

Politics, Elections and Targeting of Poverty Alleviation Programs*

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Abstract

The Social Investment Fund (FIS) of Guatemala, a demand-driven poverty alleviation program, over which the central government has substantial discretion in making allocations, provides an unusual opportunity to study the political influences on the distributions of public funds. This article uses GMM to estimate a dynamic panel data model of the expenditures made by the FIS on different municipalities. I utilize data on the political affiliation of local authorities and electoral results to evaluate if electoral timing and political affiliations matter in FIS investment allocations. In addition, I take advantage of the discontinuity generated by the general elections in which national and local authorities changed. I reach three main conclusions. First, I find that FIS disbursements peaked during elections year, while other less discretionary sources of funding did not. Second, FIS disbursements were greater in municipalities in which local electoral elections were tight. Third, municipalities with mayors belonging to the same political party as the President received greater amounts of FIS funds than municipalities with mayors having different political affiliations. The results are robust to alternative specifications and are in line with the theory of political influences on the allocation of discretionary funds.

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1 Introduction

The first and founding principle of a poverty reduction program should be that its benefits reach the neediest. However, across the world we witness how large portions of poverty reduction efforts are misallocated. The mere existence of measures of how progressive social interventions are, as in [Coady et al. \(2004\)](#), tells that achieving the goal of reaching the ones who need it the most is far from trivial. Although targeting assessments are becoming popular in social program evaluation literature, researchers seldom inquire about the causes of allocation errors. This article tries to fill this gap by studying the causes of fund misallocation in a poverty reduction program in Guatemala.

Since the early 1990s, Latin American countries have used investment funds as ways to sponsor local development projects. They were created as mechanisms through which societies could abate the hypothesized negative consequences of reform policies that were being undertaken during those years and, in particular cases like Central America, to alleviate the consequences of long decades of civil conflict. The few impact evaluations available ([Rawlings et al., 2004](#); [Ibarraran et al., 2008](#)) have shown small positive overall impacts. Their limited impacts have been attributed to the fact that targeting of such investment programs was far from successful ([Ibarrarán et al., 2008](#)).

Besides the broadly accepted assertions about the importance of targeting in poverty alleviation programs ([Sen, 1995](#); [Coady et al., 2004](#)), analyzing the determinants of targeting performance in this type of intervention acquires special relevance due to the fact that investment funds are centralized in their management and most of them are decentralized in their expenditure ([Faguet and Wietzke, 2006](#)). Thus, the investment fund works as a parallel transfer from the central government to the municipalities, separate from the habitual transfers stipulated in the regular national budgetary process.

Taking advantage of these characteristics, this paper focuses on the political determinants of targeting in Guatemala's Fondo de Inversion Social (FIS). In particular, this

paper is interested in elucidating if the fact that the central government had more decision power to allocate the FIS resulted in a strategic targeting that was used to maximize its political utility. In this sense, the FIS allocation mechanism contrasts with that of the central government regular budgetary transfers which follow a very strict rule stipulated in the Guatemalan Constitution and designed to deepen the decentralization process.

Consequently, this article relates with at least two blocks of literature: one concerned with the debate between decentralization and centralization of the delivery of poverty alleviation programs, and the other interested in the political determinants of transfers from the national to local authorities. The former centers its attention on an ongoing debate about the advantages of decentralizing social program delivery. Arguments in its favor, as in any other decentralization process, focus on the idea that communities have better information than central government bureaucrats about their needs and that it improves accountability, given that supposedly, citizens have more control over their local politicians (Shah, 1999; World-Bank, 2001; Faguet, 2004; Faguet and Wietzke, 2006). However, questionings of this rationale soon appeared due to the lack of institutional capacity in poor localities across the developing world. Some assert that the responsibilities that decentralization brings often requires human, social and technical resources that are absent in the first place (Crook and Sverrisson, 1999). Others argue that decentralization expects too much from local democratic institutions, and consequently it is linked with a hazard of resource capture by local elites (Echeverri-Gent, 1992).

Although literature on this debate is very extensive, work that focuses on targeting of poverty alleviation programs is limited. Bardhan and Mookherjee (2000) develop a theoretical model to examine the consequences of decentralization of poverty alleviation programs. Their model provides two main results regarding targeting. First, they argue that decentralized programs perform better targeting at small scales, but under-

perform with larger scales. Second, given that they assume that wealthier regions have higher governance standards, they predict that poorer regions are able to handle smaller project than wealthier regions, hence poverty reduction in poorer regions will be minor relative to rich regions. On the other hand, [Galasso and Ravallion \(2005\)](#) theoretically and empirically evaluate the information available for the targeting of a decentralized poverty alleviation program in Bangladesh. They find that decentralized targeting achieved a mildly pro-poor allocation that varied greatly depending on the village. Within village they found that decentralized targeting performance improved with lower inequality, remoteness and fewer shocks. In opposition to the theoretical findings of [Bardhan and Mookherjee \(2000\)](#), they find that decentralized targeting improved with program size.

Even though, their finding about inequality damaging the ability to perform targeting is consistent with the hypothesis of decentralization enabling local elites to capture resources, none of the previous literature studies electoral influences over targeting. This article bridges the literature on decentralized poverty alleviation program targeting and on the electoral determinants of national (or federal) transfers to local communities. This started with the analysis of the political determinants of New Deal spending ([Wright, 1974](#)), and covers the analysis of the mechanism through which electoral outcomes are related to the expenditure of discretionary funds. The basic idea of all of these models is that political parties compete for the votes of selfish citizens that are interested in both ideological stances of parties and their private consumption. The latter can be boosted by favors provided by the prospective incumbent. Hence, democracy in this context is seen as a distribution game in which winners and losers are determined by the characteristics of the voters and the parties.

Two main outcomes are analyzed: pork-barrel or clientelist politics and the role of swing voters. [Cox and McCubbins \(1986\)](#) develop a model in which candidates promise more benefits to groups of citizens with the highest electoral rates of return (i.e., more

votes per dollar promised). This yields an ordering in which swing voters receive the highest share of the benefits. However with the introduction of risk-aversion in the candidates' characteristics, they find that candidates prefer to invest relatively more in their core support group, favoring pork-barrel political outcomes. In the same vein, [Dixit and Londregan \(1996\)](#) develop a model in which pork-barrel politics arise because expenditure is more efficient in core supporter districts. That is, candidates have more information about supporters than opponents, so patronage dollars can be spent more effectively, achieving higher electoral outcomes. On the other hand, for [Lindbeck and Weibull \(1987\)](#) the pursuit of the swing voters happens only if citizens have identical consumption preferences but different ideological preferences about the parties' platforms.

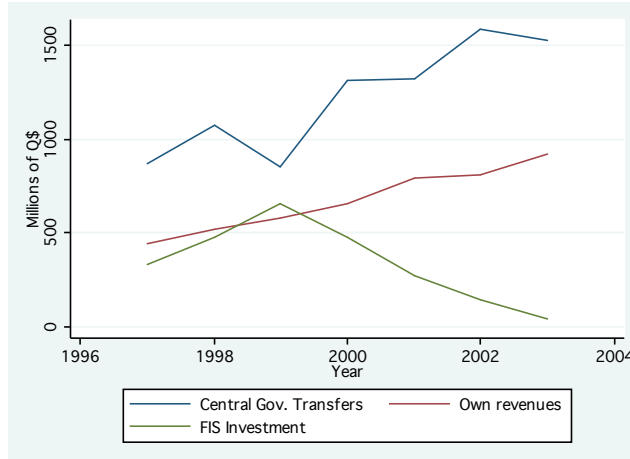
This paper analyzes if the extradiscretion the central government had over the FIS led to the funds to be allocated following political criteria. At the same time, this paper also investigates whether the discretion over the allocation of funds is exploited to a greater extent during election periods. In this sense, it is related to the work of [Levitt and Snyder \(1995\)](#) who compare the allocation of U.S. federal funds over which the Congress had high influence with those allocated by independent agencies. They find that during the period analyzed in which Democrats had control of the Congress, programs in which the the Congress had influence were heavily skewed to Democrat districts.

