. It comes out significant in panel regressions, in the reduced models, where it behaves as expected and with *very high positive coefficients* – i.e. ***investment outlays of a municipality are higher if the mayor political color is the same as central government ceteris paribus.*** In different specifications it behaves differently for the size groups, the most notable being the huge positive coefficients for the *middle-sized (15-40000) cities* – apparently *where mayor color matters, it matters a lot.* However it was insignificant for the grant-recipient sub-sample, which is also a call for checking it in another way, that is, in the probability models.

Since *grant decisions* basically represent a discrete choice between getting or not getting investment grants, and as we are most interested here in probabilities for these in different settings, I decided to create a binary variable called gotgrant (1= if LG has received central addressed and targeted investment grants³⁶ in that year, 0= otherwise) and use

³⁶ Though there are other investment purpose grants available, especially regional-development oriented TEKI and CEDA available from 1996, the allocation mechanisms are different for these, since it is regional authorities who actually collect applications and make the decisions. Since addressed and targeted investment grants are

probability models for limited (binary) dependent variable. For comparability and preciseness, estimations were done using the *Linear Probability Model* (OLS estimations) as well as *Probit* (maximum likelihood estimations), both repeated in their panel form too (fixed effects for the linear model and random effects in the case of Probit). Results using LPM are indeed quite similar to Probit versions. Several models have been tested with different sets of control variables including decentralization ratio, regional dummies and even a version without any controls. Unfortunately, here I had to use a reduced database, only containing years from 1995-2003, for reasons of data availability for the party affiliations in local governments (1993-94 missing) which were used to create the political color variables. Tables 5-7 in the Appendix give the best results, usually from panel Probit estimations, from which I highlight the most important findings. For Probit estimations, marginal effects are given in the tables, as these have the same meaning as beta coefficients in linear regressions.

In both LPM and Probit, pooled and panel estimates, I got plausible results, with significant color variables and right +/- signs. The best performing of these was the *political color of the absolute majority in local government same as that of central government* (cl2_lgcg) as this got significant and highest betas/marginal effects in most specifications. I found strongly significant (at 1%) results, showing that *if political color of the absolute majority in a local government is the same as the incumbent central government, the chances for getting investment grants are considerably increased (with +6-20% across different specifications³⁷)*. As far as the *political color similarity of the mayor* with that of central government (cl_m_cg) is concerned, it was also strongly significant across all specifications: *it raises chances for the municipality to get central investment grants by +2.5 - 15%*.

These are very strong results, reinforcing my hypothesis and coinciding with findings of other papers in different country settings that *political color considerations were and are indeed present in grant distribution practices of the central governments in Hungary*. Moreover, this argument is made stronger with the significance of the political cycle variables, showing that timing of these subsidies also matters. These findings fit with the partisan model, i.e. that *central politicians do use intergovernmental grants for improving re-election chances of their parties and themselves both at national and local levels*.

Size. (Table 6) According to both LPM and Probit models, the color of the local government being same as central government matters most for the group of middle-sized cities (between 4-15 000), meaning a + 12-17% chance of receiving investment grants, while for the largest and smallest it is not even significant. However, the color of the *mayor* is considerable more important for the *larger cities* (above 15 000), increasing grant chances by +6-15%, and in Probit also for the middle size group by +6-9%. It is probably at these places where some charismatic mayor figures can actively lobby even in national policymaking for grant approval, and also these are cities that possibly get more attention from parties in election mathematics.

Own revenue in local budget. (Table7) In my estimations for own revenue subgroups the political *color of the local government* is significant only for the two *middle groups*, those with 20-40% or 10-20% own revenues in the LG budget, and for them it raises grant chances by +3-18% in both LPM and Probit models. In Probit models, the *color of the mayor*

truly central, allocated in Parliament after propositions by Ministries, I considered the latter two to be more readily available for pork-barrel, or electorally motivated usage by politicians, thus only these are considered when constructing the variable gotgrant.

³⁷ The precise translation of the LPM/ Probit marginal effects coefficients is, since cl2_lgcg is a dummy variable, that changing from different color to same political color, the chances for receiving investment grant *increase by +6-20% across different specifications*.

is strongly significant for all, but the least financially independent (i.e. more grant-dependent - those with less than 10% own resources), and it seems to get *highest marginal effects* for the “most decentralized” *group with above 40% of own resources* (+12-17% chances of grant receiving), somewhat smaller ones for the less financially independent.

Election year however, just like with bigger cities, does not affect chances of the most well-off (or negatively, if it does –in Probit), while it matters with increasing coefficients (+3-28%) for all the three groups with own revenues of less than 40%. That is, *in election years, those municipalities are more likely to receive central grants for investments, which have less of their own to invest from* – which in fact reassures my hypothesis that ***central politicians do try to use these intergovernmental grants to get themselves or their parties re-elected locally.***

Socioeconomic and need-based indicators and the magnitude of local investment

The control for “wealth” of a city, the *per capita personal income tax base* was also included in my models, which shows on one hand the local taxing capacity of a local government to some extent; on the other hand perhaps it is another sign for infrastructure needs (more well-off citizens requiring better services). Though it is a significant determinant of municipal investment expenditures, its coefficients are always almost negligible, as they increase only slightly from 0.01 to 0.07 in the reduced forms, when possibly endogenous own revenue variables and need controls are left out. Yet, within the sub-sample of those who received grants, it lost its significance in explaining municipal investment expenditures, so apparently *the PIT base (wealth) of a city does not explain the investments of grant recipient localities.*

Other ***budget constraint variables*** (per capita grants, per capita own current and investment income or their % in the budget) all remain important and significant explanatory variables with the expected ***positive signs*** and in decreasing order of coefficient size. The inclusion of *pcgr1*, the per capita investment grant revenues, raises the explanatory strength of the model quite substantially (R^2 changed from previous 0.3 and 0.5 to 0.82). The coefficients of the investment grant variable are always quite substantial (1.28-1.29, which even rises to 1.7-1.72 when using the decentralization measure of percentage of own resources in LG budget or when possibly endogenous controls are left out) – showing that ***in financing capital investment activities of Hungarian municipalities intergovernmental grants do matter a lot, in fact the most out of the revenue-source variables.*** Per capita ***municipal own investment revenues*** are the second in terms of coefficients among the budget variables (with 0.90-0.93) – which shows that after grants, these own investment sources are ***indeed mobilized for investments*** and the higher they are, the more investments a municipality will make. At the same time, it highlights how important the differences are in endowments of municipalities with real estates and other assets to sell, privatization revenues, financial investments etc. – which comprise own investment revenues.³⁸ It has to be noted however, that as I mentioned in the variable description part, these own revenues are the most likely candidates for possibly endogenous explanatory variables, since they can play a key role in a local government’s decision on investment. Without own revenues, the local government might not even embark on investment, or a local government might in fact e.g. decide to sell some asset just in order

³⁸ Yet, *per capita own current incomes* also came out significant in all model specifications, with smaller, but still considerably large positive coefficients – i.e. revenues from local taxes and fees are also very important in explaining investments, they are not only used for operation purposes but also shifted for investment. This highlights another often emphasized policy point, that the huge imbalances that local governments encounter in terms of access to such tax revenues cause inequalities (whether this is considered good or bad depends on political views) – and as now proved, indeed it also *affects their infrastructure development chances.*

to use the revenues for infrastructure investments. That was why I reran some models without these possibly endogenous controls and was reassured that the political cycle and color variables of main interest behaved exactly the same way as without them, i.e. remained significant and with the expected signs. As I mentioned earlier, the variable per capita investment grants received I consider to be weakly exogenous (predetermined i.e. grant variable for a given year does not correlate with the error term for that given year), hence I leave it in the model.

When I replaced the per capita own revenue variables with the ratio type decentralization measure (% of own revenues in the budget), the coefficients of the most interesting political variables remained significant with the expected signs, while some increased considerably (effect of per capita grants, mayor political color), though the infrastructure level indicator lost significance and changed its sign from the previous negative to positive, and the variable for year before elections lost its significance, both of which I find hard to interpret. However, the political color of the mayor started to become significant only with the inclusion of this decentralization variable – though R^2 -s of these models decrease slightly, to a still fairly high 0.70 (OLS and panel FE alike). The coefficients for this decentralization measure are positive and significant, though strangely high, perhaps this is a sign for the need for logarithmic transformation of variables – yet as I explained, it was purposely not done for grant data reasons.

