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The "Benefits" of being small: Loose fiscal policy in the European Monetary Union

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ABSTRACT

Independent central banks typically counteract positive fiscal shocks that would otherwise increase the inflation rate above the target. In a theoretical model, we show that, in a monetary union, this mechanism implies weaker responses to national fiscal shocks because the overarching central bank must account for the fiscal policies of all members. The model highlights that the response is especially weak for small members, given their marginal impact on the union's aggregate inflation rate. Empirically, we exploit the exogenous variation in elections to show that the European Central Bank reacts more vigorously to fiscal shocks from larger countries. We then provide evidence that small countries take advantage of this; they engage more in fiscal expansions during election years than large countries. In an extension, we discuss, both theoretically and empirically, why the difference between small and large countries disappears in times of crisis.

1. Introduction

The European Central Bank (ECB) was established in 1999, in part, to bring the economic benefits of exchange rate stability to member countries in terms of cross-border trade and investment. However, the Union-wide monetary policy may not always be beneficial to all member states, for example if they are at different stages of the economic cycle. If the ECB conducts its monetary policy for a weighted average of all European Monetary Union (EMU) member states, developments in larger countries such as Germany or France will play a key role. If Germany and France were to experience a simultaneous downturn, interest rates would be likely to fall irrespective of conditions in other member states.

In this paper, we argue that this mechanism has consequences for fiscal policies by member states of a monetary union. We expect the central bank to respond to the aggregate, and, therefore, be more responsive to fiscal policies by larger countries. This, in turn, facilitates excessive fiscal spending by smaller members. Consider a single country with its own independent central bank with a focus on inflation stability. If the government chose to engage in expansionary fiscal policy, for instance during an election year, the central bank would interpret the sudden increase in output as a positive demand shock. If inflation and output were initially at the central bank's target, the central bank would raise the interest rate to counteract the government's fiscal stimulus as suggested in Drazen's Active-Fiscal, Passive-Monetary Model (Drazen, 2000). This may discourage governments from making use of fiscal stimuli. Empirical studies have shown that central bank independence helps to reduce "fiscal waste" (de Haan and Sturm, 1992; Bodea and Higashijima, 2017), especially in election years when governments have a political incentive to pursue expansionary fiscal policies to appear competent (Haga, 2015).

This mechanism of central bank deterrence may be weaker in a monetary union such as the EMU. The ECB's primary objective is inflation stability in the EMU as a whole, not just in one member state. Hence the ECB's response should depend on the size of the fiscally stimulating countries relative to the size of the entire EMU. Therefore, EMU governments can expect a smaller central bank response when making use of fiscal stimuli in a monetary union relative to having no monetary union (see for instance Beetsma and Bovenberg, 2001). This mechanism can be a double-edged sword. It grants governments of smaller countries considerable fiscal freedom because they can free-ride on larger countries, but it also undermines fiscal prudence.

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In order to assess the weakening of central bank deterrence against profligate fiscal policies in a monetary union, we examine the interaction between the ECB and individual fiscal authorities both theoretically and empirically. The theory (in Section 2) is based on a model of fiscal-monetary interaction in a monetary union. In particular, we model the possible strategic mismatch between fiscal authorities, which may be tempted to boost output, for example in run-up to elections, and the common central bank, which is trying to maintain monetary stability.[1] We derive two hypotheses. The first one says that the central bank responds more strongly to fiscal impulses stemming from larger countries. The second hypothesis we obtain suggests that small countries can exploit this central bank behavior and use fiscal expansions more freely, for instance in times of an election. Consequently, smaller countries end up with larger deficits than larger countries in a monetary union.

We can find empirical support for these two hypotheses by proceeding in two steps. First, (in Section 3), we present the methodology and the results of our monetary analysis. In line with Hypothesis 1, we assess whether the ECB reacts more vigorously to fiscal shocks from larger versus smaller member states. Second, (in Section 4), we use our knowledge of the ECB's behavior for our fiscal analysis, in particular to examine whether small EMU members adopt more imprudent fiscal policies due to reduced monetary oversight. In line with Hypothesis 2, we find evidence that small countries do indeed engage more in fiscal expansion during election years than large countries. As suggested by theory, the difference in responses by small and large countries may not hold in times of crisis. This is further explored in Section 4.3.

We face two empirical challenges. The first relates to the recurrent crises since 2008. These crises have implications for both monetary and fiscal policy. On the monetary side, the ECB's main refinancing rate fell first to 1% and then to 0%. Fiscal policy is affected by this, but also by the (crisis-related) increase in the spending multiplier (which plays an important role in our theory section). To avoid these complications, we focus on the period 1999–2007 and use monthly and quarterly data, respectively. We discuss the results that can be obtained for the crisis periods in Section 4.3.

The second empirical challenge relates to endogeneity issues. First, we instrument the forecasts in a forward-looking Taylor Rule with realized macroeconomic variables to reduce endogeneity problems. Second, we notice that the ECB response to all fiscal policies in Section 3 and individual fiscal policy decisions in Section 4 are linked and also exhibit an endogeneity problem, but we can separate them by exploiting predetermined election exogeneity. As for the ECB's response (analyzed in Section 3), we use exogenous variation in election timing in the EMU to identify an effect of fiscal policy on ECB policy. We follow the literature in arguing that incumbent governments engage in expansionary fiscal policy to enhance their re-election chances.[2] Thus, the more EMU members are in an election period, the stronger is the expected monetary policy reaction of an independent ECB. To assess this empirically, we develop a measure that captures the electoral pressure on the ECB and include it in a forward-looking Taylor rule. As for the fiscal policy adopted by member states (analyzed in Section 4), we again make use of the variation in election years to assess the differences in fiscal policy in small and large EMU member states. There are many (confounding) reasons why larger or smaller countries may stimulate more or less. Making use of the variation in elections allows us to have a plausibly exogenous shock in fiscal policy. We then test whether this fiscal shock is larger in smaller EMU member states than in larger EMU member states.

Our two empirical perspectives, one from the monetary policy angle of the ECB (in Section 3), and the other from the fiscal policy angle of individual member states (in Section 4), provide a consistent overall picture. In line with Hypothesis 1, we find robust evidence that the ECB does indeed react to severe electoral pressure with a contractionary monetary policy in normal times. She also reacts more strongly to elections taking place in many or large countries. Consistent with Hypothesis 2, our results indicate that smaller EMU members run a significantly larger deficit in election years than larger EMU members. This is understandable since smaller EMU members do not have to worry as much about the ECB's monetary policy aimed at undoing the expansionary effect of their costly fiscal stimulus.

This paper proceeds as follows. In Section 2, we derive two hypotheses from a fiscal-monetary interaction model. In Sections 3 and 4, we present the methodologies and results of our monetary and fiscal analyses (including some robustness checks), respectively. Section 4.3 extends our analysis to include crisis periods. Section 5 concludes.

2. Theoretical model

In this section, we present a static version of a standard New Keynesian model (Poutineau, 2020), which preserves government and central bank objective functions (the latter instead of a Taylor rule), because we want to derive analytical solutions for optimal fiscal and monetary policy in a two-country one-central bank setting.