The present article also contributes to the empirical literature in that it exploits the time series dimension of the data. So far, research has relied on cross-sectional data ignoring the fact that budget processes are dynamic and recursive (see [Wright \(1974\)](#); [Levitt and Snyder \(1995\)](#); [Dixit and Londregan \(1996\)](#); [Case \(2001\)](#)). To the best of my knowledge, the only related worked that has exploited the time dimension is [Schady \(2000\)](#), which used a pooled OLS to examine disbursements of a social fund in Peru with time dummies to capture the effect of electoral periods. However, he did not include cross-sectional

information in his analysis, so any heterogeneity in municipal characteristics that was correlated with the disbursement timing would bias his estimates. Furthermore, he ignored the possibility of the disbursements being autoregressive. The advantage of exploiting the time dimension of the data in a panel setting is at least twofold. First, we are able to trace out the effect of shocks, like the elections. Second, we are able to control for time-invariant and dynamic municipal characteristics that might affect the results. Given the nature of the estimation, we are still concerned about endogeneity bias. Hence, this paper exploits the time dimension using GMM estimation procedures for dynamic panels to obtain unbiased estimates.

The findings are quite revealing. First, FIS allocation does not consistently follow the allocation of central government transfers nor do they serve as revenue substitutes for low own income yielding municipalities. Furthermore, the relative freedom authorities had to allocate FIS funds contrasts with the strict rules used to allocate central government budgetary transfers, hence consistent with the findings of [Levitt and Snyder \(1995\)](#), this discretion allowed the distribution of FIS to be influenced by political considerations, something that does not happen with regular budgetary transfers. In line with the theoretical results of [Dixit and Londregan \(1996\)](#) and [Case \(2001\)](#), we find evidence that strongly suggest that FIS disbursements served both as a tool for pork-barrel politics and as a vehicle to persuade swing voters. We also find no correlation between poverty and the amount of FIS received, not even during a spending spree witnessed during election year. These results suggest that discretion over FIS allocation allowed the funds to be used to serve political ends, and that targeting based on poverty was secondary.

Figure 1: FIS, Central Government Transfers and Municipal Own Income (per capita)



Source: Own calculations based on FIS administrative data and INFOM municipal data

2 Municipal Budget and the Role of FIS

Municipal budgets rely mainly on central government transfers and on local revenues. In particular, transfers are very important for small municipalities that are not able to collect taxes from their citizens. For instance, while the smallest 10% of the municipalities receive transfers worth 10.2 times what they can collect in their own revenues, this ratio is only 1.2 for the biggest decile of the municipalities.

2.1 Central Government Transfers

Central government transfers are constituted by two main sources: The Constitutional Contribution and the shared taxes (FUNCEDE et al., 1999). The Constitutional Contribution equals the 10% of the total yearly income of the central government. By constitutional law, the Constitutional Contribution must be given to the municipalities, but its allocation should follow five strict rules (FUNCEDE, 2002): (1) 25% in equal parts among all the municipalities; (2) 25% in proportion to the population of the municipalities; (3) 25% in proportion to the income per capita in each municipality; (4) 15% in proportion to the number of small villages and hamlets in each municipality,

and (5) 10% in inverse proportion to the income per capita in each municipality. Shared taxes are those collected by the central government that are shared with the municipalities based on explicit formulae. All these resources are distributed also *following the rules of allocation given above for the Constitutional Contribution*. These shared taxes are: (1) 1% of the Value Added Tax; (2) Q\$0.20 per gallon of gasoline sold; (3) Taxes on vehicles, and (4) Tax on real estate (FUNCEDE et al., 1999).

This shows that the budgetary transfers are allocated in a straightforward process, which is very difficult to manipulate. The lack of discretion over these funds makes them unsuitable to fulfill political and clientelistic purposes. Figure 1 shows an interesting phenomenon: among all of the sources of municipal income, only the FIS peaked in the election year of 1999. This supports the hypothesis that the government enjoys a greater discretion on FIS expenditure than on other sources of funding.

2.2 Own Income

Local own incomes can be divided into two parts depending if their sources were taxes or not. Municipalities can tax particular economic activities, the use of billboards and the exploitation of resources. The second group comprises revenues obtained from sales of public services, the rent of public assets, valorization payments (i.e., payments made by real state owners that have benefited from infrastructure investments made by the municipality), and fines (FUNCEDE et al., 1999).

2.3 The FIS in Guatemala

The FIS was created in 1993 and it started to approve projects the next year. It was born as a spin-off of FONAPAZ, another social fund, and it was intended to be less permeable to political influences than its predecessor. Thus, it was created under a special law and was constituted as a public autonomous entity (Ibarrarán et al., 2008).

Its lifespan was supposed to be eight years, but in 2000 the Congress extended it until 2006. During these years the FIS received funding from international organizations such as the World Bank, the IDB, the WFP and OPEP and from international aid agencies from Germany, Canada, Japan, Finland, China and Denmark.

The FIS invested in a wide range of social projects (e.g., schools, bridges, sewage systems, teachers salaries, distributing consumer durables, reforestation) which were intended to improve the quality of life of the rural population of Guatemala. To allocate its resources, the FIS was supposed to use an Unmet Basic Needs index¹ (NBI) and engage in demand-driven negotiations with communities where the people chose the project of their liking from a pre-established menu of feasible projects. The municipality's mayor and other local authorities with the support of FIS staff held community meetings at which the projects were decided. Hence, the work of local authorities was key, especially if we consider that they became the bridge that connected the central authorities with the beneficiary communities during the project implementation phase.

During its life the FIS invested around US\$470 million in 16,382 projects. This expenditure was not constant across years. Figure 1 shows that FIS approvals peaked in 1999, the election year. Furthermore, [Ibarrarán et al. \(2008\)](#) show that FIS targeting failed and that, although the FIS was supposed to be exclusive for investment in rural areas, 20.25% of total FIS investment was not in rural villages.

¹The Unmet Basic Needs index or NBI is a deprivation measure highly used in Latin-America. It has six dimensions (i.e., education, economic dependance, water, dwelling characteristics, drainage and overcrowding) all of which have particular conditions to be fulfilled ([Feres and Mancero, 2001](#)).

3 Empirical Approach

3.1 Data

To conduct this research, I compiled information from different data sources. First, the FIS investment data, obtained from the program administrators, contains information about all the projects the FIS financed during its existence: the project type, the beneficiary community, the cost of the project, and the starting date of the project. The FIS data were supplemented with municipal public budget variables: transfers received from the central government and the amount of municipal revenues that came from own sources. This yearly information, available since 1997, was obtained from the Instituto de Fomento Municipal (INFOM), a public decentralized institution whose main task is to assist local authorities in the improvement of their administration. This information was acquired from INFOM for every year except 1997, which was obtained from the Fundación Centroamericana de Desarrollo (FUNCEDE) in [FUNCEDE et al. \(1999\)](#).

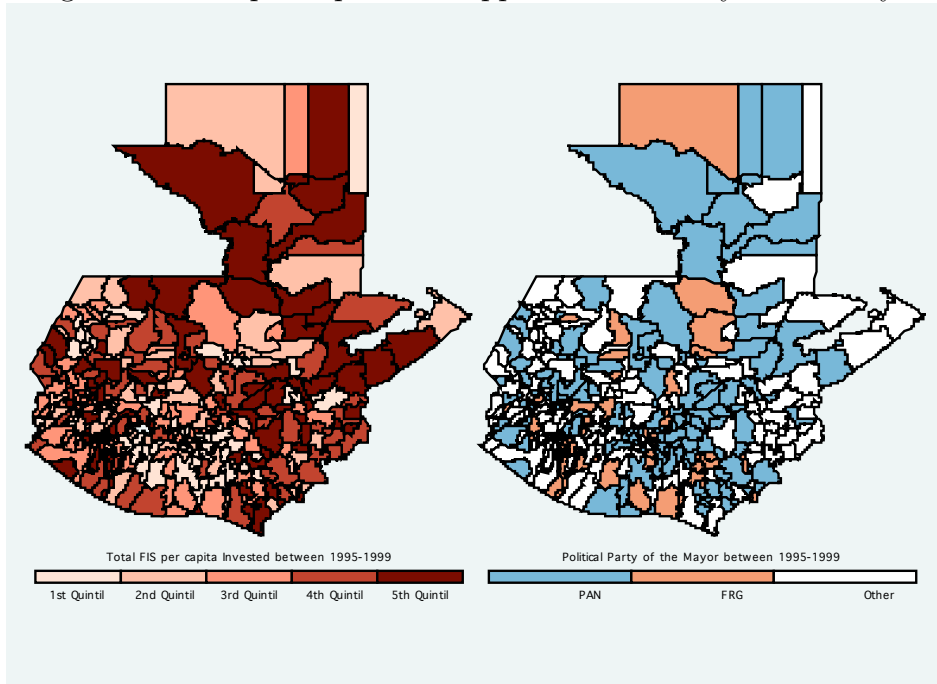
The other important part of the data set is the relevant electoral information for each municipality. The electoral memoirs of the Tribunal Supremo Electoral de Guatemala (TSE) include all electoral outcomes of Guatemala's 1999 general elections at the municipal level, in particular, the municipal vote count for each party that had a candidate in the presidential and local elections. This information also contains the number of people that were eligible to vote and the actual number of people who showed up on election day. All these data were complemented with information about the political party of incumbent mayors during the period 1995-1999 obtained from [FUNCEDE et al. \(2004\)](#)

