Political Budget Cycles in Municipalities: Evidence from Costa Rica*

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This paper

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1 Context

Hypothesis 1. *There are Political Budget Cycles in Municipalities' different types of expenditures.*

Hypothesis 2. *If the PBCs exists, majors seeking reelection spend more on voter-friendly types of expenditure.*

Hypothesis 3. *If majors seeking reelection spend more on voter-friendly types of expenditure, this strategy increases their probabilities of winning the election.*

2 Methodology

In this section, we present our empirical strategy to study the effects of election years on voter-friendly municipal expenditures. Using the database, we run the following dynamic panel specification considering most of the literature, municipalities' characteristics and the institutional context:

$$y_{jit} = \sum_{k=1}^{P} \rho_{jit-k} y_{jit-k} + \gamma \text{Elec}_t + \sum_{k=1}^{K} \mathbf{Mun}'_{\mathbf{it-k}} \beta_{t-k} + \mathbf{May}'_{\mathbf{m(i,t)}} \theta + \mathbf{Nat}'_{\mathbf{t}} \alpha + \lambda_i + \varepsilon_{jit} \quad (1)$$

where y_{jit} is the log real municipal fiscal variable per capita j for municipality i in year t and y_{jit-k} is the k-th lag of the dependent variable used to capture the persistence in the municipal fiscal outcomes. Below we explain the process to decide how many lags should be included. We estimate a separate regression for (the log of) each type of government expenditure. Elec_t is a dummy which captures the timing of elections. It takes the value of one in periods preceding local elections, and 0 in all others. We set this dummy such that the pre-election period is the year previous to the election if it takes place in the first half of the year and the year of the election, if it is held in the second half. The municipality fixed effect λ_i accounts for unobserved characteristic from each municipality and ε_{jit} an i.i.d. error term.[1] We include additional controls at several levels following the literature and others that fit our institutional context: $\mathbf{Mun}'_{\mathbf{it}}, \mathbf{May}'_{\mathbf{m(i,t)}}, \mathbf{Nat}'_{\mathbf{t}}$. The vector $\mathbf{Mun}'_{\mathbf{it}}$ at the municipality's level i in year t controls for demographic variables as the population density, share of population below 15 years old and over 65 years old; number of K-12 centers; and economic variables such as municipality's Deficit-to-Total Expenditure Ratio, current transfers, capital transfers, debt and following Drazen and Eslava (2010) we control for the total expenditure of the municipality in that year, which will allow us to interpret the coefficient for the political dummy as the election year effect on the share of spending in a given category. We estimate (1) with and without controlling for the total expenditure to see the change in levels and the share to analyze this proposed theory. The vector $\mathbf{May}'_{\mathbf{m(i,t)}}$ controls how the political environment influences the spending in each municipality. We include mayors' characteristics like Age at the start of their government, number of periods as a mayor, gender, incumbent advantage measured by the share of votes of the mayor's party received in the last election at the municipal mayoral and council, legislative and national level, and the type of political party (municipal, provin-

[1] Since the Supreme Elections Court established synchronized elections across all municipalities in Costa Rica, we follow Chortareas et al. (2016) not including time fixed effects because the election year effects cannot be separated from aggregate shocks.

cial or national). Finally, the vector $\mathbf{Nat}_t'$ contains national variables that don't vary across municipalities. We include national debt-to-GDP and deficit-to-GDP ratios, passive base interest rate and log GDP.

The coefficients of interest are the Elec_t dummy and its interactions with reelection dummies and Age. In the institutional context, we discussed that, as of 2021, mayors can be reelected indefinitely. Nevertheless, a mayor could influence the Political Budget Cycle in an altruistic manner to make its party's fellows more likely to get reelected, if the current mayor doesn't run for another term. That's why we consider three reelection variables: (1) if a mayor inscribes herself for the next election, regardless of the political party; (2) if a mayor runs again with the same political party; and (3) if the party runs for reelection in the next period. We expect the coefficients to be statistically significant and positive except the one associated with the age. We would expect that as the candidate get older, the incentives for spending more in the last period to get reelected diminish.

The specification (1) is a standard dynamic panel data one. There are two reasons why standard fixed-effects estimators would be asymptotically biased. First, including a lagged dependent variable and municipality fixed effects renders the OLS estimator biased and inconsistent by the Nickell (1981) bias. Although the Fixed-effects (FE) estimator eliminates the municipalities specific effects, it cannot eliminate the bias introduced by the inclusion of lagged dependent variables among the regressors, which is correlated by construction with the error term. The order of the FE estimator bias is $O(1/T)$, where T corresponds to the time length of the panel. In our case, the time length of our panel is 15 years, consecuently, the use of the Fixed Effects estimator may add non-negligible bias to the coefficients. To address this concern, we employ the Blundell and Bond (1998) two step system GMM estimator for dynamic panel data which augments the Arellano and Bond (1991) difference GMM estimator using lagged differences of the dependent variables as instruments in the levels equations in addition to lagged levels of the dependent variables, which are used as instruments for the equations in first differences. Since the estimated standard errors of the two step GMM estimator tend to be severely downward biased, we correct the bias using the Windmeijer (2005) finite sample correction. There could be misleading results caused by instrument proliferation from exploiting all moment conditions in system GMM. In order to alleviate this concern, we collapse the instrument set, as suggested by Roodman (2009), to reduce the number of moment conditions. Finally, we perform the Arellano and Bond (1991) tests for first-order and second-order serial correlation of the differenced residuals and the Hansen test for over-identifying restrictions.

The second potential source of bias is the mayor's age. The Age variable could be endogenous in (1), even after accounting for municipality fixed effects. The reason is that

changes in voter preferences for spending could be correlated with changes in the age profile of the pool of candidates —rendering Age endogenous. We address this possibility by treating Age and its interaction as endogenous. We borrow an instrument from Alesina et al. (2019): we use the Old variable and its interaction as instruments. The variable Old_{it} equals 1 if the mayor of municipality i in year t was the older of the top two candidates in the most recent election and 0 otherwise.

There could be macroeconomic shocks or weather disasters that affect specific groups of municipalities. This could be due to the culture of certain municipalities or the geography they're placed in. To make our results robust to this shocks, we cluster the standard errors at the municipality level, provincial level, socioeconomic region of planification and economic specialization zones, as in Alfaro Figueroa (2019).

There's no consensus in the literature whether or not to include more than one lag in the dependent variable and how many lags should be included for the predetermined variables. We apply the criteria described Kripfganz (2019) and Kiviet (2020) to decide the number of lags of the dependent variable and the municipal controls that could be contemporaneous with the error term to choose the optimal specification. We consider Elec_t, national and mayor's controls as exogenous.

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