The government objective function is given by

$$L_{G_i} = \frac{1}{2}[\phi\pi_i^2 + \alpha\tau_i^2 + \zeta(y_i - \delta\mathbf{E}_i)^2]; \qquad i = 1, 2. \tag{1}$$

$$\mathbf{E}_i = \begin{cases} 1 & \text{if election in country } i; \\ 0 & \text{otherwise.} \end{cases}$$

Each government tries to minimize the losses resulting from deviations of inflation, π_i, in country i from an inflation target, the government deficit as a share of the potential output, τ_i, and deviations from a preferred output gap, $y_i - \delta\mathbf{E}_i$.[3] In Eq. (1), $\mathbf{E}_i$ is an (election) indicator function.[4] If $\mathbf{E}_i = 1$, government i has a larger output gap target by degree δ. Preference parameters ϕ, α, and ζ, reflect the losses that each government associates with missing the inflation, the balanced budget, and the output gap targets. α can be interpreted as dead-weight loss related to using the fiscal instrument (Dixit and Lambertini, 2003), the political cost of running a surplus/deficit (Bohn, 2013), or the effective monetary cost of borrowing.[5]

[1] Note that our model does not capture the situation of a systemic crisis in which both governments and the central bank are aligned in trying to stimulate output.

[2] There is a general consensus that countries exhibit Political Budget Cycles (PBCs), even though there are certain conditioning factors. PBCs occur less often and are weaker in countries with (i) fewer uninformed voters (Shi and Svensson, 2006; Veiga et al., 2017; Bohn, 2019; Bohn and Veiga, 2021; Brender and Drazen, 2005; Gootjes et al., 2021; Bohn and Sturm, 2021), (ii) a higher level of economic development (Klomp and De Haan, 2013; Schuknecht, 1996), (iii) a more mature democracy (Akhmedov and Zhuravskaya, 2004; Brender and Drazen, 2005), (iv) more checks and balances (Streb et al., 2009), (v) greater fiscal transparency (Alt and Lassen, 2006), (vi) more and stronger fiscal rules (Alt and Rose, 2009; Gootjes et al., 2021), (vii) less corruption (Shi and Svensson, 2006), (viii) a parliamentary system (Persson and Tabellini, 2003), (ix) an expected downturn (Bohn and Sturm, 2021), (x) a large expected winning-margin for the incumbent (Aidt et al., 2011; Bohn and Veiga, 2021), (xi) a lower level of public debt (Bohn and Veiga, 2019) or (xii) an independent central bank (Drazen, 2000; Haga, 2015).

[3] We set the inflation target at zero for both the central bank and the two governments without loss of generality. The preferred output gap is zero for the central bank. It is also zero for the two governments when $\mathbf{E}_1$ and $\mathbf{E}_2$ are equal to zero.

[4] In our empirical specification, we do actually use elections as a proxy for $\mathbf{E}_i$. Parameter δ can then be interpreted as the election year output effectiveness in manipulating voters (low press freedom, high uninformedness) and capturing value (high value from staying in office, competitive election) (Shi and Svensson, 2006; Crombach and Bohn, 2024).

[5] Later, we will argue that α is likely to have a low value in times of economic crisis.

Here is the loss function of our stability-oriented central bank:

$$L_{CB} = \frac{1}{2}[\phi\pi^2 + \zeta y^2] \tag{2}$$

The central bank cares about union-wide inflation deviations, π, from its target, and about union-wide output gap deviations, y.[6] We assume that both fiscal and monetary authorities care about inflation and output gap deviations equally ($\phi^F = \phi^M = \phi, \zeta^F = \zeta^M = \zeta$). Making the central bank conservative ($\zeta^M < \zeta^F$) – as often assumed in the literature – or ultra-conservative ($\zeta_M = 0$) would deliver the same result. Strategic interaction between the fiscal authorities and the central bank *only* occurs because the fiscal authorities may, at times, have a larger output gap target when $\mathbf{E}_i = 1$. This is what we call a potential strategic mismatch between the monetary union's central bank and fiscally manipulating individual countries.

The aggregate inflation rate of the entire union, π, and the aggregate output gap, y, are the weighted averages of the country-specific values, with the weights being determined by the economic size s of country 1 and $(1 - s)$ of country 2:

$$\pi = s\pi_1 + (1 - s)\pi_2 \tag{3}$$

$$y = sy_1 + (1 - s)y_2 \tag{4}$$

The country-specific output gaps and inflation rates are:

$$y_i = \omega\tau_i - \sigma r \tag{5}$$

$$\pi_i = \kappa y_i \tag{6}$$

The output gap of each country depends on two components. First, the government deficit-financed spending τ_i ($\tau_i > 0$ for a deficit, $\tau_i < 0$ for a surplus). Its effect on the output gap depends on the multiplier of government spending, $\omega > 0$. Second, a 1%-point increase in the interest rate decreases output by σ (> 0) percent. Each country's output gap y_i translates into country-specific inflation π_i by degree κ above the target rate.

We now move to the model solution. We postulate that both governments are Stackelberg leaders vis-à-vis the central bank.[7] Governments independently choose their deficits τ_i first, after which the central bank sets interest rate r, thereby minimizing their losses. This implies that each fiscal authority accounts for the central bank's reaction in their decision-making process while taking the other government's deficit decision as given.

Hence we start with the central bank's optimization problem, with both governments' deficits taken as given. Substituting Eqs. (3), (4), (5) and (6) into the central bank's loss function, Eq. (2), setting the derivative with respect to r to 0, and solving for r^* produces the central bank's reaction function:

$$r^* = \frac{\omega}{\sigma}\left(s\tau_1 + (1 - s)\tau_2\right) \tag{7}$$

Eq. (7) shows that the interest rate is affected by the aggregate deficit. Note that each country's deficit is determined by its government deficit as a share of the potential output ($\tau_i, i = 1, 2$) multiplied with country size s and $(1 - s)$, respectively. Overall, the central bank response is chosen such that the output effect of the interest rate (σr^*) offsets the total output effect of fiscal policy in both countries, i.e. ω times the fiscal instruments (deficit-financed spending) used in both countries, proportional to their size.

Hypothesis 1. In a monetary union, the central bank uses its interest rate to offset the inflationary effects of fiscal impulses; the response is larger, if the aggregate budget deficit is larger

Hypothesis 1 is empirically tested in Section 3.

The next step in our solution is the optimization by governments. They play Nash with one another while incorporating the central bank's reaction function (7). The complete solution is presented in Appendix A. However, to understand the intuition, it is sufficient to focus only on government 1's optimization problem, assuming that government 2 does not respond to country 1's strategic manipulation. Although much simpler, this does not affect the qualitative implications.

We obtain government 1's output gap by substituting the central bank reaction function in Eq. (7) into Eq. (5):

$$y_1 = \omega(1 - s)(\tau_1 - \tau_2) \tag{8}$$

Note that the effectiveness of deficit-financed spending in increasing output tends towards 0 for a very large country nearing $s = 1$, thereby rendering government spending ineffective. However, the smaller a country becomes, the more and more effectively can a country use its deficit to increase its output (via government spending multiplier ω). For $s = 1$, we are in a situation with no monetary union. The independent (and conservative) central bank in our setup fully absorbs any fiscal expansion, thereby rendering any (electorally driven) manipulation meaningless.[8] However, the smaller a country, the more it is able to use a fiscal expansion for achieving an output boost (possibly motivated by electoral concerns) *because* it is part of a monetary union.

Optimal government deficit-financed spending τ_1^* is found by substituting Eqs. (6) and (8) into the government's loss function, Eq. (1), and setting the derivative with respect to τ_1 equal to 0:

$$\tau_1^* = \frac{(\phi\kappa^2 + \zeta)\omega^2(1 - s)^2\tau_2 + \omega(1 - s)\zeta\delta\mathbf{E}_1}{\alpha + (\phi\kappa^2 + \zeta)\omega^2(1 - s)^2} \tag{9}$$

Taking the difference of τ_1^* with and without fiscal manipulation gives us the effect of an increased output target on deficit-financed spending:

$$\Delta\tau \equiv \tau_1^*(\mathbf{E}_1 = 1) - \tau_1^*(\mathbf{E}_1 = 0) = \frac{\omega(1 - s)\zeta\delta}{\alpha + (\phi\kappa^2 + \zeta)\omega^2(1 - s)^2} > 0, \tag{10}$$

which is always greater than zero given that the parameters are positive. Empirically, we interpret this as the election-year deficit-financed spending.