Municipal socio-demographic characteristics were obtained Guatemala's 1994 census, which was conveniently collected in a year in which the investment funds had not

began or, at most, were very recent, so any influence of the funds is highly improbable. From the census data I obtained specific characteristics relevant in the determination of the need of social investment (e.g., unmet basic needs) and other municipal-specific variables.

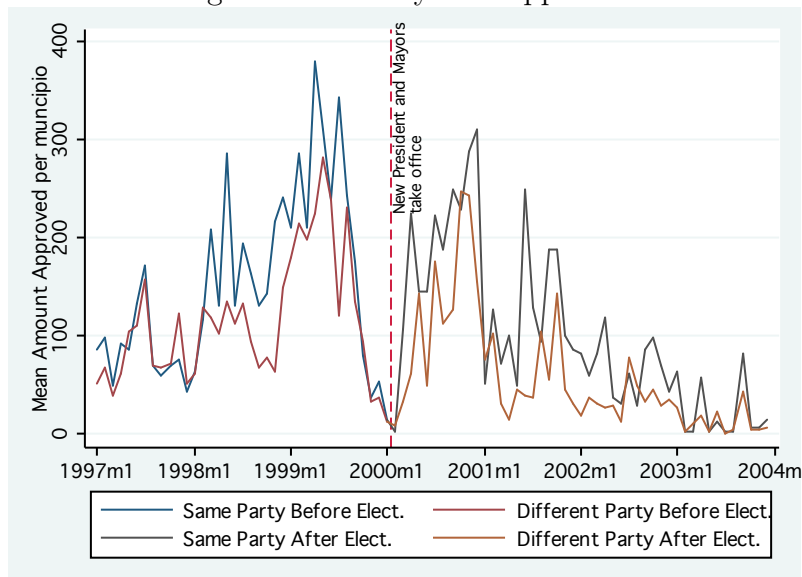
3.2 Descriptive Approach

Figure 2: Total per capita FIS Approved and Party of the Mayor



Before turning to the empirical evaluation of the hypothesis, let us first examine, in a descriptive fashion, some of the phenomena we are interested in. One of the main hypotheses of the present work is that mayors may benefit from their political party affiliation if they belong to the same party of the President. The special situation in which local authorities had responsibility for negotiating over FIS investments for their communities could have facilitated such behavior. The central government could have given priority to projects presented by co-partisan local authorities over projects presented by mayors with other political inclinations.

Figure 3: Monthly FIS Approved

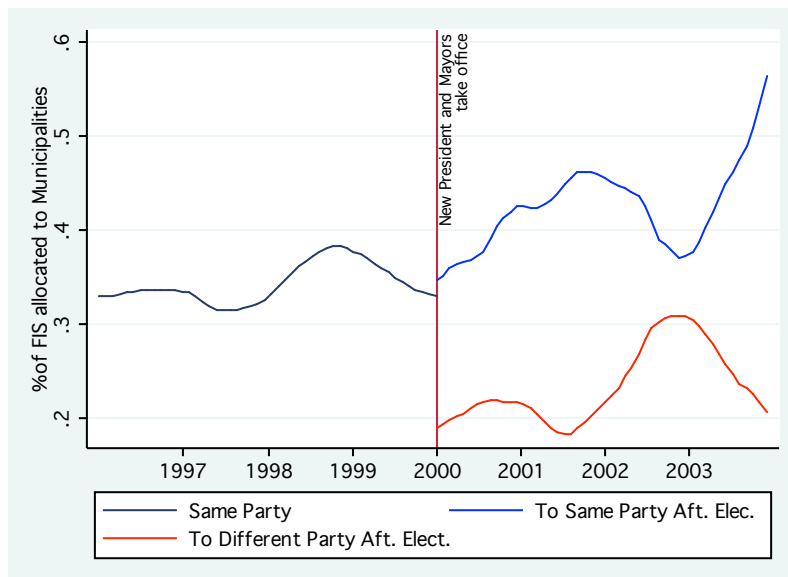


Source: Own calculations based on FIS administrative data and 1999 STE Election Memoirs

A first way to explore this is by mapping the amount per-capita FIS funds invested and compare it to a map of the political party of mayors as in Figure 2. The left panel plots the total per-capita FIS invested before the 1999 elections and the right panel maps the political party affiliation of the mayor. Guatemala’s President, Mr. Alvaro Arzú Irigoyen, belonged to the *Partido de Avanzada Nacional* (PAN). Hence the municipalities with mayors from the same party as the president are represented by blue. Figure 2 suggests a correlation between the party of the mayor and the amount of FIS per-capita received, where the main receivers of FIS are mayors from PAN. Of course, such a correlation could also reflect unobserved characteristics, for example if PAN was popular in poorer municipalities with greater need for projects.

The next step is to analyze this phenomenon in a dynamic setting. Figure 3 allows the visualization of at least three important points. First, municipalities with mayors from the same party as the President received consistently more FIS investment than municipalities with mayors from different political parties. What is even more striking is that even when the PAN lost the 1999 elections, the new party in power, the *Fuente Republicano Guatemalteco* (FRG), immediately started to allocate more FIS in-

Figure 4: Before and After: FIS Approved in Municipalities whose mayors were co-partisans of the President before 1999 election



vestments to municipalities with FRG mayors than to municipalities with mayors from parties different from FRG. That is, clientelism was not only practiced by PAN authorities, it continued even after the party in power changed, a pattern which cannot be explained by unobserved characteristics of municipalities that persist over time. This observation supports the hypothesis that these funds were easier to divert than other funds, and were used for clientelism. Another interesting observation is that there was a peak of FIS investments prior to the elections that benefited both co-partisans and not co-partisans.

A more tangible example of the importance of party affiliation in FIS disbursements can be seen in Figure 4. It shows the results of local regressions of the percentage of monthly FIS approvals allocated to municipalities that *before the 1999 elections* had mayors from the same party as the President (i.e, PAN). Figure 4 follows these same municipalities after the elections but it splits them between the ones that changed to a mayor that came from the party of the new President, FRG, (i.e., blue line) and the ones that elected a mayor from a political party different from the one of the new President (i.e., red line). The difference is striking. The municipalities that passed from

having a mayor from the same party as the President to one in which the mayor is no longer a co-partisan of the new President are the big losers. The percentage of FIS allocated to them is much lower to what they used to receive and much lower to what their counterparts, the municipalities that elected FRG mayors, received after the 1999 elections.

3.3 Dynamic Micro Panels

Section 2 showed that the economic series that will be used in this analysis either follow particular rules of allocation or depend heavily on relatively static characteristics of the municipalities (e.g., ability to collect local taxes or charge for services provided). These particularities of the data suggest that the series follow a dynamic process in which past realizations influence current ones. Additionally, they suggest that municipal characteristics, which are time-invariant at least in the short run (e.g., population, geography, economic activity), are highly important in determining the realization of the series.