To get a more toned picture, I checked my results for groups of size and own resources. One can read that per capita grants always have very large and positive coefficients, however it is largest for the largest cities and decreases very slightly as we go towards smaller groups – while coefficients of municipal own investment incomes show a reverse order, they matter for all, but most for the smallest. This reveals an interesting point: while it is true that *grants are the most important financing source for all size categories*, apparently *changes in received per capita grants have the greatest impact* on per capita investment of *the largest cities*, while changes in per capita own investment revenues have the greatest effect on the per capita investment of small villages under 4 000. This can perhaps be related to the general greater magnitude and more expensive investments carried out by the largest villages as opposed to the smaller villages, though all variables are expressed per capita. As far as own, but current revenues are concerned, they seem to matter most for the investments of the third group, i.e. municipalities of size 4-15000 tend to use also current revenues for investment purposes the most (though all others seem to do it to some extent), since it is always significant and positive. If these *possibly endogenous own resources are left out, coefficients of per capita grants and per capita PIT base, but especially those of election year, go up.*

Budget constraint variables were strongly significant and positive for all own revenue categories, though coefficients for per capita grants received were highest for the group with higher than 40% own resources (in panel FE regressions), which seems a little strange – apparently they can do a lot without grants too, but nonetheless if they do receive grants, those have a big effect on overall investment expenses. This result coincides with the fact that mostly larger cities are recipients of central addressed and targeted grants.

*Need indicator composite controls*³⁹ showing need for education, health and social services in a municipality were *not significant at all* in explaining local investments in panel FE and FE+AR regressions - except the infrastructure level indicator ind_infr. This is not that surprising as it first sounds, as these variables do not vary that much from year to year for any

³⁹ These summary indicator variables were created by simple arithmetic averaging of several related components, the infrastructure level variable (ind_infr) is a composite index of ratios of flats connected to water-, sewage- and gas-networks. Higher values of the variable show higher level of infrastructure services, the maximum being 1.

given municipality – the *within variation is very small* – hence no significance in the FE specifications. (They were significant, but with practically 0 coefficients in the OLS setup). Concerning *demographic need-variables*, the proportion of young people was never significant in the investment models; the proportion of old people in a municipality was always significant and positive with very high coefficients. From the two demographic controls, interestingly the share of young population does matter significantly only for the LGs between 4- 15 000, albeit insignificant in all other places, while the *share of old people* became a *significant determinant for the investments of the smallest villages* of less than 4000. This might be explained as smaller places (villages) usually with aging populations are more in need of basic infrastructure investments – yet, as we saw in the analysis, central investment grant programs tend not to favor these small places.

The coefficients of the *infrastructure indicator* variable - sometimes fairly large - are *significant and mostly negative as expected*, indicating that where infrastructure levels are already high, there is less further investment activity – however its behavior is odd sometimes and changes to positive sign. According to panel FE estimates, it *matters only for the two smallest groups (i.e. those under 15 000* – but this is the majority of Hungarian LGs) with the expected *negative sign*: the more infrastructure they already have, the less they invest.

For groups by proportions of own resources, the infrastructure indicator (ind_infr) becomes insignificant in OLS, yet in panel regressions it gains renewed significance and with the expected negative sign for all but the most financially independent group (with more than 40% own resources). Thus, ***existing levels of infrastructure do have effects on investment activities of municipalities except for those with a considerable ratio of financial independence***. A possible explanation is that investments of these largest, financially most independent cities that most probably fall in this category, are not measured well (or at all) by this infrastructure indicator, since they are already provided with basic infrastructure and now concentrate on other types of investment projects. This result links back to those found in the survey analysis.

Socioeconomic and need indicators in investment grant allocations

These socioeconomic and need indicators *were expected to have some role* in grant allocations too, since they control if existing own revenues of a municipality, wealth of locality (measure by per capita PIT base), its size, region, local need for infrastructure, health, social and educational services, demographic factors such as share of young or old people etc. matter in the allocation of grants. By theory they should, to some extent – precisely *because grants are supposedly correcting for certain efficiency or equity problems*. The above mentioned were used as control variables in the regressions on the panel database of all Hungarian LGs, both in models for per capita local investment expenditure and probability models of getting investment grants.

The picture is quite mixed in my findings, indeed several of these socioeconomic and need controls turned out to be statistically not significant for grant reciprocity in the analysis, however they did in the investment equations. (see section above). In the probability models for grant reciprocity, the effect of per capita local PIT base was again always significant, yet practically zero, adding to this the finding that it lost significance in the investment equations for the sub-group of those who got grants, I can state that the *PIT base (wealth of citizens) of a city does not seem to affect grant-reciprocity chances*.

In the probability models for getting grants, the composite *infrastructure indicator* (ind_infr) again behaves somewhat strangely, in pooled versions of both LPM and Probit estimates it gains significance, but *contrary to my expectations with positive sign*, seems to add + 8-18% to the chances for grant receipt, while this effect is estimated to be + 3-5% in the panel Probit version. It is surprising that those who already have more infrastructure would

get more grants - it *appears the grant system in fact rewards an existing endowment of infrastructure* and local governments who own huge school buildings, health centers, and lots of bad roads get more grants for reconstructions and add-ons – which are not necessarily the best solutions from overall efficiency – as critiques of the Hungarian system of targeted and addressed grants usually point out (Hegedus et al, 1996, Deli, 2003). When the models on investment expenditures were run on the subgroup of grant-receivers, interestingly the infrastructure indicator also lost its significance for this group in some models, while it remained significant, but positive in others. This says that apparently the *existing level of infrastructure development is not an unequivocal major determinant of investment outlays for those who receive grants to finance them*. There are several possible explanations: one is that the infrastructure variable might not vary that much among the grantees, or possibly need indicators have only indirect effects on the dependent investment variable hence no significance for them in the models.⁴⁰ Yet another – not so benevolent – interpretation which I venture to suppose based on interview responses, is that indeed there is a kind of distortion effect of grants, i.e. their mere existence provokes the selection of certain types of investment projects as opposed to those that would reflect true local needs and preferences (which among others the infrastructure indicator is supposed to represent).⁴¹ Survey results (Kalman, PhD dissertation, 2007) have given some justification for such an interpretation.

The *budget constraint variables*, per capita municipal current revenue, and per capita own investment revenues were in the models and then out from the reduced forms, in addition to which I included per capita income tax base again. All of these came out significant, yet with virtually 0 coefficients. The same is true for the need control composite indicators for education, social and health service demands. Besides these I tried using regional dummies, however most of them were not significant, so I dropped them.

Replacing per capita revenues with *ratio of own resources in the budget (decentralization measure)* always get strongly significant positive coefficients, *adding +17-25% to the chances of receiving investment grants* for a 1% increase in own revenues (except for panel LPM, where its coefficient was only 3-5%). This result can be interpreted as saying that Hungarian *investment grant policy indeed rewards local efforts* – in fact both targeted and addressed grants are matching in nature, i.e. local governments cannot get them without some local contribution to project costs.⁴² In fact, my findings strongly reinforced one of the most often emphasized policy critique of the Hungarian addressed and targeted grant system, that *because of its matching nature, better-off municipalities have advantages in getting the grants, hence the system contributes to enlarging (instead of smoothing) existing inequalities among service levels in localities*. To say something about this critique, the question is, whether such equalization is (should be) really the goal of this grant system at all or not.

Regarding *demographic controls* in the grant reciprocity models however, the proportion of young people got strongly significant and positive, while that of old people strongly negative – *suggesting that the addressed and targeted central investment grants definitely favor places with a younger population* (adds +4-27% to the chances of grant

⁴⁰By the same token, such an argument might be valid for the lack of significant variation for other need-variables too (educ-, soc-, health-indicators), which have already been left out from the models here. I thank Zoltan Hermann, of the Hungarian Academy of Sciences, Research Institute for Economics for pointing this out after reviewing an earlier version.

⁴¹ Though it is in fact one of the goals of grant programs to alter choices of recipients for the utility of all taxpayers, for e.g. ensuring minimum service levels, or inducing the internalization of certain externalities, still, here theory would project level of existing infrastructure to have some effect on grants received.

⁴² However up until the recent past, for lack of internal controlling, it was not an unusual practice for localities to cover these needed “own” contributions from other successfully received state funds (documented in Hegedüs et al., 1996, Deli, 2003, Jókay et al. 2004).

reciency depending on model specification) and do not favor small, ageing villages. This is of course partly due to the announced goals of these grants, many of which link to e.g. education. The share of young people is strongly positive for all size categories' grant reciency chances in LPM, while only for the smallest (under 4000) in Probit and as expected, the share of old population very negatively affects the investment grant chances of again this same group of under 4000 small, ageing villages.