It is clear from Eq. (10) that country size affects the optimal level of election-year deficit spending. The direction of the effect of country size on the election deficit spending effect can be assessed by taking the derivative of election-year deficit-financed spending with respect to s, country 1's size:

$$\frac{\partial\Delta\tau}{\partial s} = \frac{\delta\zeta\omega[(\phi\kappa^2 + \zeta)\omega^2(1 - s)^2 - \alpha]}{[\alpha + (\phi\kappa^2 + \zeta)\omega^2(1 - s)^2]^2} \tag{11}$$

The sign of this derivative depends on the numerator and is negative, if

$$\alpha > (1 - s)^2[(\phi\kappa^2 + \zeta)\omega^2]. \tag{12}$$

[6] One could model the central bank loss function with $\zeta = 0$ without affecting the qualitative results of expansionary policy in our model setup, because there is no difference between fighting inflation or deficit-financed fiscal expansions from the central bank's perspective. That is, the central bank has no trade-off between output and inflation. This is termed "divine coincidence" in Blanchard and Gali (2005).

[7] We believe that this is the best description of the reality in Europe. Multiple governments decide on their fiscal policy and then the central banks acts according to its monetary stability mandate. For evidence on this, see Fragetta and Kirsanova (2010).

[8] Empirical studies have shown that central bank independence helps reduce "fiscal waste" (de Haan and Sturm, 1992; Bodea and Higashijima, 2017), especially in election years (Haga, 2015).

If the inequality holds, an *increase* in country size s in Eq. (11) leads to a decrease in deficit spending in election years. In Appendix A, we discuss Inequality (12) in detail and present some calibrations to get a better idea of the shape of Eq. (11). Essentially, whether Inequality (12) holds or not depends on two parameters that are likely to take different values when a country is in a crisis or not.

Eq. (11) is negative, i.e. smaller countries are likely to have larger deficits, if α, the loss from deviating from the zero deficit objective, exceeds the benefits of the deficit. These benefits are determined by the extent to which the deficit positively impacts output (ω) and hence impacts the deviation from the inflation and output objectives proportional to the size of country 1 ($1-s$; i.e. completely for $s=1$).

Government spending multiplier ω and α are likely to vary depending on the economic conditions. Amendola et al. (2020) estimate the fiscal multiplier ω at around 1 during stable periods in the euro area, while it can go up to 2.9 when the interest rate is at its effective lower bound during recessionary times. At the same time, α may behave inversely. In a crisis, interest rates are typically lower, thereby decreasing borrowing costs. Additionally, fiscal rules are typically less strict during crises. For instance, the "general escape" and "unusual events" clauses within the Stability and Growth Pact allow for deviations from fiscal rules during economic downturns. These dynamics make it less likely for the Inequality (12) to hold in a crisis.

Essentially, Inequality (12) holds, if ω is sufficiently small relative to α. When ω is large and α small, there is a good chance that the inequality is violated, but it may hold for normal values of ω during stable periods and large values of α. Hence smaller countries have an incentive to expand more in election years than larger countries during stable periods, but this may not be the case in times of crisis.[9] During stable periods, a fiscal authority is likely to submit to the central bank's stabilization policy,[10] which becomes more and more determined with country size ($(1-s)^2$). Hence:

Hypothesis 2. Larger member states of a monetary union have a smaller deficit than smaller ones during election years in a non-crisis period

Hypothesis 2 is empirically tested in Section 4. The effects of crises on Hypothesis 2 are investigated in Section 4.3.

3. EMU monetary policy: when the cat's away...

3.1. Methodology

To assess the effect of fiscal policy on central bank policy, we create a single measure that accounts for all the elections within the EMU. That is, we do not use government spending or taxes directly as they are endogenous to monetary policy (and expectations thereof). For an individual country i, $Electoral\,Pressure_{im}$ is equal to 1 in month m if there is an election within a 12-month period including the election month. To alleviate endogeneity concerns further, we exclude snap elections. That is, we only include predetermined elections.[11] We then generate a measure that encompasses the total pressure from all N EMU member country elections on ECB policy:

$$EMU\,Electoral\,Pressure_m = \sum_{i=1}^{N} CS_i * Electoral\,Pressure_{im}, \tag{13}$$

where CS_i is the country weight of country i. In the analyses, we use two variants of $EMU\,Electoral\,Pressure$. First, we weigh the individual impact of each member country i on electoral pressure by multiplying its electoral pressure by country size, using each country's central bank's "subscription to the total capital of the ECB" called the ECB capital key, or ECB Capital Subscription (CS), as a proxy. The capital key reflects each member's share in the EMU's total population and GDP. Second, we give each country an equal weight in ECB decision-making (akin to replacing the CS with 1 for all N member countries).[12]

We make use of a forward-looking Taylor rule to represent ECB policy. A central bank following the Taylor rule adjusts rates depending on the deviation of inflation from its target (2% in the EMU) and output from its potential.[13] To take into account the fact that monetary policy affects inflation and output with a lag, we use expectations of these economic conditions[14]:

$$i_m = r_m^* + \pi^* + \beta(E[\pi_{m+12}] - \pi^*) + \gamma(E[y_{m+12}] - y^*), \tag{14}$$

where i is the nominal interest rate in month m, r_m^* is the neutral real interest rate, π^* is the inflation target, $E_t[\pi_{m+12}]$ is the expectation of the inflation rate one year from now, $E_t[y_{m+12}]$ is the expectation of economic growth one year from now and y^* is the potential growth rate.

Empirically, we follow Sauer and Sturm (2007), Sturm and de Haan (2011), Anderes et al. (2021) and estimate Taylor rules using forward-looking and real-time data on 12-months ahead inflation and growth expectations as opposed to using actual inflation and growth rates. These expectations are taken from consensus forecasts published by Consensus Economics Inc. Furthermore, and in accordance with the aforementioned literature, we take the ECB's Main Refinancing Rate (MRR) as our nominal interest rate. (The MRR is the interest rate that banks pay when they borrow money from the ECB for one week.) Finally, we include our measure of EMU-wide electoral pressure as a separate variable:

$$MRR_m = \beta_0 + \beta_1 E[\pi_{m+12}] + \beta_2 E[y_{m+12}] + \beta_3 EMU\,Electoral\,Pressure_m + \epsilon_m. \tag{15}$$

The neutral real interest rate, inflation target, and potential growth rate are assumed to be constant during the estimation period and therefore collapse to a single constant.[15] We hereby effectively decompose the MRR into components reflecting Taylor-rule based policy, policy to

[9] In our empirical sample, we distinguish a non-crisis period lasting from the start of the EMU in 1999 up to 2007.

[10] For instance, during stable periods, assuming $s=0.3$, $\kappa=0.1$, $\phi=1$, $\zeta=1$, and $\omega=1$, we get that α should be at least around 0.5. That is, deviating from the balanced budget target should be at least half as painful as the deviation from the output gap and inflation targets. This is not that restrictive. For instance, in Demertzis et al. (2004), α is implicitly set to a more restrictive value of 1.

[11] We identify potentially endogenous elections by (i) checking whether an election occurred before the end of a term limit and (ii) using individual web searches.

[12] One may argue that fiscal spending during an election year in one country will have spillover effects on the economies of other countries. We do not explicitly account for this to maintain the simplicity of our setup. However, note that it is likely that larger countries induce larger spillovers. Hence, excluding the ECB's response to spillovers biases our results to our disadvantage, that is, it makes it more difficult to find a significant effect of country size on election-year spending.

[13] We follow Sturm and de Haan (2011) in using output growth as a leading indicator for the output gap.