The conditions described in Section 2 also suggest that “transfers” and “own income” might not be completely exogenous from FIS disbursements, especially given the dynamic nature of the data generating process (DGP). Those series can be *predetermined* in the sense that they are “independent of current disturbances, but they may be influenced by past ones” (Roodman, 2006) or even endogenous. One can believe that own income might be endogenous if one finds it plausible that FIS funds would crowd-out the need for local taxation. However, I am more inclined to believe that transfers and own income series are predetermined to FIS because of the rules that are used to allocate the Constitutional Contributions and the activities from which own incomes are collected. Realizations of FIS might affect future—but not current—realizations of the transfers and own income through the materialization of the benefits of the FIS

investments. Hence, FIS disbursements do not affect current levels of transfers or own income because of the existence of a lag between the moment the FIS disburses the funds and the time when the benefits generated by them materialize.

Fortunately for the analysis of co-partisanship in FIS allocation, within the period of analysis there was a change of both mayors and Presidents that, together with the panel structure of the data, can be exploited to study the phenomenon. In that sense, the equation to be estimated should include a dummy variable that captures this political party effect. In addition, given that the timing of the elections is totally exogenous from municipal finances, its effect on FIS can be captured through the use of year dummies. Furthermore, the inclusion of time dummies purges any common effects on all the municipalities from the residuals assuring that the idiosyncratic disturbances are uncorrelated across observations at the same point in time.

Given the nature of the variables to be analyzed, the model considered for estimation is an autoregressive process of the form:

$$\text{FIS}_{i,t} = \alpha_0 + \alpha_1 \text{FIS}_{i,t-1} + \beta \text{SP}_{i,t} + \sum_{s=0}^L \gamma_{t-s} \text{Trans}_{i,t-s} + \sum_{r=0}^K \psi_{t-r} \text{Inc}_{i,t-r} + \sum_{Y=Y_1}^{Y_T} D_Y Y + \eta_i + \nu_{it} \quad (1)$$

where $\text{FIS}_{i,t}$ is the total investment made by the FIS in municipality i in year t ; $\text{Trans}_{i,t-s}$ is the amount of central government transfers that the municipality i received at time $t-s$; $\text{Inc}_{i,t-r}$ is the amount of own income collected by municipality i at year $t-r$, L and K , the upper limits of the summations are the maximum amount of lags of Trans and Inc used in the estimation; and $\text{SP}_{i,t}$ is a dummy variable that equals 1 when the mayor of the municipality i at year t is from the same political party as the President; finally equation (1) also controls for year dummies, where $Y_1 = 1998$ and $Y_T = 2003$, and recognizes the existence of time invariant characteristics (η_i) in each municipality.

The combination of the panel data structure with a time invariant term and the autoregressive nature of the DGP causes the estimation of (1) to require a special approach.

Pooled OLS will yield biased estimators. The recursiveness of the series will cause the time-invariant component to be correlated with the lagged dependent variable (i.e., η_i is present in both $\text{FIS}_{i,t}$ and $\text{FIS}_{i,t-1}$). This means there are characteristics of each municipality that influence the outcomes of every FIS realization that are being collected in the residual. Hence, $E[\text{FIS}_{i,t-1}(\eta_i + \nu_{it})] \neq 0$. The positive correlation between the time-invariant component and the lagged dependent variable will cause the bias to be upwards.

The Fixed-Effect estimator will not solve the bias either. The within transformation used by the FE imposes a stronger intertemporal exogeneity assumption, which in the case of a dynamic DGP is not fulfilled (Bond, 2002; Roodman, 2006). The realization at time t of FIS depends on the realization at time $t - 1$, which will be negatively correlated with the $\nu_{i,t-1}$ in the transformed disturbance. This negative correlation will yield a negative bias.

An alternative way to purge the time-invariant component out of (1) is by estimating it in first differences:

$$\Delta\text{FIS}_{i,t} = \alpha_1\Delta\text{FIS}_{i,t-1} + \beta\Delta\text{SP}_{i,t} + \sum_{s=1}^L \gamma_{t-s}\Delta\text{Trans}_{i,t-s} + \sum_{r=1}^K \psi_{t-r}\Delta\text{Inc}_{i,t-r} + \sum_{Y=Y_1}^{Y_T} D_Y\Delta Y + \Delta\nu_{it} \quad (2)$$

however, the term $\text{FIS}_{i,t-1}$ in $\Delta\text{FIS}_{i,t-1}$ is correlated with the term $\nu_{i,t-1}$ in the term $\Delta\nu_{it}$. At the same time, Trans and Inc are potentially endogenous because they also may be correlated with $\nu_{i,t-1}$. To solve this endogeneity problem and taking advantage of the fact that longer lags of the regressors are not correlated with the differenced residual, Arellano and Bond (1991) develop an estimator in which the differenced regressors are instrumented by these longer lags. The Arellano-Bond estimator for dynamic panel data uses the General Method of Moments (GMM) conditions to produce as many instruments as possible in order to get efficient estimates. These moment conditions are the orthogonality conditions of the instruments used. For instance, if the panel

has a $T = 3$ then $\Delta\text{FIS}_{i,t-1}$ can be instrumented with $\text{FIS}_{i,t-2}$ and $\text{FIS}_{i,t-3}$. Then, the orthogonality conditions would be:

$$E[\text{FIS}_{i,t-2}\Delta\nu_{it}] = 0 \quad E[\text{FIS}_{i,t-3}\Delta\nu_{it}] = 0 \quad (3)$$

The Arellano-Bond estimator is getting rid of the fixed-effect by differencing and then avoiding endogeneity by instrumenting it with the lagged dependent variable in levels.

The instruments used in the Arellano-Bond estimator or Difference GMM estimator (DIFF-GMM) work as long as the series is weakly dependent. In the presence of strongly dependent series the instruments are not informative. Levels become bad predictors of future changes. To solve this estimation problem, [Arellano and Bover \(1995\)](#) and [Blundell and Bond \(1998\)](#) expanded the DIFF-GMM estimator by including in the estimation an approach where the regressors in (1) are instrumented by lagged differences. In this setting, the lagged differenced instruments are exogenous to the time-invariant component. Hence, this estimator, called the System GMM estimator (SYS-GMM), includes another set of orthogonality conditions (i.e., moment conditions) on top of (3):

$$\begin{aligned} E[\Delta\text{FIS}_{i,t-1}(\eta_i + \nu_{it})] &= E[\Delta\text{FIS}_{i,t-1}\nu_{it}] = 0 \\ E[\Delta\text{FIS}_{i,t-2}(\eta_i + \nu_{it})] &= E[\Delta\text{FIS}_{i,t-2}\nu_{it}] = 0 \end{aligned} \quad (4)$$

The lagged differenced instruments of the levels equation (1) are much more informative in series that are strongly dependent.

The discussion above shows that to define which GMM method is appropriate depends on the degree of dependence of the series that are going to be used. For weakly dependent series, DIFF-GMM will be the way to go, on the contrary, if we are dealing with random walk-like series, SYS-GMM will be the appropriate procedure. This is one of

the reasons a deep analysis of the time-series properties of the data is required.

3.4 Empirical Diagnostics: In Search of Unit Roots

Unlike time-series data, micro panels are characterized by a large number of individuals (large N) observed at a few points in time (short T). Hence, the usual diagnostic tests for time-series properties (e.g., Dickey-Fuller tests) are not useable in this context. However, given the importance of determining the time properties of the series that are going to be used, the dynamic panel literature has developed a series of simulations that inform researchers on how to identify weakly or strongly dependent series from micro panels. For instance, the work of [Bond et al. \(2002\)](#) gives guidelines on how to analyze the time-series properties of micro panels using different estimators based on Monte Carlo simulations of weakly and strongly dependent series with large N and short T .

As in [Bond et al. \(2002\)](#), in order to analyze the time-series properties of the data, I focus on the estimation of α in the first-order autoregressive model with unobserved fixed-effects η_i and serially uncorrelated disturbances ν_{ij} , where $\{y_i\}$ can be any of the series used (i.e., FIS disbursements, Central government transfers and Municipal own income):

$$y_{it} = \alpha y_{it-1} + (1 - \alpha)\eta_i + \nu_{it}, \quad |\alpha| \leq 1 \quad (5)$$

As we know the FE transformation will always yield a downwardly biased estimator in a dynamic setting due to the negative correlation between the transformed lagged variable and the transformed idiosyncratic disturbance ([Roodman, 2006](#)). Hence, the FE estimates can be used as a lower limit of the true value of α ([Bond, 2002](#)).