Size. For a better understanding, I created a table where I combined size and actual grant status. What we can infer from this table is that though n-s are different, still there are considerable imbalances: while 86% of the largest cities (above 40 000) and 73.5% of the second largest (15-40 000) did receive central investment grants in the examined ten-year period, the two smaller groups had much less success – of the municipalities with 4-15 000 people, less than half (43.8%) while from the smallest villages under 4 000, only 14.6% received these central grants for investments. It is the large number of municipalities in this last category (2791) that shifts the total percentage to the low result of 18.84%. This result for the small municipalities is also due to grant allocation goals and rules, as these grants were primarily designed for supporting larger investment projects and as such, give support to smaller places only for investment projects carried out jointly in a formal cooperation. The justification for this *preference for big cities* is that they perform more tasks, hence not only need more investments, but also tend to need more complex and larger ones.

5. Table: LGs which received addressed and targeted investment grant by size categories

Population size		(% within all LGs)	% of LGs that received AT investment grant	Average AT amount received (Mn HUF)
Above 40000	23	0,73	86,17	231,17
15-40000	72	2,27	73,52	142,56
4-15000	281	8,87	43,78	36,87
Under 4000	2791	88,13	14,57	5,72
	3167	100%	18,84%	

Source: Own calculations, RPAA database

As visible from the table below, while they represent only 5.75% from all municipalities, cities with more than 40% own resources in their budgets take up nearly 30% of those who have in fact received targeted and addressed central investment grants, and also the average amount received is highest for them. Though, regarding the total sum of grants received, that the group of those with 20-40% own revenues stand out as having received by far the largest share, cc. half of all the grants. On the other end are those municipalities whose own revenues were under 10%, where 28.6% of all LGs, (while 11% of the grant recipient LGs) belong – though we can see that the average amount is much smaller, roughly 1/10 of the average amount received by the largest and most independent (this is of course due to the different type and scale of projects carried out).

6. Table: Percent of LGs and average sum of Targeted and Addressed Grants received by own-resource groups

own resources in LG budget (%)	% of LGs that received AT investment Grant	(% within all LGs)	Average AT grant amount received (thousand HUF)
above 40%	29.25	5.75	35.594
20-40%	27.49	26.24	26.242
10-20%	17.17	39.41	7.735
under 10%	11.11	28.6	3.49
Total	18.84	100	12.978

Source: own calculations

To sum up, my hypotheses on the effect of these socioeconomic need indicators on chances for grant reciprocity are partly rejected, partly accepted. Details on the items given above – in short the need indicators – did not work well in explaining grant reciprocity and usually had practically zero coefficients, similarly to the per capita budget constraint variables and per capita PIT base. Only the level of local infrastructure endowment, share of young people and the decentralization measure of ratio of own resources were significant and positive, while the share of old people was strongly negative.

5. Concluding remarks

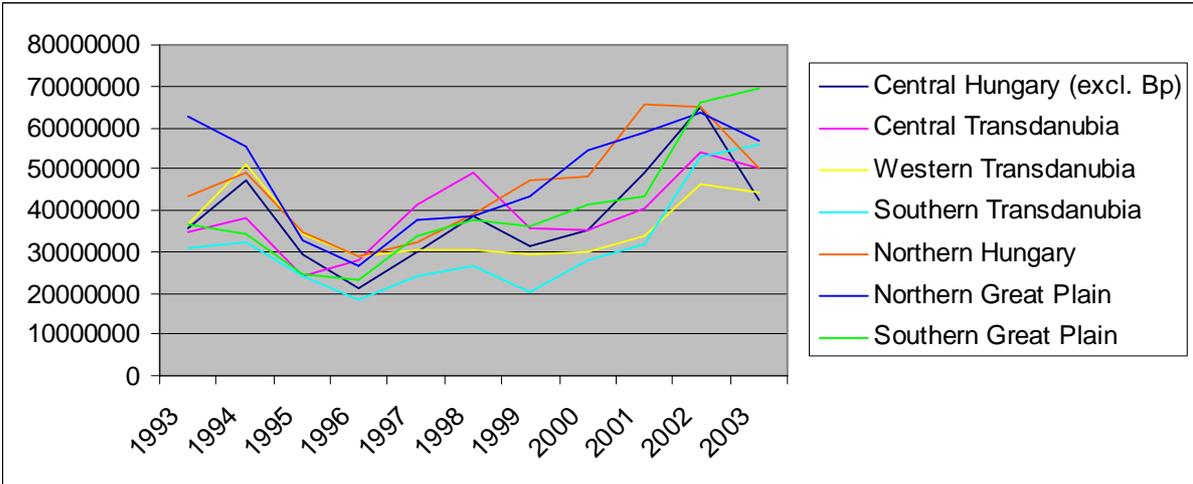
These findings led me to answering my research question and slightly enlarge my horizon for further policy related conclusions. Driven from the theoretical and empirical context the basic *research question* guiding my work was: whether local infrastructure policies in Hungary are really designed according to efficiency considerations? What politico-economic factors might affect central and local governments' allocations on infrastructure investment? I deliberately chose to concentrate on municipal capital investment financing in Hungary, since investments are more visible, more prone to political influences at both central and local levels than the operational side of the budgets – my empirical literature survey on the topic reinforced this choice. Related to the main research question, several themes have emerged, based on which I formulated my hypotheses. In sum, as I expected – *some of my efficiency-related hypotheses were indeed rejected*, which all the more justified and also reinforced the *hypotheses on political factors* (election cycles, political color), all of which are *accepted with strongly significant results*.

The analysis have confirmed my hypotheses and coincide with findings of other papers in different country settings (see Introduction for references), that *political color considerations* were and are indeed present *in grant distribution practices* of the different central governments in Hungary. Moreover, this argument is made stronger with the *significance of the election cycle variables*, showing that timing of these subsidies also matters. These findings fit with the partisan model, i.e. that (central) *politicians do use intergovernmental grants to improve re-election chances* of their parties and themselves both at the national and local levels. That political factors explain some portion of the variation in municipal investment grant allocations that economic factors cannot – should likely be of little surprise. By virtue of their flexibility, such discretionary grants are a natural vehicle for the political objectives of the incumbent government, as much as for targeting assistance based on some equity goal or economic efficiency criteria. My other important result on the *existence of political cycles* in both magnitude of local investments and grants

allocated to finance them is more of a verification of “common wisdom”, yet never done in a systematic and scientific way with respect to Hungarian data, as to my knowledge. More surprising, perhaps, and hence also important is the evidence I find of substantial and systematic *non-significance of most variables reflecting need* and other socioeconomic controls in the allocation of investment grants.

This chart below shows local investments regionally. Apart from certain regional dynamics, one can clearly read the bad years of 1995-95, when the Bokros austerity plan, a general government consolidation took place and its effects on lowered investment, but also the political cycles: it is very visible how election years 1994, 1998 and 2002 are local maximums, i.e. investments in all regions peak just before and in election years, yet always fall back shortly afterwards. It gives the same conclusive evidence of the true existence of political cycles in local investments that my research results demonstrated in numbers.

2. Chart: Total investment expenditures (at 2003prices) regionally



Source: Halasz-Kalman, 2006

Apart from checking all my political economy hypotheses, some further results of the analysis are worth mentioning. One is about general *grant dependence* of basically all Hungarian *local governments when it comes to financing their infrastructure investments*. It is an oft-made policy statement generally for the operation of municipalities all over the transition countries (and Europe, from an American perspective), yet here my results truly confirm it regarding the investments of Hungarian LGs. As I have found, even among the largest cities (above 40 000), 86% have received targeted and addressed central investment grants in the 11-year period investigated.

7. Table: Decentralization – financial independence: own resources in LG budgets by size groups

Size indicator	Own resources in LG budget (%)					% of size groups
	above 40%	20-40%	10-20%	under 10%	Total %	
above 40000	20.95	73.12	5.53	0.40	100.00	0.74%
15-40000	12.77	66.67	20.56	0.00	100.00	2.17%
4-15000	11.89	52.27	32.27	3.57	100.00	8.42%
under 4000	4.87	22.39	40.83	31.92	100.00	88.67%
Total	5.75	26.24	39.41	28.60	100.00	100%

Source: Own calculations, RPAA database

In order to clarify this picture a bit more, I created the above table between size and percentage of own resources in the budget for the categories I used in the database. Size and financial independence are statistically associated, yet even for the group of 23 largest cities, the majority (73%) have a ratio of 20-40% true own revenues in their budgets and only 21% are considerably less grant-dependent and financially autonomous (having above 40% own revenues). This is characteristic to only 12% of the towns between 4-40 000 and not at all (a mere 4.9%) for smaller villages. While on the other end of the scale, of the places under 4 000 (where most, nearly 90% of Hungarian LGs belong) 70% have own revenues under 20%, i.e. they are really grant dependent. These facts highlight why I have found that *in election years, those municipalities are most likely to receive central grants for investments, who have less of their own to invest from* – which further demonstrates that central politicians do try to use these intergovernmental grants for re-election purposes of themselves or their parties locally.