[14] For instance, Batini and Nelson (2001) found that monetary policy takes up to a year to reach its peak effect on inflation.

[15] At the suggestion of one of the reviewers, we checked for a correlation between the electoral pressure variable, the neutral interest rate, and the potential growth rate of the economy. We reran the equivalent of Columns (2) and (6) of Table 1, including the neutral rate and the potential growth rate as estimated using the Holston et al. (2017) model. In the Column (2) equivalent, our electoral pressure variable coefficient remains significant with a coefficient of 0.0180 and a t-statistic of 2.52. In the Column (6) equivalent, our electoral pressure variable coefficient also remains significant with a coefficient of 0.00388 and a t-statistic of 3.53. Thus, while the variation in the neutral

Table 1
Monetary analyses.

Dependent: MRR_m	(1) Taylor rule	(2) Weighted	(3) Unweighted	(4) Germany and France	(5) Taylor rule lagged dep.	(6) Weighted lagged dep.
MRR_{m-1}					0.901***	0.857***
					(31.97)	(26.80)
Forecasted $Inflation_m$	2.113**	1.699***	2.519***	2.263***	0.260	0.346**
	(2.49)	(3.39)	(5.48)	(4.61)	(1.62)	(2.25)
Forecasted $Growth_m$	2.870***	2.040***	1.814***	1.774***	0.181***	0.240***
	(2.88)	(4.65)	(5.66)	(5.95)	(4.53)	(5.11)
EMU Elec. $Pressure_m$		0.0244***	0.273***			0.00260**
		(3.33)	(3.84)			(2.33)
EMU Elec. Pressure $Group_m$				0.412**		
				(2.54)		
EMU Elec. Pressure $Others_m$				0.214**		
				(2.54)		
Adjusted R^2	0.5762	0.6844	0.6523	0.6880	0.9727	0.9742
Underidentification p	0.037	0.005	0.000	0.000	0.006	0.004
Cragg-Donald Wald F	6.367	12.484	21.818	23.424	6.089	6.527
Sargan p	–	–	–	–	0.065	0.128

Note: t statistics in parentheses. Significance is denoted by (*) [**] {***} for the (90) [95] {99} levels. All standard errors are Newey–West corrected for serial correlation to the second order. Model (1) is a standard forward-looking Taylor-rule model without a lagged dependent variable. Model (2) weighs all EMU members according to their capital share in the ECB (effect of 1% of the EMU being in an election). Model (3) concerns the total number of (upcoming) elections in a given month, that is, no weighting (average effect per election). Model (4) allows for a distinct role of Germany and France vis-à-vis all other states. Model (5) includes the lagged dependent in the standard Taylor-rule setup. Model (6) includes the lagged dependent in the weighted model setup. Models (1)–(6) include all months from January 1999 to December 2007, covering 108 observations; though models (5) and (6) use 8 observations for the inclusion of the lagged dependent variable and its instrumental lag structure (2–8). The underidentification p shows the p-value of the Kleibergen-Paap rk LM Chi-squared. In all models, forecasted inflation and forecasted growth are instrumented with the actual values of inflation and unemployment in that month for the EMU.

combat fiscal manipulation and discretionary policy. In the last two specifications (models 6 and 7), we also include a lagged dependent variable to capture the smoothing nature of monetary policy.

Arguably, the role of the ECB changed dramatically during the 2008 financial crisis. The ECB moved to unconventional measures to curb the financial and debt crises. That is, from 2008 onward one can no longer capture monetary policy by looking at interest rates alone (Anderes et al., 2021).[16] Given this change in behavior, we decide to exclude the sample period after 2007. This has the additional advantage that the assumptions of (i) an independent central bank and (ii) more or less stable neutral real interest and potential growth rates are easier to defend. Starting January 1999, this leaves us with a monetary analysis that covers 108 months. All standard errors are Newey–West corrected for serial correlation up to the second order.[17]

Table 5 in the appendix shows the descriptive statistics of the variables used in the monetary sample.

Because forecasts are also affected by (expected) monetary policy decisions, there may be endogeneity between our dependent and independent variables.[18] Using a backward-looking Taylor Rule with actual values of the current macroeconomic environment, however, would also not properly capture how the ECB makes interest rate decisions.[19] To alleviate endogeneity concerns, we follow Rühl (2015) and instrument the forecasts of inflation and growth with the actual values of inflation and unemployment. In this way, we only look at the marginal impact of that part of the macroeconomic forecasts that is related to the current macroeconomic environment.

3.2. Results

Table 1 shows the main results of our monetary analysis. In model (1), we begin with a standard Taylor rule setup in which the MRR is explained by expected inflation and expected economic growth. We observe that the coefficient of forecasted inflation on the MRR is larger than 1. That is, the result is in line with the Taylor principle: for each percentage point increase in expected inflation, the nominal interest rate target rises by more than one percentage point to make sure that the real interest rate increases. In fact, the effects of forecasted inflation and growth are quite high. This is not surprising, given that we are estimating a local average treatment effect (LATE). That is, we are estimating that response of the ECB to expectations of the future that are based on the most certain aspect of those expectations: the current macroeconomic environment.

In models (2)–(4) we include our variants of the electoral pressure variable. In model (2), the electoral pressure variable (ranging from 0, no country in an election, to 100, all countries in an election) accounts for the size of each country in an election, while in model (3) we make no distinction between large and small countries and look at the total number of elections. In both models, the election effect is positive and highly significant. This is in line with Hypothesis 1. On average,

interest rate is relevant for the main refinancing rate, it does not fundamentally affect our conclusions regarding the relevance of elections in member states with different country sizes for monetary policy. We thank a reviewer for acknowledging the potential relevance of time-varying neutral interest rates and potential growth rates.

[16] When including the effective lower bound period by exploiting variation in so-called shadow interest rates (Black, 1995; Wu and Xia, 2017, 2020) we face a unit root in the dependent variable indicating that our Taylor rule is no longer a good representation of monetary policy behavior.

[17] We opt for two lags, as the residuals are significantly explained by up to two lagged terms.

[18] We would like to thank a reviewer for this comment.

[19] As highlighted in the existing literature, e.g. Klose (2023), the use of a backward-looking inflation variable often results in an inflation coefficient significantly smaller than 1. Klose (2023) shows that the coefficients in a Taylor rule increase in significance and magnitude when the forecast horizon is extended to reflect the monetary policy lag. This underscores the importance of forward-looking considerations in setting the main refinancing rate, as also emphasized, for example, by Svensson (2003), Sauer and Sturm (2007), Gorter et al. (2008) and Sturm and de Haan (2011). Using such forward-looking specifications, for example, Orphanides and Wieland (2013), Bletzinger and Wieland (2017), and Hartmann and Smets (2018) have shown that they can describe changes in the ECB's policy rates quite well.

one election raises the ECB's MRR target by 27 basis points (bps) (unweighted variant),[20] while one standard deviation (15 in Table 5 in the appendix) in weighted electoral pressure increases the target by about 37 bps. We conclude that the ECB responds to elections in the EMU with its interest rates.[21] Because the explained variance of the weighted model (model 2) is larger,[22] we also conclude that an election in a larger country invokes a stronger response from the ECB than when a smaller country is in an election period. We explore this further in model (4), in which the electoral pressure variable is split into a German + French component and another component including all other members. These models confirm that it is the largest countries that invoke the strongest ECB reaction, again supporting Hypothesis 1.[23] A German or French election can be expected to push rates up by 41 bps.