POLS estimates of (5) will be consistent if $\alpha = 1$ (i.e., if the series follow a random walk). However, if $\alpha < 1$ POLS estimation of (5) yields an upward biased and inconsistent

Table 1: AR(1) Diagnostics

	FE		POLS		DIFF-GMM		SYS-GMM	
L.FIS_pc	-0.118***	[0.023]	0.179***	[0.021]	0.090**	[0.037]	0.106***	[0.032]
Pval AB AR(2)			0.009		0.522		0.437	
L.transf_pc	0.522***	[0.021]	1.042***	[0.007]	0.265**	[0.108]	1.015***	[0.023]
Pval AB AR(2)			0.000		0.000		0.000	
L.owninc._pc	0.351***	[0.031]	0.929***	[0.017]	0.144	[0.236]	0.887***	[0.107]
Pval AB AR(2)			0.000		0.260		0.199	
Observations	1,980		1,980		1,650		1,980	
Numb of i02	330				330		330	

All estimations are obtained after controlling for year effects. SE in brackets. (***) $p < 0.01$, (**) $p < 0.05$, (*) $p < 0.1$

estimate, due to the correlation of y_{it-1} and the time-invariant characteristic. [Bond \(2002\)](#) argues that this estimate can be taken as the upper bound of the real value of α .

As was shown in the previous section, the instruments in DIFF-GMM are informative as long as the series is weakly dependent one. Thus, if the series is strongly dependent, the DIFF-GMM estimates are not identified, but SYS-GMM estimates are, because its estimates are informative in the presence of strongly dependent series. The results of the estimation of (5) with DIFF-GMM are compared to those estimated with SYS-GMM, if the series is close to have a unit root, DIFF-GMM will be seriously biased while SYS-GMM will be consistent.

The results in Table 1 show that the FIS disbursements series is a weakly dependent one and is far from having a unit root. As expected, DIFF-GMM and SYS-GMM estimates are relatively close. Table 1 also reveals that the Central government transfers series is a random walk. As expected, the DIF-GMM is highly biased while the POLS and the SYS-GMM estimates yield a number for α close to unity. This is the case because of the existence of constitutional rules in the allocation of the transfers. This suggests that the allocation rules are relatively static; they depend on fundamental and not transitory characteristics of the municipalities. In fact, Table 1 also reports the p -value

of the Arellano-Bond test for autocorrelation of order 2 in the residuals (see [Roodman \(2006\)](#)). The null of no autocorrelation is rejected which suggests that the order of the autoregressive process is higher than 1. Finally, the bottom panel of [Table 1](#) shows that municipal own income series is highly dependent but not high enough to be a random walk. The upper limit being the POLS estimate of 0.929 while the SYS-GMM estimates that α has a value of 0.887.

4 Results

4.1 Dynamic Disbursement Analysis

The results of the previous section about the autoregressive characteristics of the series show that we are dealing with weakly and highly dependent series at the same time. Consequently, exploiting the time dimensions of the data becomes crucial to relate in time the FIS approvals to the other sources of municipal income. The advantage of exploiting the time dimension of the data is not only that we are able to track the effect of elections, but also we are able to incorporate in the analysis municipal characteristics whose effects are transmitted through the series used. For instance, being able to control for central government transfers, we are introducing in the analysis to some extent the time-variant municipal characteristics that determine which each municipality receives. At the same time, controlling for own income also proxies for local economic growth or changes in institutional capability to collect taxes.

First, the POLS, FE and FD estimates are presented in [Table 2](#). Regardless of all of the estimation issues these procedures face when being estimated in a dynamic setting, they are a starting point. As expected the estimates provide an upper and lower bound for the estimate of `L.FIS_pc`. We should also note that the coefficients of `sameparty` and `y_1999` remain robust to changes in the estimation procedures.

Table 2: FIS Disbursement Estimation: POLS, FE and FD

VARIABLES	POLS		FE		VARIABLES	FD	
	FIS_pc	SE	FIS_pc	SE		FIS_pc	SE
L.FIS_pc	0.170***	[0.031]	-0.122***	[0.030]	LD.FIS_pc	-0.460***	[0.046]
transf_pc	-0.031	[0.023]	-0.100***	[0.032]	D.transf_pc	-0.074**	[0.033]
L.transf_pc	0.034	[0.025]	0.038	[0.027]	LD.transf_pc	0.017	[0.039]
owninc._pc	-0.019	[0.018]	0.016	[0.026]	D.owninc._pc	0.032	[0.024]
L.owninc._pc	-0.064***	[0.023]	0.068*	[0.036]	LD.owninc._pc	0.098**	[0.039]
sameparty	0.010***	[0.003]	0.017***	[0.007]	D.sameparty	0.016*	[0.009]
y_1998	0.056***	[0.005]	0.065***	[0.007]			
y_1999	0.076***	[0.005]	0.086***	[0.007]	y_1999	0.055***	[0.006]
y_2000	0.048***	[0.006]	0.072***	[0.007]	y_2000	0.015**	[0.008]
Constant	-0.002	[0.003]	0.015	[0.014]	Constant	-0.025***	[0.004]
Observations	1,645		1,974			1,645	
Number of i02			329				

Robust SE in brackets. (*** p<0.01, ** p<0.05, * p<0.1). Coefficients of y_2001 and y_2002 not shown

4.1.1 GMM Estimates

The results of the estimations that incorporate the dynamic structure are presented in Table 3. Column 1 reports the estimation of the FIS DGP as an AR(1) process that includes the `sameparty` variable using DIFF-GMM. This is done based on the weakly dependence of FIS, which allows us to instrument differences with levels. However this specification ignores any possible relation with the other sources of funding. Column 2 reports the estimation of the same specification but this time using SYS-GMM. As expected, the coefficients produced are relatively similar to those in column 1. This is the case because transfers and own income are highly dependent processes. Therefore, as was explained above, SYS-GMM will use both an equation in levels (1) which will be instrumented by lagged differences of the variables and the equation in differences (2) that will be instrumented with lagged levels of the variables. These different specifications are used as robustness checks. Specifications differ not only because of the controls used, but because of the number of lags allowed in the generation of GMM-type

instruments. Columns 2 through 10 report SYS-GMM estimates.

The inclusion of transfers in the specification might be inconvenient due to the fact that this series has a unit root, and consequently we are not going to be able to instrument it. However its exclusion might cause the estimates to be biased if the explanatory variables of interest are correlated with it. This situation impels us to compare the estimations with and without transfers as a explanatory variable (i.e., column 3 with columns 4, 5 and 6). We find that estimates change relatively little, they are not statistically different from one-another. In particular the coefficient of `sameparty` remains almost unmodified. So we can assert that the unit root condition of transfers does not impose a problem on the estimation of this coefficient. This suggests that the two variables might not be correlated. This is something on which we will elaborate below.

All the SYS-GMM estimations in Table 3 allow only one lag in the generation of GMM-type instruments of FIS both for the levels equation (1) and for the differenced equation (2). This is because, as we found in the time-series diagnosis, although the FIS series is a recursive process, it is a very weakly dependent one. Hence, the second or further lags can hardly be informative instruments. This is not the case for transfers and own income, which were found to be highly persistent series. Consequently, the upper lag limit of GMM-type instruments for these variables was allowed to vary from 6 to 3 lags, as robustness checks, although not presented in Table 3, estimates proved to be robust. Estimates also proved to be robust to the introduction of the contemporaneous realizations of own income.