Policy implications

As for policy consequences my research results can add to the discussion on reforming the local government finance system overall, which has been on the agenda in Hungary for quite a while, but not surprisingly no government have dared to fully commit itself to implementing it so far. Eventually, the deteriorating macroeconomic conditions (especially of the central budget) might force politicians to act.

Local politicians or the local bureaucracy themselves are not necessarily the best representatives of local needs, but rather act in a Niskanen way to maximize local budgets, or merely pursue their own re-election. For this reason, and also because of the lack of own resources detailed above, they are interested in rent-seeking and lobby activities in order to maximize grant revenues, which they in fact have acknowledged in survey answers (Kalman, 2007). In the Hungarian system, such rent-seeking and lobby activities were supposed to be avoided by the entitled nature of targeted grants, albeit unsuccessfully, since there was a cap on the overall amount of grants, thus a lining up and not perfectly transparent allocation were unavoidable. There is even more room for maneuver in the case of discrete addressed grants, decided upon yearly in Parliament, with the relevant pork-barrel activities of MPs. Besides, as my analysis has clearly proved, there are opportunities for both grant programs to favor municipalities where mayors or local assemblies belong to the same color as that of the central government. This result is based on panel data across three election cycles, so is significant for both left-wing and right-wing governments.

This feeds into the major policy lesson from my findings: as long as there remains such grant dependence of Hungarian local governments, the presence and strong effect of political factors is likely to be remaining as well – since ultimately it is the availability and magnitude of grants that creates room for all these rent-seeking, politically motivated endeavors of both local and central players in this game. As it turned out, actual decision-making in local investments does depend on the revenue basis, more own revenues mean somewhat more independence in project selection, yet as a matter of fact most Hungarian local governments are quite grant-dependent in financing their infrastructure investments. Reliance on more local own revenues does mean somewhat more investment activity in general, as the ratio of own revenues was a strongly significant and positive explanatory variable – although in grant reciprocity chances too, which means more grants are given for those with more own revenues (local matching sources). Grants – if well designed – are an excellent way to alter local recipient choices and correct certain problems, like externalities, vertical equity considerations or to ensure minimum service standards. Yet, grants can be distortive, or have unintended consequences – which the reviewed political economy literature also discusses in great detail

In order to boost local investments and also to eliminate most (as all is not possible) political influences, reform of local own revenues seems crucial (e.g. with new types of possible local taxes introduced or widening of property tax usage), giving state guarantees or setup; a local investment fund could also enhance results. Along with increasing the role for own resources in local investments, a slow withdrawal of the pure grants which do not induce any LG loans could take place. The Hungarian government could indeed take steps which have long been recommended by experts, e.g. change regulation⁴³ concerning service responsibilities of all those small localities, provide more financial incentives for their joint service provision to capture economies of scale; reform the financing system to be truly transparent, stable and predictable– so that local revenues also become more calculable.

A great deal of investments essential to the future development in any given locality are not the competence of its local government, but that of other actors (business, central government or households). Public investments (e.g. construction of highways) are rather limited, yet their spatial distribution is crucial for local governments. Though not directly related to their basic service responsibilities, local governments do engage in trying to influence public investments: a strategy which is often described by the term “competition for investments” first introduced by Gábor Vági (1982), describing the behavior of towns in the socialist central planning system, though many of his remarks and conclusions still seem valid. Private sector investments can also be really crucial for their future development chances, hence a similar competition takes place and local governments are often willing to make financial sacrifices to get them (e.g. providing some additional infrastructure or granting tax exemptions – this is referred to as the “race to the bottom” in the literature, though the extent of such competition is not yet detrimental in Hungary⁴⁴, partly because of the smaller role of own revenues in local budgets).

In the event that the targeted and addressed grants favor localities with a better financial situation (as they indeed do according to my findings) and if this financial situation is influenced by the development of the local economy, we can expect that the system in fact favors the more developed ones. According to the new economic geography literature and empirical papers on growth, nothing is wrong with this approach. In these faster developing municipalities, local demand for investments can be larger and thus the marginal effect of public investments on local economic development is also larger, hence justified – while later the faster developers can pull others with them.

As far as timing is related, the long cycles of investment grants (application – acceptance – implementation – funding - withdrawal - monitoring) are characteristic first and foremost of the targeted and addressed grants to municipalities – to which several other programs relate/connect, though experience with pre-accession funds and by now with some of the Structural Funds proves that dealing with the EU bureaucracy (which employs more checkups and monitoring) is also causing a lot of time-lags and delays in projects. Recipients usually “manage” to spend all the money, although sometimes only on paper – yet this is very hard to prove and re-payments usually only happen when the State Audit Office finds irregularities ex post. Nevertheless, non-utilization of funds in any given year is quite high (at least, with targeted grants), which reinforces the existence of timing problems; hence I can safely presume that such type of problems will persist with the applications for/recipients of EU funds as well. The stakes are large.

⁴³ Though this is hard to implement, as changes to the local government system need 2/3 of votes in parliament, which the current incumbent coalition government does not have (neither did its predecessors), moreover in this election cycle – for the first time – the opposition won a majority of local government positions.

⁴⁴ For more information on the tax-race among Hungarian localities, see Szalai, 2005.

With respect to EU funding, there is inevitably a lot of principal-agent type information and incentive problems involved as well, *asymmetric, non-transparent system* similar to the ones described above – but the EU recognized this long ago, and tries to correct it to a certain extent. The greatest danger, however, is that just as with local goals versus announced central transfer schemes, areas which have EU priority might take funding away from other areas of importance for economic policy, areas which might be crucial for Hungary's competitiveness.

Contributions, possibilities for further research

My results show the prevalence of political effects on the allocation of public expenditures in general, more concretely the political economy viewpoint on grants. In this school of thought, grants are acknowledged to provide more direct political benefits to the recipient government politicians, as they allow them to expand on vote-generating visible expenditure items without the pain of additional taxation, however in exchange, they deliver political capital/votes of supporters and of interest group for the higher level government and its ruling party too. Overall, my estimations feed into the partisan model of political budget cycles and are comparable and similar to other international findings on such cycles and partisan effects for the local government tier (Veiga, 2004, Veiga-Pinho, 2007, Balerias-Costa, 2005, Sole Olle-Navarro, 2006).

Such results pose new questions for the researcher. For instance, if voters are rational, at the next local elections they may choose to vote for the party in charge of the upper layer in order to make sure that the same party as their local government is elected, thus protecting future flow of grant funds. In this scenario, a party winning the general elections (only when they are held prior to municipal ones) would see its vote share increase at the municipal elections. In the case of Hungary, this seemed to have been the case throughout three election cycles, yet for the first time in 2006 - probably due to the immediate consolidation efforts of the central government – disappointment turned voters to vote for the opposition at local elections held a few months after the general ones. The comparative testing of this hypothesis is definitely a line for future research as well as checking the validity of the swing voter hypothesis in central grant allocations, apart from ones previously mentioned on fiscal illusions or political economy of reform sequencing. Moreover, models of strategic interaction that give rise to a spatial pattern in local government expenditures and revenues could be further investigated. Another interesting line to test is whether the most visible type of projects are indeed increased prior to elections. Yet another one is to sophisticate models and estimation techniques for crowding out/crowding in effects of grants.

Although I did not delve into the new and widening literature on the political economy of failures or delays in reforms (see e.g. Drazen 2002:Ch.10 for a brief review), delays of fiscal consolidation or for that matter the political economy of local government reform (Dollery-Wallis, 2002) – my evidences could readily contribute to that too, which also points to a possible future research line. What this paper certainly does contribute to is the fairly small pool of international empirical evidence available on political budget cycles, especially at the sub-national level and to the emerging literature on the political economy of intergovernmental grants – in providing the case of one transition country, it shows that, irrespective of EU membership, Hungary sometimes shows certain similarities to developing countries.