So far, our models have not accounted for interest rate smoothing, that is, a central bank's preference to move toward its target slowly as opposed to shocking the economy with a large interest rate drop or hike. To account for this, we include the lagged MRR in models (5) and (6). In model (5) we once again run the standard Taylor rule setup as in model (1), but with the lagged MRR, which is strongly significant and positive. At first sight, it may appear that our results are no longer in line with the Taylor principle. However, our coefficients now only show the immediate response to electoral pressure. To return to the structural parameter, one must divide the coefficients by one minus the coefficient of the lagged dependent variable. For inflation, this would give us a structural parameter of $\frac{0.260}{1-0.901} = 2.626$, which is even larger than our original estimate (though not significant). Finally, in model (6) we introduce the lagged dependent variable into our model (2) setup with the weighted electoral pressure variable. We opt for the weighted variable as it is (i) clear that country size does matter for ECB policy and (ii) easier to interpret one coefficient than two separate coefficients for each group as in model (4). We observe that elections continue to have a strongly significant and positive effect on the MRR. The structural parameter of our election variable is now $\frac{0.00260}{1-0.857} = 0.0182$.[24]

In Fig. 1 we compare our model predictions with the trajectory of the actual MRR (continuous [blue] line) based on Model (2) in Table 1. The dotted [red] line represents the model's prediction based purely on Taylor-rule considerations: forecasted inflation and output (with the lagged dependent variable included). The dashed [green] line represents our overall prediction with the effects on the MRR of both the Taylor rule and weighted electoral pressure. We observe that ECB policy was quite closely aligned with the Taylor rule during the 1999–2007 period and that, in general, our model including the electoral pressure variable does reflect the development of the actual MRR better. This particularly holds for the last quarter of 2001 and all quarters of 2002. For that year, the standard Taylor variables suggest a sharp decline in the policy rate, while our model including elections recommends a more stable approach at a higher MRR. During this period and supporting our approach, the ECB faced exceptional electoral pressure as both Germany and France held simultaneous and predetermined elections.[25]

4. EMU fiscal policy: … the mice will play

4.1. Methodology

Since there are hardly any data on fiscal variables at a monthly frequency, we use quarterly data for our analysis of the fiscal side of our story. We follow the literature on fiscal manipulation (e.g. Brender and Drazen, 2005; Shi and Svensson, 2006; Crombach and Bohn, 2024), and specify our fiscal regression as follows:

$$\begin{aligned} Balance_{iq} &= \beta_0 + \beta_1 \sum_{z=1}^{4} Balance_{iq-z} + \beta_2 y_{iq-4} + \beta_3 \pi_{iq-4} + \beta_4 Debt_{iq-4} \\ &+ \beta_5 Pred Elec_{iq} + \beta_6 CS_{iq} + \beta_6 CS_{iq} * Pred Elec_{iq} + \beta_7 InfoVot_{iq} \\ &+ \beta_8 InfoVot_{iq} * Pred Elec_{iq} + \mu_i + \sum_{s=1}^{4} Q_{is} + \theta_q + \epsilon_{iq}, \end{aligned} \tag{16}$$

where $Balance_{iq}$ is the primary budget balance of country i as a percentage of its GDP in quarter q, y is economic growth (growth increases tax revenues and reduces expenditures due to automatic stabilizers), π is the inflation rate based on the Harmonized Consumer Price Index (inflation could produce an incentive to raise the deficit because inflation erodes real debt; yet it could also lead to a lower deficit as more workers fall into higher nominal tax brackets). $Debt$ is public debt as a percentage of GDP. We include debt as a control because higher levels of public debt relative to GDP (i) increase the share of government spending devoted to interest payments for a given interest rate, and (ii) higher levels of debt also lead to higher rates, thereby increasing the cost of existing debt. To achieve fiscal sustainability, governments must increase revenues or cut budgets elsewhere once public debt exceeds growth-maximizing levels (Checherita-Westphal et al., 2014). $Pred Elec$ is a dummy equal to 1 in a predetermined election year (the election quarter itself and the three preceding quarters), and CS is our proxy for country size (ECB Capital Subscription) as in the monetary section (Eq. (13)). $InfoVot$ is an index created by Janku and Libich (2019) to measure the degree of voter informedness.[26] Veiga et al. (2017) and Crombach and Bohn (2024) also find that voter informedness is a key determinant of fiscal manipulation. We also include the interaction between the informed voter index and the election dummy. This is important, because fiscal manipulation is only sensible from the government's perspective if it effectively convinces some share of the population to vote for her. Without an incentive to manipulate overall, country size would not be a relevant factor in determining the

[20] The median number of elections at the annual level is equal to two. This implies that in a zero-election year the MRR is 40 bps below the "baseline", while in a year with the maximum number of elections (five), it is 60 bps above the "baseline".

[21] This also hints at the ECB being independent during our sample period, 1999–2007. Otherwise, the coefficients of our electoral pressure variable would have been zero, or, in case the central bank even actively took part in stimulating the economy during election times, significantly negative.

[22] We run an alternative to models (2) and (3) in which we include a dummy that is equal to 1 in the case of no electoral pressure whatsoever, and 0 if there is electoral pressure emitting from at least one member state. The coefficient of this dummy is significant and negative with an effect of 81 bps, meaning that the MRR would be 81 bps lower in periods without elections than in those with elections.

[23] We also run this specification with alternative groups: one that includes Italy as a large country, another that also includes Spain, and a last one that also includes the Netherlands. In all OLS models, the large country effect exceeds the small country effect. In the IV models this is also the case, with the exception of the model that includes Italy as a large country. In this case, the large country effect is slightly smaller than the small country effect.

[24] We also run a Jackknife procedure in which we exclude one country from the electoral pressure variable in each analysis. There is no model in which our weighted electoral pressure variable turns insignificant, except for the model without Germany, in which the p-value rises to 0.144.

[25] Our results do not depend on this high level of electoral pressure. If we replicate model (2) while excluding the period of peak electoral pressure in 2002, we obtain a coefficient of 0.025 and a t statistic of 2.70 for our weighted electoral pressure variable.

[26] It is a weighted average of the degree of information provision (transparency and credibility of government policy), information transmission (internet availability and media independence) and information processing (labor force with tertiary education and PISA test score) ranging from −1.30 to 1.17. The index reflects the number of standard deviations by which a country deviates from the OECD average. The index starts in 2000 and ends in 2014. For robustness checks including the years after 2014, we assume all values to be equal to the 2014 value. Additionally, values for Lithuania and Latvia are missing. We set these equal to those of the remaining Baltic state, Estonia. The 1999 value is set equal to the 2000 value.

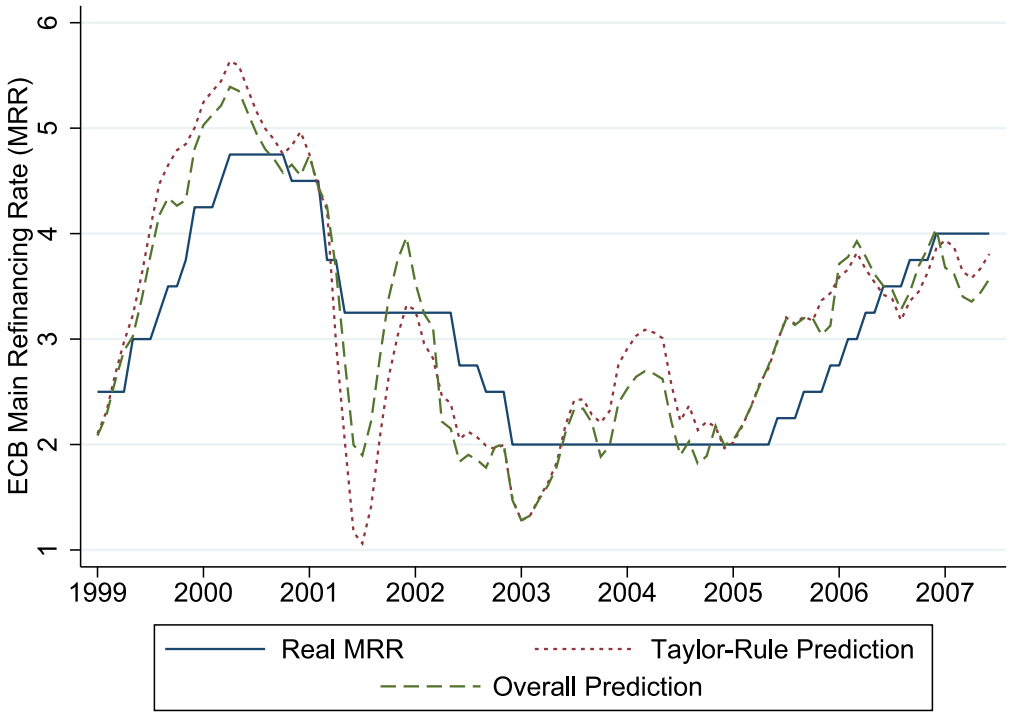

Fig. 1. Main refinancing rates over time.