The lower lag limit for the generation of GMM-type instruments is determined by the degree of exogeneity we believe transfers and own income have with respect to current realizations of FIS. That is, if we believe the series are predetermined or entirely endogenous. In section 3.3, I made the case for transfers and own income being predetermined as they might be influenced by past realizations of FIS but not by current FIS. If this

Table 3: GMM Estimates

VARIABLES	(1) [§] FIS_pc	(2) FIS_pc	(3) FIS_pc	(4) FIS_pc	(5) FIS_pc	(6) FIS_pc	(7) transf_pc	(8) FIS_pc	(9) FIS_pc	(10) FIS_pc
L.FIS_pc	0.125** [0.053]	0.088*** [0.033]	0.087** [0.039]	0.115*** [0.037] -0.091***	0.112*** [0.039] -0.086***	0.115*** [0.037] -0.090**		0.118*** [0.041] -0.098***	0.119*** [0.037] -0.091**	0.119*** [0.040] -0.101***
transf_pc				[0.035] 0.091**	[0.031] 0.089***	[0.035] 0.091**		[0.038] 0.096**	[0.039] 0.092**	[0.036] 0.100**
L.transf_pc				[0.039] -0.017*	[0.034] -0.021**	[0.039] -0.017		[0.043] -0.010	[0.046] -0.021	[0.040] -0.013
L.ownincome_pc			-0.002 [0.018]	[0.010]	[0.011]	[0.010]	0.165* [0.091]	[0.019]	[0.023]	[0.026]
sameparty	0.023** [0.010]	0.013*** [0.005]	0.013*** [0.005]	0.013*** [0.005]	0.015*** [0.005]	0.012*** [0.005] 0.003	0.004 [0.004]	0.010* [0.005]	0.011** [0.004]	0.012** [0.005]
sameparty_1999										
y_1998	0.058*** [0.009]	0.058*** [0.005]	0.056*** [0.005]	0.058*** [0.005]	0.059*** [0.005]	0.058*** [0.005]		0.054*** [0.005]	0.055*** [0.005]	0.056*** [0.005]
y_1999	0.081*** [0.009]	0.082*** [0.005]	0.081*** [0.005]	0.075*** [0.005]	0.075*** [0.005]	0.073*** [0.006]	-0.021*** [0.006]	0.084*** [0.008]	0.062*** [0.005]	0.081*** [0.009]
y_2000	0.047*** [0.010]	0.050*** [0.005]	0.050*** [0.006]	0.052*** [0.007]	0.054*** [0.007]	0.052*** [0.007]	0.026*** [0.007] 1.165***	0.052*** [0.007]	0.051*** [0.007]	0.052*** [0.007]
L2.transf_pc										
votediff1999 [¶]									0.031*** [0.012]	-0.032 [0.041]
vm1999sameparty ^γ									0.015 [0.023]	0.004 [0.045]
Observations	1,645	1,974	1,974	1,974	1,974	1,974	1,650	1,968	1,974	1,974
Number of i02	329	329	329	329	329	329	330	328	329	329
Pvalue AB test for AR(2)	0.338	0.519	0.529	0.431	0.451	0.427	0.263	0.424	0.445	0.419
Pvalue Overid. Restrict.	0.0314	0.247	0.442	0.586	0.544	0.591	0.000	0.178	0.293	0.624
Pvalue Diff. In Sargan Test										
GMM instruments levels		0.320	0.224	0.536	0.250	0.528	0.000	0.450	0.383	0.493
FIS in diff eq		0.185	0.137	0.362	0.184	0.362		0.362	0.295	0.508
FIS in level eq		0.320	0.274	0.411	0.122	0.410		0.490	0.447	0.539
income in diff eq			0.0990	0.284	0.350	0.297	0.0430	0.0900	0.203	0.112
transfers in diff eq				0.971	0.345	0.966	0.457	0.872	0.827	0.916
transfers in level eq				0.865	0.675	0.876	0.460	0.837	0.874	0.779
income in level eq			0.353	0.735	0.659	0.738	0.169	0.701	0.457	0.597
IV sameparty in both eqs	0.251	0.0640	0.0680	0.594	0.740	0.728	0.388	0.292	0.274	0.367
IV yr & el. vars in level eq		0.316	0.0690	0.260	0.256	0.236	0.333	0.184	0.240	0.481
IV yr & el. vars in diff eq	0.0550	1.000	1.000	1.000	1.000	1.000	1.000	0.686	0.885	0.999

Constant and coefficients of y_2001 and y_2002 not shown. Robust standard errors in brackets (***) p<0.01, ** p<0.05, * p<0.1). In column (5) own income is supposed to be endogenous to transfers. [§]Column (1) reports DIFF-GMM estimates, the rest of the columns report SYS-GMM estimates. [¶]votediff1999 reports the relative difference in votes in municipal elections in column (6) and in the presidential elections in column (8), while in column (7) it represents a dummy variable that takes the value of 1 if voting difference between winner and runner-up of the municipal elections was less than 5%. ^γvm1999sameparty represents the respective variable votediff1999 in each column multiplied by sameparty.

is the case, the lower lag limit for the generation of GMM-style instruments can be 1 in both equations, in levels and in differences, because both sets of instruments will be exogenous to current disturbances in the estimation equation. Results presented in columns 4 and 6 follow this assumption. On the contrary, column 5 relaxes the assumption of predetermination of the series and treats them as if they were endogenous where they are supposed to be correlated with current realizations of FIS, by setting the lower lag limit to 2 for both variables in both equations.

In column 6, a dummy variable that results from the interaction of the 1999 year dummy variable and the dummy of the mayor being of the same political party as the president was included to investigate if same party mayors received particularly more than the different party mayors in the spending spree of 1999.

These dynamic estimations yield very interesting results, which are robust to specification changes. First, the results in Table 3 show that there is no conclusive evidence in favor of municipal own income being a relevant determinant of FIS approvals. This reveals that the FIS funds were not consistently used by low own income collecting municipalities as complements to their scarce sources of funding. Second, FIS approvals are highly correlated with central government transfers. Nevertheless, the alternating sign makes the effect of transfers on FIS ambiguous and difficult to interpret. Third, year dummy variables show that the election year dummy (i.e., 1999) is the highest, and is statistically greater than all the other year dummy variables, demonstrating that relative to the omitted year (i.e., 1997), the election year was the one when most FIS funds were approved. Fourth, estimations yield a positive significant coefficient for the `sameparty` variable. This means that we have empirical evidence that municipalities with mayors from the party of the President receive more FIS investments than municipalities with non co-partizan mayors. This argues that FIS funds were used to finance pork-barrel politics between the central government and the local authorities. This is consistent with the leaky bucket theory of [Dixit and Londregan \(1996\)](#) that asserts that

spending on co-partisans is more efficient because relations are smoother making the leaky bucket that transfers discretionary funds from the central government to the local authorities less leaky and more productive in achieving political support. Our results also suggest that while same party mayors consistently benefited more from the FIS approvals, they did not receive a particular higher amount in 1999 relative to other years.

4.1.2 Estimation Diagnostics and Exogeneity of the Instruments

A crucial presumption required to believe in the veracity of our GMM estimates is the exogeneity of the instruments. At the bottom of Table 3 we have reported some estimation diagnostics. We have included the Arellano-Bond test for autocorrelation of order 2 in the residuals. The null hypothesis of this test is no serial correlation of the residuals. We are worried about autocorrelation of order 2 and not of order 1 because the differenced series are AR(1) by definition, since consecutive differences have a term in common. AR(2) in the residuals would indicate that the instruments that are being used are not valid. That is, they are not exogenous because the lags of the variables would be correlated with the current disturbance term (Roodman, 2006). Our results fail to reject the null of no autocorrelation in every estimation. This indicates that the dynamic process is fully being captured by the specifications used and that our instruments are not invalidated by the recursiveness of the series.

The second part of the estimation diagnostics reported in Table 3 groups the tests that directly examine the exogeneity assumption of the instruments. The Sargan test for overidentifying restrictions tests if the moment conditions of the form of equations (3) and (4) generated in the GMM estimation hold, where the null is that all the instruments are valid. Furthermore, the validity of subsets of instruments can also be tested using these overidentifying restrictions tests. In particular, two models are estimated for every test, one with all the instruments and the other *restricted* (i.e., without the subset of

instruments for whose validity is being tested) and the difference in the reported Sargan test statistic is calculated. This difference in Sargan test statistic follows a χ^2 with j degrees of freedom under the null of exogeneity of the tested instruments, where j is the number of instruments in the subset that is being tested ([Roodman, 2006](#)).