References

- Alesina, Alberto - Rosenthal, Howard [1995]: *Partisan Politics. Divided Government, and the Economy*, Cambridge, MA
- Alesina, Alberto [1987]: "Macroeconomic Policy in a Two Party System as a Repeated Game", *Quarterly Journal of Economics* 102, August, 651-78
- Alesina, Alberto - Drazen, Allan, [1991] "[Why Are Stabilizations Delayed?](#)," [American Economic Review](#), American Economic Association, vol. 81(5), December, 1170-88
- Alesina, Alberto F - Cohen, Gerald D - Roubini, Nouriel, [1992] "[Macroeconomic Policy and Elections in OECD Democracies](#)," [CEPR Discussion Papers](#) 608, C.E.P.R. Discussion Papers
- Alesina A,- Roubini N, - Cohen G. 1997. *Political Cycles and the Macroeconomy*. MIT Press
- Alt, James E.-Rose, Shannon [2006]: *Context Conditional Political Budget Cycles*, in: Carles Boix and Susan Stokes (eds.), *Handbook of Comparative Politics* (Oxford University Press)
- Alt, James E. - Lassen, David Dreyer [2005] "[The Political Budget Cycle is Where You Can't See It: Transparency and Fiscal Manipulation](#)," [EPRU Working Paper Series](#) 05-03, Economic Policy Research Unit (EPRU), University of Copenhagen. Department of Economics
- Bailey, Stephen J. 1999: *Local Government Economics*, MacMillan, London, UK
- Balerias, Rui N. – da Silva Costa, José 2003 "To Be or Not To Be in Office Again: Political Business Cycles with Local Governments," *Public Economics* 0302009.
- Barro, R. J., and D. B. Gordon, "A Positive Theory of Monetary Policy in a Natural Rate Model" *Journal of Political Economy* 91:589-610 1983b
- Besley, Timothy - Case, Anne [2003]. "[Political Institutions and Policy Choices: Evidence from the United States](#)," [Journal of Economic Literature](#), American Economic Association, vol. 41(1), pages 7-73, March.
- Block, Stephen A.[2002] *Elections, Electoral Competitiveness, and Political Budget Cycles in Developing Countries*, Working Paper - Fletcher School of Law & Diplomacy, Tufts University
- Boadway, R. 2002: 'The role of public choice considerations in normative public economics', in: *Political Economy and Public Finance: the role of political economy in the theory and practice of public economics* (eds. Stanely L.Winer-Hirofumi Shibata), Edward Elgar 2002
- Brender, Adi - Drazen, Allan, [2005] "[Political budget cycles in new versus established democracies](#)," [Journal of Monetary Economics](#), Elsevier, vol. 52(7), pages 1271-1295, October
- Brennan, G. and Buchanan, J. 1980: *The Power to Tax: Analytical Foundations of a Fiscal Constitution*, New York, Cambridge University Press
- Clark, WR- Reichert, UN- Lomas, SL – Parker, KL [1998] "International and domestic constraints on political business cycles in OECD economies." *International Organization* 52(1):87-120
- Clark, William Roberts – Hallerberg, Mark [2000] "Mobile Capital, Domestic Institutions, and Electorally Induced Monetary and Fiscal Policy", *The American Political Science Review*, Vol. 94, No. 2 (Jun., 2000), pp. 323-346
- de Mello, L. –Barenstein, M. [2001]: *Fiscal Decentralization and Governance: a Cross-Country Analysis*. IMF Working Paper, WP/01/71
- Deli, E. 2003: "A helyi önkormányzatok fejlesztési lehetőségeit meghatározó támogatások, különös tekintettel a címzett és céltámogatások jövőjére" – "Central grants determining investment possibilities of local governments, with special regard to the future of addressed and targeted subsidies" Conference Presentation, Ministry of Interior, IDEA Working Group
- Dixit, A. - J. Londregan (1996). "The Determinants of Success of Special Interests in Redistributive Politics," *Journal of Politics* 58, 1132-55.

- Dollery, B.E. – Wallis, J.L. 2001: *The Political Economy of Local Government*, Edward Elgar, Cheltenham, UK
- Drazen, Allan [2000] “The political business cycle after 25 years.” in: Ben S. Bernanke and Kenneth S. Rogoff (eds) *NBER Macroeconomic Annual*, pp. 75-117. Cambridge, MA: MIT Press
- [2002]: *Political Economy in Macroeconomics*, Princeton University Press, 2002
- Drazen, Allan - Eslava, Marcela, [2006] "[Pork Barrel Cycles](#)," [NBER Working Papers](#) 12190, National Bureau of Economic Research, Inc.
- Ferejohn, John 1974: *Pork Barrel Politics: Rivers and Harbors Legislation, 1947-1968*. Stanford, CA Stanford University Press,
- Gramlich, Edward M. 1977: *Intergovernmental Grants - A Review of the Empirical Literature*, in: W.E.Oates (ed.) : *The Political Economy of Fiscal Federalism*, Lexington Books
- 1994. "Infrastructure Investment: A Review Essay," *Journal of Economic Literature*, American Economic Association, vol. 32(3), pages 1176-96, September
- Greene, William H. [2002]: *Econometric Analysis*, Fifth Edition, Prentice Hall, New Jersey, 2002
- Grier, Kevin B. - Tullock, Gordon, 1989. "[An empirical analysis of cross-national economic growth, 1951-1980](#)," [Journal of Monetary Economics](#), Elsevier, vol. 24(2), pages 259-276, September.
- Hallerberg, M. – Vinhas de Souza, L.-Clark, W.R. 2002]:”Political Business Cycles in EU Accession Countries”, *European Union Politics*, Vol. 3, No. 2, 231-250 (2002)
- Hegedüs et al. [1996] *Municipal Infrastructure Finance in Hungary*, Unpublished Background paper prepared for USAID
- Hibbs, D. [1977]. “Political Parties and Macroeconomic Policy.’ *American Political Science Review* 71.
- [1987]. *The American Political Economy: Macroeconomics and Electoral Politics in the United States*. Cambridge: Harvard University Press.
- _____ [1992]. “Partisan Theory After Fifteen Years,” *European Journal of Political Economy* 8, 361-73.
- Hommel, Rudolf, 1996: *Conflicts and Dilemmas of Decentralization*, in: *Annual World Bank Conference on Development Economics 1995*, The World Bank 1996
- Hulten-Schwab, 1997: *A fiscal federalism approach to infrastructure policy*, *Regional science and Urban Economics*, 27, pp.139-159
- Huther, Jeff & Shah, Anwar, 1998. "Applying a simple measure of good governance to the debate on fiscal decentralization," *Policy Research Working Paper Series 1894*, The World Bank
- Inman, Robert P. – Rubinfeld, Daniel L.1997 : *Rethinking Federalism*, *Journal of Economic Perspectives* -vol. 11. no.4., Fall 1997, p.43-64.
- Inman, Robert P. 1988: *Markets, governments, and the "new" political economy*, in: *Handbook of Public Economics*, vol.II., ed. by A.J. Auerbach and M Feldstein
- Johansson, E. 2003: *Intergovernmental Grants as Tactical Instruments – some empirical evidence from Swedish municipalities*, *Journal of Public Economics*, forthcoming
- Jokay, Ch.-Kalman, J-Kopanyi,M, 2004 : *Municipal Infrastructure Financing Cases - in Intergovernmental Finance in Hungary : a Decade of Experience 1990-2000* (ed. by Kopányi –Wetzel-Dahrer) World Bank-LGI
- Kalman, J. (2002): *Possible Structural Funds Absorption Problems - The Political Economy view with Application to the Hungarian Regional Development Institutions and Financial system* in: Marcou,G. (ed.) *Regionalization for Development and Accession to the EU – A Comparative Perspective*, LGI Studies, pp.29-65. LGI/OSI 2002
- 2007: *Some Political Economy Insights to Multi-Level Government Financing Mechanisms in Hungary*, unpublished PhD Dissertation, Central European University
- Analysis of political budget cycles and partisanship in municipal investment activities and central grant distribution*