degree of fiscal manipulation.[27] μ_i are country fixed effects,[28] $\sum_{s=1}^{4} Q_{is}$ are season dummies interacted with country dummies to account for country-specific seasonality, θ_q are quarter dummies, that is, there is a dummy for each unique quarter, and ϵ_{iq} is a random error term. We also include the first four lags of the dependent variable to account for the dynamic nature of our panel.[29]

Hypothesis 2 is addressed by including a two-way interaction term between $Pred\,Elec$ and CS. For our theoretical mechanism to hold, the interaction between $Pred\,Elec$ and CS should be significant and positive during stable periods, while $Pred\,Elec$ itself should be significant and negative (to indicate that small countries run deficits during elections, while larger countries do not).

Our sample consists of all EMU members during the sample period. All the fiscal and economic data are taken from Eurostat. The information on elections comes from the Database of Political Institutions (Scartascini et al., 2021). To remain consistent with the monetary regression, we limit the sample to 2000–2007 (we use 1999 to include the four lagged dependent variables). However, we also conduct robustness checks using extended samples.

Table 6 in the appendix shows the descriptive statistics for the fiscal sample covering the 1999–2007 period. Table 7 in Appendix B lists all EMU countries and the number of included elections for that period.

4.2. Results during stable periods

Table 2 presents the main results of our fiscal analysis. In model (1), we introduce the basic setup without elections. We observe that the lagged dependent variables are not as important as in the previous literature which mostly used annual data (e.g. Gootjes et al., 2021; Crombach and Bohn, 2024) as most of the coefficients are insignificant.[30] This is likely to be the result of our stringent set of time dummies, as we de-season our analysis specifically for each country by including quarter dummies interacted with country dummies. Nevertheless, we continue to include them for consistency with the existing empirical literature. There is no effect of economic growth or inflation in any model. Public debt has a positive effect on the primary balance in most models, indicating the dynamics of fiscal sustainability. As debt increases (above growth-maximizing targets), governments must raise revenues or cut the budget elsewhere to achieve fiscal sustainability (Checherita-Westphal et al., 2014). In model (2), we introduce the election dummy, which is significant and negative. On average, the primary balance is 0.51 percentage points of GDP lower in an election year. In model (3), we include our measures of country size and informed voters,[31] and their interaction with the predetermined election dummy. The interaction between the informed voter index and the election dummy is significant and positive, highlighting that we are successfully controlling for factors of fiscal manipulation other than the one in our theory. In terms of country size, we find a significant and positive effect in election years, but not in non-election years. For countries with a (theoretical) minimal country share (i.e. $CS = 0$) and the lowest score of the informed voter index, the primary budget balance is 1.92 percentage points of GDP lower during election years relative to non-election years. As CS increases, this effect diminishes.

[27] This captures $\delta * \mathbf{E}_i$ in the theoretical fiscal reaction function in Eq. (9) in Section 2.

[28] Including a lagged dependent variable in a fixed-effects model could lead to biased estimates due to the Nickell bias (Nickell, 1981; Kiviet, 1995). The literature has usually accounted for the Nickell bias by using a GMM estimator. In our setup, this is not feasible, as there is no plausible setup in which we are not susceptible to the instrument proliferation bias (Roodman, 2009). Furthermore, the Nickell bias should be limited in our setup, given that we have $T > N$.

[29] Philips (2016) found in a meta-analysis of the empirical fiscal manipulation literature that election-year effects are overstated if the model does not include the lagged dependent variable to account for the autoregressive tendencies of fiscal variables.

[30] A joint F-test of the coefficients of all the lagged dependent variables is insignificant in all the models. The lowest p-value is 0.2301.

[31] The informed voter index is rescaled such that its starting point is zero. This eases the interpretation of the election dummy. It now shows the effect of a country with size "0" and the lowest informed voter score.

Table 2
Fiscal analyses.

Dependent: Primary Balance$_q$	(1) Basic	(2) Elections	(3) Main result
Primary Balance$_{q-1}$	0.0401	0.0371	0.0244
	(0.46)	(0.42)	(0.28)
Primary Balance$_{q-2}$	0.0996	0.0996	0.0911
	(0.87)	(0.89)	(0.82)
Primary Balance$_{q-3}$	0.0931	0.0905	0.0850
	(1.64)	(1.56)	(1.59)
Primary Balance$_{q-4}$	0.165	0.170	0.166
	(1.37)	(1.41)	(1.34)
Public Debt$_{q-4}$	0.0458*	0.0414	0.0542*
	(1.86)	(1.68)	(2.17)
Economic Growth$_{q-4}$	−0.0976	−0.107	−0.0860
	(−0.43)	(−0.46)	(−0.36)
Inflation$_{q-4}$	0.106	0.112	0.0914
	(0.54)	(0.61)	(0.56)
Predetermined Election$_q$		−0.512***	−1.915***
		(−3.09)	(−4.53)
Country Size$_q$			0.129
			(0.34)
Informed Voter Index$_q$			−1.312
			(−1.31)
Country Size$_q$* Predetermined Election$_q$			0.0525***
			(3.29)
Informed Voter Index$_q$* Predetermined Election$_q$			0.746**
			(2.81)
Within R^2	0.825	0.828	0.831

Note: Robust t statistics in parentheses. Significance is denoted by (*) [**] {***} for the (90) [95] {99} levels. Model (1) introduces the basic setup without an election variable. Model (2) includes our dummy of electoral pressure. Model (3) includes our proxies for country size and informed voters and their interactions with elections. Models (1)–(3) cover 320 observations of 13 countries. All models include quarter-year fixed effects, and quarter dummies interacted with all country dummies to account for quarter-specific events and country-specific seasonality.

Overall, we conclude from this that smaller EMU member states run significantly larger deficits during exogenous election periods than larger EMU members. This is in line with our second hypothesis. The marginal effects plot in Fig. 2 shows graphically that (i) small countries resort to fiscal manipulation, (ii) large countries do not, and (iii) their behavior is significantly different.[32]

In Table 3, we assess the robustness of our result using alternative specifications. Column (1) replicates our main result in this fiscal part (Column (3) in Table 2). In Column (2), we exclude the lagged dependent variables. There is no relevant difference between our main result and a model without lagged dependent variables. In Model (3), we exclude all insignificant controls up to the 10% level. Again, there is no observable difference between this model and our main result. In Columns (4), (5), and (6), we adjust our election dummy such that, as opposed to being equal to 1 in the entire pre-election year, it is only equal to 1 in the 9, 6, or 3 months preceding an election, respectively. We observe that both the election dummy and the interaction effect become much stronger with larger coefficients. If our analysis focuses solely on the election quarter itself (Model 6), we observe an election effect that is 2.3 times larger than in the main sample, and an interaction effect that is 3.1 times larger than in the main sample. Lastly, in Column (7), we include the Gootjes et al. (2021) index of fiscal rules because fiscal rules are seen as potentially curbing PBCs. The fiscal rules index (with and without interaction) is insignificant, while the interaction effect between country size and the election dummy is 1.4 times larger than for our main result. This suggests that our mechanism remains relevant even if fiscal rules help with PBCs in general (there is a reduced election-year effect). The effect for small countries does not disappear; to the contrary, it becomes stronger.[33]

4.3. Results during crisis periods

In this subsection, we empirically examine our mechanism during crisis periods from a fiscal perspective. There is evidence that our mechanism also holds during 2017–2019, when investment in the euro area was finally close to reaching its pre-crisis level.[34] Theoretically, it is important to distinguish between country-specific and euro area-wide (systemic) crises. Recall that our Hypothesis 2 was derived for monetary–fiscal policy interactions when there is a potential strategic mismatch between the monetary union's central bank and the fiscally manipulating individual countries. Therefore, it does not apply to systemic crises.