As the difference-in-Sargan test is calculated for every subset of instruments, [Table 3](#) reports one result per subset. The subsets are specified depending on the variable that is being used as instrument and the equation that it is instrumenting. So, for instance, the p-value of the difference-in-Sargan presented in the row labeled “`FIS diff eq`” reports the results of the test for the GMM-type FIS instruments (as many instruments as we are allowed given the lag limits) that are being used in differenced equation [\(2\)](#). The row labeled “`GMM instruments levels`” test the entire set of GMM-type instruments used in the levels equation [\(1\)](#). The final three rows that are labeled “`IV`” test the regular (i.e., not GMM-type) instruments, which do not use lags but their current realizations.

[Table 3](#) show that the null of exogeneity of the instruments is not rejected. In fact, every subset of instruments is tested separately and all of them are found exogenous in all specifications. As all of the tests have demonstrated, we can be confident about the fact that our instruments are exogenous and have not been invalidated by autocorrelation.

4.2 Comparing With Less Discretionary Funds: Central Government Transfers

Throughout the paper it has been emphasized that a big difference between the transfers and the FIS was that the former have very specific rules of allocation which are considered to be so important that they are stated in the National Constitution. Consequently, it should be fruitful to compare, as in [Levitt and Snyder \(1995\)](#), the behavior

of the series that is believed to be discretionary with the one that is less manipulable. Column 7 in Table 3 shows the results of estimating equation (6). These results are robust to specification modifications like changing the endogeneity assumptions of the explanatory variables and the number of lags used in the creation of GMM-style instruments.

$$\text{Trans}_{i,t} = \alpha_0 + \alpha_1 \text{Trans}_{i,t-2} + \beta \text{SP}_{i,t} + \phi \text{Inc}_{i,t-1} + \sum_{Y=Y_1}^{Y_T} D_Y Y + \eta_i + v_{it} \quad (6)$$

First, it should be noted that, as expected due to the presence of a unit root, in these estimations the test of overidentifying restrictions show that there might be problems with the validity of some sets of instruments. Thus, we cannot be sure whether we have obtained unbiased estimates, as the instruments used might not be purging all of the endogeneity out of the estimation. [Blundell and Bond \(1998\)](#) show that in order for the differenced realizations of transfers to be valid instruments for $\text{Trans}_{i,t-2}$, SYS-GMM requires that the initial realizations of the series (i.e., Trans_{i1} in this case) do not deviate systematically from the value $\frac{\eta_i}{1-\alpha_1}$. This condition ensures that the series will converge towards this value from period 2 onwards, and hence, differences will be informative. Results in Table 1 and Table 3 show that transfers are not stationary. Consequently, the values of Trans_{it} will not converge to the value imposed by the condition. This might be why we were unable to find exogenous differenced instruments for transfers to use in the levels equation². The fact that the difference-in-Sargan tests show that all the other sets of instruments are exogenous suggest that this problem of divergence of the transfer series is what is affecting the validity of the instruments for this particular variable.

Despite this difficulty and with the palliative fact that all the other instruments are

²Note that this condition applies only to the series that is being used as dependent variable because it focuses on the disturbance of the estimation at time 1 (see [Blundell and Bond \(1998\)](#)), so the estimations of FIS, previously shown, are not affected by this phenomenon present in the transfers series.

exogenous, column 7 in Table 3 suggest that the allocation of transfers was not manipulated in order to favor co-partisans. Even more, it asserts that transfers disbursements in the election year diminished in comparison to other years, something that is consistent with what is presented in Figure 1. These results provide evidence that discretion over FIS funds distribution was a key element for their use for political purposes. Authorities had discretion over FIS funds but not so much over the transfers. Consequently, FIS funds were diverted to fulfill political goals while transfers were not.

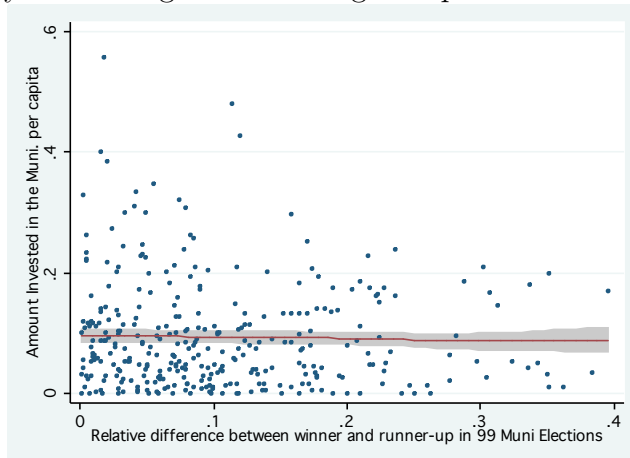
The results in column 7 are also in line with the previous findings were the inclusion on transfers in the FIS estimation did not modify `sameparty` coefficient. That is, `sameparty` and transfers are not correlated, so if due to omitting the latter variable goes to the residual in the FIS regressions, `sameparty` coefficient remains unaffected.

4.3 Electorally Competitive Municipalities

Section 1 showed that the political economy literature has described conditions under which discretionary funds are used to influence swing voters in favor of a particular candidate. In our case, what this intuition would imply is that FIS would be over-delivered to municipalities in which elections were thought to be particularly close.

The concern that is being faced when addressing this matter empirically is the endogeneity of the closeness of the election to FIS disbursements. In particular, disbursements are made with the intention to influence electoral outcomes, but at the same time the expectations of those outcomes influence the choice of the disbursements. [Schady \(2000\)](#) addressed this issue by instrumenting the voting outcomes with a prior election, an election that occurred before the start of the disbursement program, and consequently not influenced by such disbursements. However in our case there were no accessible records of prior elections. Nevertheless, this issue acquires particular interest now that I have demonstrated the presence of political influences in FIS allocation. Therefore, notwith-

Figure 5: Local Polynomial Regression Voting Competition and FIS Approvals in 1999



The band represents the 95% confidence interval. Source: Own calculations based on FIS administrative data and 1999 STE Election Memoirs

standing the concerns about endogeneity, we investigate whether electoral competition had an effect on FIS allocation. In defense of not directly addressing the endogeneity problem one can argue that even though FIS disbursements influence the difference in votes in a given electoral contest, they do it for both close elections and for elections that are not close. In fact, as can be seen in Figure 5 analyzing the cross-section on the election year, 1999, there seems to be no relevant correlation between the electoral competitiveness of the elections and the amount of FIS approved.

Now we introduce into the GMM estimations a measure of electoral competitiveness that is defined by the relative difference between the winner of the election and the runner-up. Hence, the closer this number is to zero the more competitive the election was. Most of the municipal elections were close. Around 60% (37%) of the municipalities had an election in which the difference between the two first candidates was below 10% (5%) of the total votes casted in that municipality.

Columns 8 through 10 in Table 3 show the results of the estimation that includes measures of electoral competition. Column 8 includes the relative difference in votes in the municipal elections in 1999 (i.e., `votediff1999` in this case) and the fact that the mayor and the President are from the same political party in the year of the election

and allow for the interaction of this variable and the electoral competition measure. The negative sign in `votediff1999` states that as the difference in votes tended to zero FIS approvals increased. However, the interaction is not significant. This suggests that even if municipalities with mayors from the same party as the president received more FIS systematically and more electoral competitive municipalities receive more FIS during 1999, electoral competitive municipalities with co-partisan mayors did not receive a particular higher amount than the municipalities that had only one of these two conditions.

In column 9 the measure of electoral competition is a dummy variable that takes the value of 1 if the relative difference of voting outcomes between the winner and the second candidate are below 5%. In the same vein as the results of column (8), the results based on the dummy variables show that electoral competition mattered, and it mattered even more than having a mayor-President co-partisanship did.

Column 10 includes the relative difference between the winner and the runner-up in the *presidential* elections of 1999 in each municipality (i.e., `votediff1999` in this case, see footnote in table). It shows that presidential electoral competition did not matter in determining FIS. This is expected, as presidential elections in Guatemala are direct and the candidates do not need to win geographical divisions. Each vote counts equally and the winner needs a majority in national terms. Consequently close presidential elections in a given municipality did not give the incentives to authorities to manipulate FIS allocations as municipal elections did.

Even if the results of columns 8 through 10 of Table 3 are taken with caution, they have powerful suggestions. They suggest that during election year, as a response to the electoral rules of the presidential elections (i.e., direct elections), FIS was seen more as a local than a national proselytism tool.