- Kalman, J.-Soos, G. 2002. "Report on the State of Local Democracy in Hungary." In *The State of Local Democracy in Central Europe*, ed. by Gabor Soos, Gabor Toka, and Glen Wright. Budapest: OSI/LGI.
- Keech, W.R. (1995). *Economic Politics: The Costs of Democracy*, Cambridge University Press
- Kopanyi, M. (et. al.): *Modernizing the Subnational Government System – Hungary*, World Bank Discussion Paper no. 417, 2000
- Levaggi, Rosella 2002: "Decentralized Budgeting Procedures for Public Expenditure," *Public Finance Review* 30 (July), 273-95
- Lewis-Beck M. (1988). *Economics and Elections*. University Michigan Press, Ann Arbor
- Mink, Mark – DeHaan, Jakob 2005: *Has the Stability and Growth Pact Impeded Political Budget Cycles in the European Union?*, CESifo Working Paper No. 1532
- Nordhaus W. (1975). "The Political Business Cycle." *Review Economic Studies* 42(1):169-90
 -----(1989). *Alternative approaches to the political business cycle*. Brookings Papers in Economic Activity 1989(2), 1–49.
- Oates, Wallace E.(1977): *An economist perspective on Fiscal federalism - in: The Political Economy of Fiscal Federalism* (ed.by. W.E.Oates), 1977, Lexington Books, pp. 3-19
 ----- (1991): *Studies in Fiscal federalism*, Edward Elgar Co. 1991
- OECD, 2001 *Fiscal Design across Levels of Government*, Paris 2001, www.oecd.org
- OECD, 2007 *Economic Survey of Hungary 2007 – Policy Brief*, www.oecd.org
- Persson, Torsten and Tabellini, Guido 2000. *Political Economics: Explaining Economic Policy*. Cambridge, MA: MIT Press.
 ----- 2002 'Do Electoral Cycles Differ Across Political Systems?', working paper.
 ----- 2003a *The Economic Effects of Constitutions*. Cambridge, MA: MIT Press.
 ----- 2003b "Do Electoral Cycles Differ Across Political Systems?" IGIER Working Paper n. 232, March.
 ----- 2004 "Fiscal Effects of Constitutions." *American Economic Review* 94, 25-46
- Prud'homme, Remy 1996 : *Comment on Rudolf Hommes' Conflicts and Dilemmas of Decentralization*, in: *Annual World Bank Conference on Development Economics 1995*, The World Bank 1996
- Prud'homme, Remy 1997: *The Dangers of Decentralization - The World Bank Research Observer*, vol.10.no.2. pp.201-220.
- Rogoff K, Sibert A. 1988. "Elections and macroeconomic policy cycles." *Review Economic Studies* 55(1):1-16
- Rogoff, K. 1990. *Equilibrium political budget cycles*. *American Economic Review* 80, 21–36
- Schuknecht, L. (1996), "Political Business Cycles in Developing Countries," *Kyklos* 49, 155-70.
 -----2000
- Shah, Anwar, 1998. "[Fiscal federalism and macroeconomic governance : for better or for worse?](#)," [Policy Research Working Paper Series](#) 2005, The World Bank
 ----- 2005: *Fiscal Decentralization and Fiscal Performance*, World Bank Policy Research Working Paper 3786, December 2005
- Anwar Shah, 2006. "Fiscal decentralization and macroeconomic management," *International Tax and Public Finance*, Springer, vol. 13(4), pages 437-462, August
- Shi, M. and J. Svensson (2000), "Political Business Cycles in Developed and Developing Countries," working paper, The World Bank, February.
- Shi, Min. and J. Svensson [2004] *Political budget cycles: a review of recent developments*. Institute for International Economic Studies, Stockholm University.
 -----[2002a] *Political budget cycles in developed and developing countries*. Institute for International Economic Studies, Stockholm University.
 ----- [2002b], "Conditional Political Business Cycles," CEPR Discussion Paper #3352.

- Szalai, Á. 2005 Adóverseny az iparüzési adóban - az 5000 fő fölötti települések adópolitikája a 2000-es években, MTA KTI Discussion Papers 2005/3
- Tanzi, Vito : Fiscal federalism and decentralization: a review of some efficiency and macroeconomic aspects - in: Annual World Bank Conference on Development Economics 1995, The World Bank 1996, pp.295-316
- Territorial Review at National Level – Hungary, OECD, DT/TDPC (2000) 26
- Vági, Gábor [1982]: Versengés a fejlesztési forrásokért. Közgazdasági és Jogi Könyvkiadó, Budapest, 1982,
- Veiga, Linda and Pinho, Maria Manuel (2007), "[The Political Economy of Intergovernmental Grants: Evidence from a Maturing Democracy](#)," Public Choice, forthcoming
- Veiga, Linda - Veiga, Francisco [2007], "[Political Business Cycles at the Municipal Level](#)," Public Choice, 131 (1/2): 45-64
- Weingast - Shepsle - Johnsen, 1989 : The Political Economy of Benefits and Costs: a neoclassical approach to distributive politics, Journal of Political Economy 89:4
- Weingast, Barry R. 1995, "The Economic Role of Political Institutions: Market-Preserving Federalism and Economic Development," Journal of Law and Economic Organization 11, 1-31.
- Wildavsky, Aaron. 1984. The Politics of the Budgetary Process. 4th ed. Boston: Little, Brown and Company.
- Wooldridge, J.M. 2002: Econometric Analysis of Cross Section and Panel Data, MIT Press, Cambridge, MA
- World Bank: Subnational Development in Hungary - country study 2000, published in *Intergovernmental Finance in Hungary : a Decade of Experience 1990-2000* (ed. by Kopányi –Wetzel-Dahrer) World Bank-LGI, 2004
- Worthington, A.C. – Dollery, B.E.1998: The political determination of intergovernmental grants in Australia, Public Choice 94.(1998) pp.299-315

APPENDIX

Table1:Regression results: political cycles in per capita municipal investment expenditures

Dep.var.: per capita municipal investment expenditures	Pooled OLS					Fixed Effects Panel Estimations					Fixed effects with AR			
			<i>with more controls for need</i>	<i>with decentr measure</i>	<i>without possibly endogen controls</i>			<i>with more controls for need</i>	<i>with decentr measure</i>	<i>without possibly endogen controls</i>			<i>with decentr measure</i>	<i>without possibly endogen controls</i>
<i>political variables of interest:</i>														
election year	3.704		3.794	2.835	3.951	3.261		3.235	2.226	3.707	3.654		2.028	3.570
	[0.519]**		[0.523]**	[0.685]**	[0.723]**	[0.489]**		[0.489]**	[0.629]**	[0.652]**	[0.484]**		[0.618]**	[0.638]**
year before elections	2.813		2.778	0.733	2.980	2.292		2.311	0.732	3.134	-0.785		-2.219	0.277
	[0.537]**		[0.536]**	[0.655]	[0.664]**	[0.489]**		[0.492]**	[0.633]	[0.655]**	[0.543]		[0.704]**	[0.726]
distance from next election year		-0.947					-0.834					-0.722		
		[0.194]**					[0.174]**					[0.172]**		
mayor political color same as central government	-0.580	-0.690	-0.590	1.414	2.616	1.571	1.462	1.717	3.999	4.629	1.967	1.709	4.489	4.925
	[0.919]	[0.919]	[0.928]	[1.381]	[1.443]	[1.079]	[1.079]	[1.089]	[1.394]**	[1.446]**	[1.115]	[1.115]	[1.496]**	[1.575]**
<i>control variables for LG revenues:</i>														
per capita local personal income tax base	-0.011	-0.010	-0.013	-0.026	0.028	0.022	0.025	0.021	0.036	0.072	0.014	0.021	0.030	0.067
	[0.005]*	[0.005]*	[0.004]**	[0.005]**	[0.004]**	[0.005]**	[0.005]**	[0.005]**	[0.006]**	[0.006]**	[0.005]**	[0.005]**	[0.007]**	[0.007]**
per capita capital grants received	1.289	1.289	1.291	1.724	1.751	1.283	1.283	1.286	1.698	1.722	1.288	1.289	1.693	1.713
	[0.055]**	[0.055]**	[0.055]**	[0.065]**	[0.066]**	[0.006]**	[0.006]**	[0.006]**	[0.007]**	[0.007]**	[0.006]**	[0.006]**	[0.007]**	[0.007]**
per capita municipal investment income	0.934	0.933	0.935			0.903	0.903	0.902			0.918	0.916		
	[0.047]**	[0.047]**	[0.047]**			[0.007]**	[0.007]**	[0.007]**			[0.007]**	[0.007]**		
per capita municipal current own income	0.411	0.412	0.409			0.461	0.462	0.457			0.400	0.402		
	[0.063]**	[0.063]**	[0.060]**			[0.010]**	[0.010]**	[0.009]**			[0.010]**	[0.010]**		
% of own (current+capital) resources in LG budget (decentralization measure)				143.760					166.302				172.343	
				[7.820]**					[3.385]**				[3.538]**	
<i>controls for need:</i>														
indicator of local infrastructure endowment	-5.961	-6.330	-8.589	-0.675	17.067	-14.114	-14.845	-16.109	3.511	18.113	-4.428	-6.483	14.565	29.539
	[1.907]**	[1.902]**	[1.906]**	[1.990]	[1.898]**	[2.163]**	[2.152]**	[2.119]**	[2.718]	[2.803]**	[2.483]	[2.470]**	[3.339]**	[3.526]**
indicator of local education demand			0.001					0.001						
			[0.000]**					[0.001]						
indicator of local health service demand			-0.000					0.000						
			[0.000]**					[0.000]						
indicator of local social service demand			0.012					0.003						
			[0.004]**					[0.008]						
share of young population	16.109	17.651				22.553	25.546				6.927	16.177		
	[10.998]	[11.004]				[13.438]	[13.430]				[14.731]	[14.692]		
share of old population	51.709	52.417		56.028	61.771	103.563	104.997				87.473	93.983	35.507	56.817
	[8.803]**	[8.805]**		[8.840]**	[8.991]**	[14.861]**	[14.864]**				[16.437]**	[16.428]**	[20.838]	[22.080]**
population	-0.000	-0.000	-0.001	-0.000	-0.000	-0.002	-0.002	-0.003	-0.003	-0.003	-0.002	-0.002	-0.003	-0.003
	[0.000]**	[0.000]**	[0.000]**	[0.000]**	[0.000]**	[0.001]**	[0.001]**	[0.001]**	[0.001]**	[0.001]**	[0.001]**	[0.001]**	[0.001]**	[0.001]**
Constant	-3.227	-0.697	14.213	-7.424	-8.220	-16.161	-14.917	14.772	-22.519	-16.287	-10.739	-13.079	-21.925	-15.565
	[4.559]	[4.572]	[0.809]**	[2.215]**	[2.264]**	[6.142]**	[6.160]**	[3.080]**	[5.512]**	[5.718]**	[6.553]	[6.544]**	[5.991]**	[6.195]**
Observations	34109	34109	34256	34244	34253	34109	34109	34256	34244	34253	30979	30979	31115	31123
Number of LGs						3130	3130	3130	3129	3130	3129	3129	3128	3129
R-squared	0.83	0.83	0.83	0.70	0.67	0.82	0.82	0.82	0.70	0.68				
Robust standard errors in brackets														