Consider a country or a small group of countries experiencing a recession/crisis, while other countries in the monetary union do not. In such a scenario, the output gap of the monetary union as a whole could still be (close to) 0. The strategic mismatch between the monetary union's central bank and the fiscally manipulating individual countries that our analysis focuses on is preserved. Now consider what we discussed in Section 2: Inequality (12) is likely to hold if the direct costs of fiscal policy are relatively large compared to its effects, i.e. the fiscal multiplier. That is, if the fiscal instrument is sufficiently costly and ineffective, larger countries will spend less as the central bank negates most of their costly efforts. In times of crisis, however, Inequality (12) may be violated. This is because the direct costs of the fiscal instrument may be reduced (because, for example, borrowing costs are relatively low) and the fiscal instrument may become more effective (i.e. the fiscal multiplier increases). In this case, large countries may find it optimal to fight the central bank and respond to the central bank's countermeasures (which are stronger when large countries are expanding) by substantially increasing the use of their relatively inexpensive fiscal instrument. As a consequence, we empirically expect our interaction coefficient between the predetermined election dummy and country size to become insignificant, or even negative, during such crises.

In contrast to the aforementioned case of a country-specific shock, consider the case where the entire euro area is faced with a negative macroeconomic shock, leading the central bank and the fiscal authorities to unite under the common goal of increasing union-wide output. In this scenario, our theoretical argument no longer holds as our model argues from a steady-state perspective. In our theoretical setup, there

[32] Of course, the EMU consists of many small countries and a few large countries, as is apparent from Fig. 2. Nevertheless, we find that our results are not driven by the smallest countries in the sample. The interaction between CS and $PredElec$ remains strongly significant after excluding the smallest 5% of countries (p-value 0.01) and is still significant after excluding the smallest 10% of countries (p-value 0.092) with coefficients similar to the main result (not shown).

[33] The fact that country size matters more when controlling for fiscal rules actually implies that fiscal rules are effectively stricter for small countries than for large countries. There is evidence that the European Commission is less willing to impose sanctions on larger countries such as France (Sacher, 2021).

[34] We can only do this comprehensively for the fiscal policy part of our analysis because the proxy we have chosen to capture expansionary fiscal policy is no longer as appropriate for analyzing monetary policy in times of crisis. In theory, fiscal policy is now more valued by the central bank, regardless of the size of the country. Moreover, estimating a Taylor rule in an interest rate environment that has reached the effective lower bound, as has largely been the case since the financial crisis, is a challenge in itself. The 2017–2019 period of 36 observations reports significant results for our mechanism for Newey–West regressions and weakly significant results for IV regressions, but due to the small sample, we cannot realistically guarantee that we avoid problems of over- and under-identification.

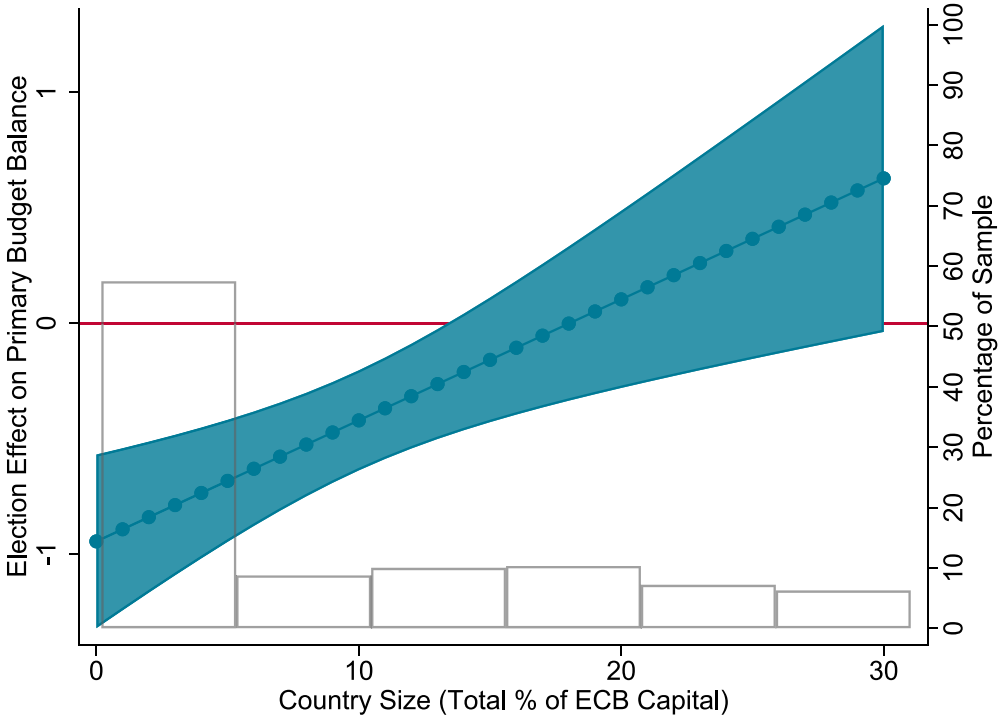

Fig. 2. Effect of EMU elections on the primary budget balance by country size.

is a mismatch in the interests of fiscal and monetary policymakers and the central bank is effective in bringing the union back to the steady-state level of output using monetary policy alone. However, in extreme macroeconomic crises (such as the 2008 financial crisis), the divergence of interests between fiscal and monetary policymakers disappears because the central bank is also concerned about the decline in aggregate activity.[35] There is no reason to expect a central bank to raise interest rates (or reduce quantitative easing) in response to elections during such periods. Empirically, therefore, we can expect (as in the country-specific crisis case above) that our interaction between the predetermined election dummy and country size becomes insignificant during such periods of adverse systemic shocks.

In Table 4 we assess our main result using extended fiscal samples. For comparison, Column (1) repeats our main result which corresponds to Column (3) in Table 2 and is based on the period 2000–2007. In Column (2), we do not limit the sample years and end up with an analysis of data between 2000 and 2022 (again, we lose 1999 due to the inclusion of our lagged dependent variable). In this setup, as expected, there is no significant effect of the interaction between country size and our election dummy. In fact, predetermined elections seem to matter less overall, as the coefficient drops by about 50%. Columns (3) and (4) suggest that this is only partly the case, in line with our reasoning above. Column (4) excludes all countries affected by a systemic crisis. Column (3) excludes only those countries that were additionally affected by a country-specific crisis. Consider Column (3) first. We exclude Portugal, Ireland, Italy, Greece, and Spain from the analysis during the financial, debt, and COVID-19 crises (2008–2015 and 2020–2021), while keeping all other years and including the crisis years for the remaining countries. These countries were particularly hard hit by the financial and debt crises. The election effect increases by about 34% compared to Column (2). The interaction also becomes significant, with a positive coefficient, but only at the 10% level. In Column (4), we exclude the years 2008–2015 and 2020–2021 for all countries. The election dummy increases by another 29% and is very similar to that of the main sample. The same is true for the interaction term between country size and elections, albeit with a slightly weaker coefficient. Overall, these results confirm that fiscal-monetary dynamics differ during periods of systemic crisis. Most importantly, we show that our main result is robust to the inclusion of additional years up to 2022, suggesting that our mechanism may still be relevant today as both fiscal and monetary policies return to normal.