4.4 Introducing Time-Invariant Variables into the Dynamic Analysis

In order to find if poverty was a determinant of the allocation of FIS atypical spending in the electoral year, we introduce some time invariant municipal characteristics into the dynamic analysis. We do this by multiplying municipal time invariant well-being characteristic with the year dummies. The idea of multiplying time-invariant characteristics by the year dummies is to determine if the *effect* of these time-invariant characteristics on FIS approvals varied in time. The introduction of the well-being measure in the estimations will yield an estimate of targeting performance relative to the targeting in the omitted year (i.e., 1997). The measure of well-being analyzed is the NBI index that theoretically the FIS used to target (NBIFIS).

Table 4: Per capita FIS Disbursement Estimation: GMM Estimates (Interact Time Invariant with Time Dummies)

	(1)		(2)	
	Coef	SE	Coef	SE
sameparty	0.014***	[0.005]	0.010**	[0.005]
vm1999			-0.122**	[0.054]
vm1999sameparty			0.080	[0.067]
NBI_1998	0.013	[0.060]	0.028	[0.062]
NBI_1999	0.044	[0.061]	0.050	[0.063]
NBI_2000	0.070	[0.069]	0.058	[0.069]
NBI_2001	0.008	[0.050]	0.006	[0.051]
NBI_2002	0.049	[0.036]	0.045	[0.037]
Observations	1,974		1,968	
Number of i02	329		328	

P-values of AB test for AR(2), Overid. Restrictions and Diff. in Sargan tests not shown, all fail to reject the null.

Constant and coefficient of L.FIS_pc, Transfers_pc, L.Transfers_pc, ownincome, y_1998, y_1999, y_2000 y_2001 and y_2002 not shown. Standard errors in brackets (*** p<0.01, ** p<0.05, * p<0.1).

Table 4 shows the GMM estimates that include the time-invariant interactions. These interactions are considered exogenous because the measures of well-being are from 1994 so they had not been affected by the FIS projects, consequently we can use them as

regular IV instruments in the GMM estimation. The assumptions on the nature of the variables are the same as the for the other results; hence, the number of lags used to create the GMM-style instruments are the same.

The results in Table 4 show that there was no clear tendency to give more FIS to the poorest municipalities relative to what was given in 1997 (the omitted category). In addition, the same party and electoral competition variables remain robust and statistically significant. These results mean that the spending spree of 1999 was not biased in favor of the more deprived municipalities. According to their own measure, deprivation did not matter as much as other factors, like political characteristics, in the allocation of FIS resources. This reinforces what was found above that during election year there was no effort to target the neediest; it was more relevant whether the election was competitive or whether the mayors were from the same political party as the president.

5 Conclusions

This paper analyzes political influences on the allocation of FIS funds in Guatemala. It contributes to the literatures on decentralization, targeting of social programs, and electoral outcomes. Through the use of GMM estimation, this paper also pioneers the utilization of the time dimension of panel data to purge away dynamic effects that had not been accounted for before in this type of literature. At the same time, GMM also allows the estimates to control for time invariant characteristics that would bias results based only on time series. This article also takes advantage of the discontinuity generated by the general elections of 1999 in which national and local authorities changed, allowing us to isolate the effect of co-partisanship in the disbursement of the funds.

Findings are very interesting and suggest the existence of pork-barrel politics and pur-

suit of swing voters in FIS allocations. This is the case because there were national and local elections at the same time, both of which have parties with different electoral goals. First, our results find that mayors that were co-partisans of the President received more FIS consistently throughout the lifespan of the program. This holds for the periods before and after the election, even after the party holding the presidency changed, providing evidence of *pork-barrel politics* at the *national level*. Second, we find a positive correlation between local electoral competition and FIS disbursements, consistent with the pursuit of *swing voters* at the *local level*. We also find that FIS disbursements peaked during the election year, that targeting based on poverty failed and that it did not improve during the spending spree during election year. These findings are robust to different specifications and are consistent with the main theoretical findings of the literature regarding electoral games and redistribution. These findings suggest that there are important political factors that affect the distribution of poverty alleviation programs that should be considered when developing programs in decentralized contexts.

Bibliography

- Arellano, M. and Bond, S. (1991). Some tests of specification for panel data: Monte carlo evidence and an application to employment equations. *The Review of Economic Studies*, 58(2):277–297.
- Arellano, M. and Bover, O. (1995). Another look at the instrumental variable estimation of error-components models* 1. *Journal of econometrics*.
- Bardhan, P. and Mookherjee, D. (2000). Decentralizing anti-poverty program delivery in developing countries. *Center for International and Development Economics Research (CIDER) Working Papers*, (C98-104.1).
- Blundell, R. and Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of econometrics*.
- Bond, Nauges, C., and Windmeijer, F. (2002). Unit roots and identification in autoregressive panel data models: a comparisson of alternative tests. *Institute for Fiscal Studies*.
- Bond, S. (2002). Dynamic panel data models: a guide to micro data methods and practice. *CEMMAP Working Paper*, (CWP09/02):1–36.
- Case, A. (2001). Election goals and income redistribution: recent evidence from albania. *European Economic Review*, 45(3):405–423.
- Coady, D., Grosh, M., and Hoddinott, J. (2004). *Targeting of transfers in developing countries: Review of lessons and experience*.
- Cox, G. and McCubbins, M. (1986). Electoral politics as a redistributive game. *The Journal of Politics*.
- Crook, R. and Sverrisson, A. (1999). To what extent can decentralized forms of government enhance the development of pro-poor policies and improve poverty-alleviation outcomes? *Unpublished manuscript*.
- Dixit, A. and Londregan, J. (1996). The determinants of success of special interests in redistributive politics. *Journal of Politics*.
- Echeverri-Gent, J. (1992). Public participation and poverty alleviation: the experience of reform communists in india’s west bengal. *World Development*.
- Faguet, J. (2004). Does decentralization increase government responsiveness to local needs? evidence from bolivia. *Journal of Public Economics*, 88(3-4):867–893.
- Faguet, J. and Wietzke, F. (2006). Social funds and decentralisation: optimal institutional design. *Public administration and development*, 26(4):303–316.
- Feres, J. and Mancero, X. (2001). El método de las necesidades básicas insatisfechas (nbi) y sus aplicaiones en america latina. *Serie estudios estadísticos CEPAL*.

- FUNCEDE (2002). *Descentralización en Guatemala*.
- FUNCEDE, INFOM, and de los Países Bajos, E. R. (1999). La estructura del presupuesto municipal de los municipios de Guatemala año de 1997. *FUNCEDE, Guatemala*, pages 1–147.
- FUNCEDE, Stiftung, F. K. A., and Guatemala, F. S. (2004). Comportamiento electoral municipal en Guatemala. *FUNCEDE, Guatemala*, pages 1–216.
- Galasso, E. and Ravallion, M. (2005). Decentralized targeting of an antipoverty program. *Journal of Public Economics*, 89(4):705–727.
- Ibarrarán, P., Sarzosa, M., and Soares, Y. (2008). The welfare impacts of local investment projects: Evidence from the Guatemala fis. *OVE Working Papers*, 08(02).
- Levitt, S. and Snyder, J. (1995). Political parties and the distribution of federal outlays. *American Journal of Political Science*, 39(4):958–980.
- Lindbeck, A. and Weibull, J. (1987). Balanced-budget redistribution as the outcome of political competition. *Public Choice*.
- Roodman, D. (2006). How to do xtabond2: An introduction to difference and system gmm in stata. *Center for global development*.
- Schady, N. (2000). The political economy of expenditures by the Peruvian social fund (foncodes), 1991–95. *American Political Science Review*, 94(2):289–304.
- Sen, A. (1995). The political economy of targeting. *Public spending and the poor: Theory and evidence*.
- Shah, A. (1999). Balance, accountability, and responsiveness: lessons about decentralization. *World Bank Discussion Paper*.
- World-Bank (2001). Promoting good governance with social funds and decentralization. *Prem Notes*, January:1–4.
- Wright, G. (1974). The political economy of new deal spending: An econometric analysis. *The Review of Economics and Statistics*.