* significant at 5%; ** significant at 1%

APPENDIX

Table 2: Regression results for local investments and election cycles by size categories - Panel FE
dep.var.: per capita municipal investment expenditures

	Panel FE							
	cities above 40000		cities 15-40000		between 4-15000		under 4000	
<i>political variables of interest:</i>								
election year	3.659	4.655	5.716	6.515	6.187	8.006	2.848	1.455
	[2.174]	[2.208]*	[1.873]**	[2.163]**	[1.089]**	[1.333]**	[0.538]**	[0.695]*
year before elections	0.527	1.578	0.102	1.043	0.416	1.229	2.571	0.700
	[2.240]	[2.253]	[1.881]	[2.182]	[1.117]	[1.366]	[0.537]**	[0.699]
mayor political color same as central government	1.627	1.097	5.892	10.034	1.342	2.723	2.040	4.359
	[2.115]	[2.190]	[1.874]**	[2.126]**	[1.521]	[1.866]	[1.414]	[1.837]*
<i>control variables for LG revenues:</i>								
per capita local personal income tax base	0.014	0.064	0.052	0.069	-0.001	0.065	0.023	0.037
	[0.027]	[0.020]**	[0.018]**	[0.020]**	[0.011]	[0.013]**	[0.006]**	[0.007]**
per capita capital grants received	1.615	1.799	1.443	1.607	1.403	1.937	1.279	1.694
	[0.214]**	[0.215]**	[0.070]**	[0.080]**	[0.029]**	[0.031]**	[0.006]**	[0.007]**
per capita municipal investment income	0.344		0.340		0.652		0.922	
	[0.126]**		[0.029]**		[0.025]**		[0.007]**	
per capita municipal current own income	0.348		0.367		0.905		0.445	
	[0.118]**		[0.046]**		[0.035]**		[0.010]**	
% of own (current+capital) resources in LG budget (decentr. measure)		5.622		91.664		90.678		174.344
		[17.819]		[15.806]**		[7.892]**		[3.690]**
<i>controls for need:</i>								
indicator of local infrastructure endowment	29.114	20.603	-1.055	-0.084	-18.827	-16.842	-14.110	4.217
	[34.826]	[35.273]	[15.391]	[17.137]	[6.470]**	[6.962]*	[2.325]**	[2.952]
share of young population	92.318		-144.041		-111.264		22.999	
	[129.807]		[107.622]		[59.461]		[14.315]	
share of old population	224.527	147.478	-160.184	-69.238	6.111	107.447	107.780	61.772
	[260.217]	[147.176]	[195.108]	[142.511]	[95.303]	[95.649]	[15.588]**	[18.758]**
population	-0.001	-0.001	-0.001	-0.002	-0.004	-0.009	-0.004	-0.020
	[0.001]*	[0.001]*	[0.001]	[0.001]	[0.002]*	[0.002]**	[0.005]	[0.006]**
Constant	30.747	66.672	66.237	21.268	49.870	33.468	-19.106	-10.193
	[92.380]	[70.655]	[63.714]	[46.648]	[30.280]	[23.183]	[7.765]*	[8.402]
Observations	253	253	744	744	2885	2885	30227	30362
R-squared	0.44	0.40	0.60	0.47	0.76	0.64	0.82	0.70
Number of LGs	23	23	72	72	281	281	2791	2790
Robust standard errors in brackets	* significant at 5%; ** significant at 1%							

APPENDIX

Table 4: Election cycles in per capita municipal investment - among those who received central investment grants

dep-var.: per capita municipal investment expenditures

	Pooled OLS				Panel FE				
<i>political variables of interest:</i>									
election year	5.035		1.290	-0.636	4.696		0.455	1.524	
	[1.397]**		[1.887]	[2.045]	[1.489]**		[1.973]	[2.042]	
year before elections	4.972		1.973	4.235	4.011		1.126	3.437	
	[1.770]**		[2.255]	[2.322]	[1.560]*		[2.061]	[2.130]	
distance from next election year		-1.627				-1.419			
		[0.526]**				[0.534]**			
mayor political color same as central government	-1.889	-2.113	-2.195	-0.883	3.278	3.133	4.860	6.004	
	[2.097]	[2.115]	[2.538]	[2.592]	[2.446]	[2.447]	[3.233]	[3.347]	
<i>controls for LG revenue:</i>									
per capita local personal income tax base	-0.023	-0.021	-0.062	0.018	0.021	0.026	0.027	0.079	
	[0.014]	[0.013]	[0.012]**	[0.009]	[0.016]	[0.016]	[0.022]	[0.022]**	
per capita capital grants received	1.278	1.278	1.694	1.720	1.232	1.232	1.628	1.655	
	[0.050]**	[0.050]**	[0.073]**	[0.075]**	[0.012]**	[0.012]**	[0.012]**	[0.013]**	
per capita municipal investment income	0.911	0.910			0.824	0.823			
	[0.069]**	[0.069]**			[0.016]**	[0.016]**			
per capita municipal current own income	0.407	0.408			0.496	0.497			
	[0.093]**	[0.093]**			[0.023]**	[0.023]**			
% of own (current+capital) resources in LG budget			201.150				202.353		
			[15.051]**				[11.342]**		
<i>controls for need:</i>									
indicator of local infrastructure endowment	-2.604	-3.632	19.820	51.327	-4.732	-6.033	17.911	45.079	
	[4.602]	[4.453]	[5.918]**	[6.420]**	[7.700]	[7.623]	[9.352]	[9.556]**	
share of young population	16.361	20.271			65.529	76.546			
	[41.288]	[40.944]			[62.087]	[61.732]			
share of old population	21.434	23.967	-35.725	-30.776	21.020	23.964	-69.840	23.494	
	[37.840]	[37.715]	[38.174]	[39.670]	[83.998]	[84.011]	[95.231]	[98.471]	
population	-0.000	-0.000	-0.000	-0.000	-0.002	-0.002	-0.002	-0.002	
	[0.000]**	[0.000]**	[0.000]**	[0.000]**	[0.001]	[0.001]	[0.002]	[0.002]	
Constant	8.510	12.229	3.151	3.918	-1.533	-0.954	-1.972	-10.581	
	[18.311]	[18.418]	[9.753]	[10.202]	[29.719]	[29.753]	[25.199]	[26.092]	
Observations		6435	6435	6454	6454	6435	6435	6454	6454
R-squared	0.91	0.91	0.84	0.82	0.89	0.89	0.81	0.80	
Number of ksh						2057	2057	2066	2066

Robust standard errors in brackets

* significant at 5%; ** significant at 1%

APPENDIX

Table 5: Probability models for receiving central investment grants and political colors - Probit estimations - Panel RE Marginal Effects

Dep var: received targeted and addressed investment grants from central govt.

	Panel Probit - Marginal Effects				with decentralization measure				more controls for need			
<i>political variables of major interest:</i>												
local government political color same as central (abs. or rel. majority)	0.035		0.036		0.044	0.045			0.031	0.031		
	[0.006]**		[0.006]**		[0.007]**	[0.007]**			[0.006]**	[0.006]**		
local government political color same as central (abs. majority)		0.064		0.065		0.111		0.113			0.055	0.057
		[0.016]**		[0.016]**		[0.018]**		[0.018]**			[0.016]**	[0.016]**
mayor political color same as central government	0.043	0.048	0.042	0.048	0.070	0.071	0.069	0.070	0.041	0.041	0.046	0.046
	[0.009]**	[0.009]**	[0.009]**	[0.009]**	[0.010]**	[0.010]**	[0.010]**	[0.010]**	[0.009]**	[0.009]**	[0.009]**	[0.009]**
election year	0.034	0.034			0.034	0.033			0.034		0.034	
	[0.005]**	[0.005]**			[0.005]**	[0.005]**			[0.005]**		[0.005]**	
year before elections			-0.037	-0.037			-0.037	-0.037		-0.036		-0.036
			[0.004]**	[0.004]**			[0.004]**	[0.004]**		[0.004]**		[0.004]**
distance from next election year												
<i>control variables:</i>												
indicator of local infrastructure endowment	0.038	0.041	0.050	0.054	0.028	0.030	0.037	0.039	-0.018	-0.010	-0.016	-0.008
	[0.016]*	[0.016]*	[0.016]**	[0.016]**	[0.015]	[0.015]*	[0.015]*	[0.015]**	[0.015]	[0.015]	[0.015]	[0.015]
per capita local personal income tax base, 2003 prices	-0.000	-0.000	-0.000	-0.000								
	[0.000]**	[0.000]**	[0.000]**	[0.000]**								
population	0.000	0.000	0.000	0.000								
	[0.000]**	[0.000]**	[0.000]**	[0.000]**								
per capita municipal current own income	0.001	0.001	0.001	0.001								
	[0.000]**	[0.000]**	[0.000]**	[0.000]**								
per capita municipal investment income	0.000	0.000	0.000	0.000								
	[0.000]**	[0.000]**	[0.000]**	[0.000]**								
% of own (current+capital) resources in LG budget (decentralization measure)					0.175	0.177	0.186	0.187	0.184	0.194	0.185	0.195
					[0.019]**	[0.019]**	[0.019]**	[0.019]**	[0.019]**	[0.019]**	[0.019]**	[0.019]**
<i>other need indicators:</i>												
indicator of local education demand									0.000	0.000	0.000	0.000
									[0.000]**	[0.000]**	[0.000]**	[0.000]**
indicator of local health service demand									0.000	0.000	0.000	0.000
									[0.000]**	[0.000]**	[0.000]**	[0.000]**
indicator of local social service demand									-0.000	-0.000	-0.000	-0.000
									[0.000]**	[0.000]**	[0.000]**	[0.000]**
share of young population									0.417	0.411	0.417	0.411
									[0.080]**	[0.080]**	[0.080]**	[0.080]**
share of old population									-0.376	-0.376	-0.393	-0.393
									[0.066]**	[0.066]**	[0.066]**	[0.066]**
Observations	28076	28076	28076	28076	28068	28068	28068	28068	27923	27923	27923	27923
Number of groups	3130	3130	3130	3130	3129	3129	3129	3129	3129	3129	3129	3129
Standard errors in brackets												

* significant at 5%; ** significant at 1%

APPENDIX

Table 6 : Probability models for receiving central inv. grants and political colors by size categories

dep. var.: received addressed and targeted invest. grant	LPM						Probit-marginal effects					
	cities above 15000		between 4-15000		under 4000		cities above 15000		between 4-15000		under 4000	
	panel FE		panel FE		panel FE		panel probit		panel probit		panel probit	
local government political color same as central (abs. majority)	0.008 [0.040]	-0.012 [0.040]	0.137 [0.046]**	0.138 [0.047]**	0.054 [0.023]*	0.054 [0.023]*	-0.009 [0.037]	-0.011 [0.037]	0.120 [0.042]**	0.148 [0.044]**	0.027 [0.020]	0.043 [0.023]
mayor political color same as central government	0.118 [0.033]**	0.107 [0.033]**	0.014 [0.030]	0.011 [0.031]	0.003 [0.012]	0.005 [0.012]	0.134 [0.031]**	0.125 [0.032]**	0.029 [0.026]	0.049 [0.027]	0.003 [0.009]	0.018 [0.010]
election year	-0.064 [0.033]	-0.044 [0.033]	0.020 [0.020]	0.031 [0.021]	0.046 [0.004]**	0.045 [0.004]**	-0.074 [0.033]*	-0.068 [0.033]*	-0.000 [0.020]	0.008 [0.021]	0.045 [0.005]**	0.041 [0.005]**
per capita local personal income tax base,2003prices	-0.001 [0.000]**		-0.001 [0.000]**		-0.000 [0.000]**		-0.001 [0.000]**		-0.001 [0.000]**		-0.000 [0.000]**	
per capita municipal investment income	0.000 [0.001]		0.002 [0.000]**		0.001 [0.000]**		-0.000 [0.001]		0.002 [0.000]**		0.000 [0.000]**	
per capita municipal current own income	-0.001 [0.001]		0.004 [0.001]**		0.001 [0.000]**		-0.000 [0.001]		0.004 [0.001]**		0.001 [0.000]**	
% of own (current+capital) resources in LG budget		-0.348 [0.248]		0.427 [0.121]**		0.064 [0.022]**		-0.612 [0.194]**		0.358 [0.101]**		0.147 [0.018]**
indicator of local infrastructure endowment	-0.103 [0.318]	0.099 [0.321]	-0.670 [0.144]**	-0.869 [0.145]**	-0.252 [0.023]**	-0.247 [0.020]**	0.354 [0.213]	0.480 [0.213]*	-0.129 [0.101]	-0.397 [0.101]**	-0.055 [0.015]**	-0.021 [0.013]
share of young population		1.187 [2.572]		2.677 [1.345]*		0.816 [0.120]**		2.478 [1.733]		0.715 [0.797]		0.367 [0.071]**
share of old population		-7.768 [3.565]*		-3.304 [2.000]		0.037 [0.140]		-0.022 [1.377]		-1.281 [0.766]		-0.247 [0.058]**
population	0.000 [0.000]		-0.000 [0.000]**		0.000 [0.000]		0.000 [0.000]**		0.000 [0.000]**		0.000 [0.000]**	
Constant	1.046 [0.622]	1.884 [1.183]	1.996 [0.274]**	0.834 [0.624]	0.232 [0.049]**	0.015 [0.049]						
Observations	813	813	2387	2387	24876	24723	813	813	2387	2387	24876	24723
Number of LGs	94	94	279	279	2787	2786	94	94	279	279	2787	2786

Robust standard errors in brackets

* significant at 5%; ** significant at 1%

APPENDIX

Table 7: Probability models for receiving central inv. grants and political colors by financial independence

dep.var.:received addressed and targeted invest. grant	Probit-marginal effects							
	own rev.>40%		own rev.20-40%		own rev.10-20%		own rev. under 10%	
	panel	probit	panel	probit	panel	probit	panel	probit
local government political color same as central (abs. majority)	0.007 [0.060]	0.047 [0.064]	0.050 [0.024]*	0.103 [0.027]**	0.054 [0.026]*	0.142 [0.032]**	-0.022 [0.025]	0.026 [0.037]
mayor political color same as central government	0.111 [0.040]**	0.129 [0.040]**	0.071 [0.017]**	0.100 [0.018]**	0.027 [0.014]	0.084 [0.017]**	-0.008 [0.014]	0.003 [0.016]
election year	-0.065 [0.019]**	-0.065 [0.020]**	0.006 [0.009]	0.007 [0.010]	0.043 [0.007]**	0.039 [0.008]**	0.077 [0.009]**	0.073 [0.009]**
per capita local personal income tax base,2003prices	-0.000 [0.000]*		-0.000 [0.000]**		-0.000 [0.000]**		-0.000 [0.000]	
per capita municipal investment income	0.000 [0.000]**		0.002 [0.000]**		0.000 [0.000]*		0.002 [0.001]*	
per capita municipal current own income	0.000 [0.000]**		0.003 [0.000]**		0.003 [0.000]**		0.003 [0.000]**	
% of own (current+capital) resources in LG budget		-0.488 [0.117]**		0.178 [0.083]*		0.338 [0.114]**		-0.212 [0.146]
indicator of local infrastructure endowment	0.189 [0.077]*	0.027 [0.072]	0.161 [0.034]**	0.051 [0.034]	0.022 [0.023]	0.037 [0.022]	-0.051 [0.021]*	0.019 [0.022]
share of young population		0.014 [0.474]		0.157 [0.182]		0.626 [0.144]**		0.318 [0.113]**
share of old population		-1.863 [0.351]**		-1.454 [0.162]**		-0.431 [0.110]**		-0.112 [0.084]
population	0.000 [0.000]**		0.000 [0.000]**		0.000 [0.000]**		0.000 [0.000]**	
Constant								
Observations	1826	1807	7288	7251	10325	10293	8637	8572
Number of LGs	784	770	2255	2248	2700	2698	2113	2110

Robust standard errors in brackets

* significant at 5%; ** significant at 1%