5. Discussion and conclusion

In this paper we present a channel, neglected in the literature, through which membership of a monetary union undermines responsible fiscal policy. An independent central bank with an unequivocal mandate for providing inflation stability discourages fiscal profligacy. In a monetary union, however, such a central bank must account for the effects of the fiscal policies of all member states. Larger member states are therefore more relevant to the central bank of a monetary union than small ones. The consequence is that the individual fiscal policy of the small member states naturally plays no (or, at most, a limited) role in the conducting of monetary policy. We empirically evaluate this argument from both a monetary policy and a fiscal policy perspective in the context of the European Monetary Union (EMU).

Using a pre-crisis sample and a modified forward-looking Taylor rule setup, this paper finds that the European Central Bank (ECB) responds to fiscal shocks by increasing the interest rate or by decreasing the interest rate at a slower pace. The results also show that the ECB responds differently to fiscal shocks in small countries compared with such shocks in large countries. If, in a given year, there is expansionary fiscal policy in a small member country, the ECB has no (strong) incentive to respond with an interest rate increase, as the ECB focuses on the entire monetary union. In contrast, if large member state governments engage in expansionary fiscal policy this leads to EMU-wide inflationary pressures, urging the ECB to engage in restrictive monetary policy.

[35] In addition, monetary policy also becomes less effective as interest rates approach the effective lower bound.

Table 3
Alternative specifications.

Dependent: Primary Balance$_q$	(1) Main result	(2) No lagged	(3) Significant controls	(4) Elec: 9 Months	(5) Elec: 6 Months	(6) Elec: 3 Months	(7) Fiscal rules
Primary Balance$_{q-1}$	0.0244		0.0217	0.0264	0.0325	0.0198	0.0186
	(0.28)		(0.25)	(0.30)	(0.35)	(0.22)	(0.21)
Primary Balance$_{q-2}$	0.0911		0.0889	0.0861	0.0920	0.102	0.0883
	(0.82)		(0.80)	(0.77)	(0.85)	(1.00)	(0.79)
Primary Balance$_{q-3}$	0.0850		0.0811	0.0850	0.0751	0.0791	0.0853
	(1.59)		(1.60)	(1.55)	(1.26)	(1.39)	(1.67)
Primary Balance$_{q-4}$	0.166		0.161	0.165	0.166	0.150	0.170
	(1.34)		(1.36)	(1.33)	(1.36)	(1.28)	(1.35)
Public Debt$_{q-4}$	0.0542*	0.0619*	0.0542*	0.0546**	0.0493*	0.0525**	0.0625**
	(2.17)	(2.12)	(2.18)	(2.19)	(2.07)	(2.23)	(2.43)
Economic Growth$_{q-4}$	−0.0860	−0.0974		−0.0717	−0.0494	−0.0465	−0.0908
	(−0.36)	(−0.46)		(−0.31)	(−0.22)	(−0.21)	(−0.37)
Inflation$_{q-4}$	0.0914	−0.0394		0.0957	0.118	0.0896	0.0909
	(0.56)	(−0.20)		(0.57)	(0.77)	(0.58)	(0.56)
Predetermined Election$_q$	−1.915***	−1.878***	−1.944***	−2.447***	−3.166***	−4.413***	−1.681***
	(−4.53)	(−4.11)	(−5.21)	(−5.43)	(−4.22)	(−3.92)	(−3.66)
Country Size$_q$	0.129	−0.244	0.0280	0.171	0.220	0.240	0.109
	(0.34)	(−0.42)	(0.07)	(0.45)	(0.61)	(0.65)	(0.30)
Informed Voter Index$_q$	−1.312	−2.220*	−1.429	−1.261	−0.904	−1.056	−1.811
	(−1.31)	(−1.94)	(−1.32)	(−1.22)	(−0.94)	(−1.13)	(−1.75)
Country Size$_q$* Predetermined Election$_q$	0.0525***	0.0532**	0.0523***	0.0742***	0.0888**	0.163**	0.0712***
	(3.29)	(2.53)	(3.32)	(3.75)	(2.73)	(2.88)	(3.69)
Informed Voter Index$_q$* Predetermined Election$_q$	0.746**	0.735**	0.774***	0.995***	1.008**	1.307**	0.966**
	(2.81)	(2.61)	(3.11)	(3.55)	(2.46)	(2.35)	(2.91)
Fiscal Rules Index$_q$							−1.030
							(−1.22)
Fiscal Rules Index$_q$* Predetermined Election$_q$							−0.306
							(−0.99)
Within R^2	0.831	0.821	0.830	0.831	0.835	0.834	0.832

Note: Robust *t* statistics in parentheses. Significance is denoted by (*) [**] {***} for the (90) [95] {99} levels. Model (1) is our main result. Model (2) excludes all lagged dependent variables. Model (3) excludes all insignificant controls. Models (4), (5), and (6) include different durations for the election dummy. Instead of being coded as 1 for the preceding year, the dummy is now coded 1 for the preceding 9, 6, or 3 months, respectively. Model (7) includes the Gootjes et al. (2021) fiscal rules index and its interaction with the election dummy. Models (1)–(7) cover 320 observations of 13 countries. All models include quarter-year fixed effects, and quarter dummies interacted with all country dummies to account for quarter-specific events and country-specific seasonality.

Since this gives smaller members more room for fiscal maneuvers, we then test whether smaller EMU member state governments are more likely to run larger deficits than larger ones. To alleviate endogeneity concerns, we focus on predetermined election years. In such times, governments have an incentive to pursue expansionary fiscal policies to increase their chances of re-election. We find that governments of smaller members run an additional deficit of about 1% of their GDP during election years, while we find no evidence of a larger deficit in larger member states. These empirical results highlight that small countries might well be less deterred from fiscal manipulation since the ECB is responsible for price stability at the union level. Therefore, governments of smaller EMU countries *de facto* operate as if they were facing a central bank with a lower level of independence. This empirical result also holds in an extended fiscal sample and for a range of alternative specifications.

Crisis periods are special. In crisis periods, fiscal policy tends to be less costly and more effective. When other members of the monetary union are not in a crisis period, the aforementioned strategic mismatch reappears, but this time, it is between the central bank and the government of the crisis country. In this unique scenario, large countries may even increase their deficit in response to the central bank's interest rate hike. Alternatively, in times of union-wide macroeconomic crises, there is no longer a strategic mismatch between the central bank and the fiscal authorities: both are united in their goal of increasing aggregate output. In this context, it does not make sense to expect an effect of country size, since there is no central bank response to fiscal policy to begin with.

Our results may give rise to interesting international comparisons. In principle, we believe that the mechanism that we describe can be assessed in other settings with multiple fiscal authorities and a single central bank. One could think of, for instance, US states or Swiss cantons, although state and canton budgets are smaller than the budgets of the independent countries in the EMU. Nonetheless, we would expect more expansionary fiscal policies in the smaller states/cantons during election years. Furthermore, one could investigate whether monetary union member states set election dates strategically such that they do not coincide with election dates of other (larger) member states. A comparison of our result with results obtained for the US could be particularly interesting for two reasons. First, the Federal Reserve is independent but also pursues an employment objective, so one may expect a less clear-cut result for the US. Second, Hellerstein (2007) found that the Federal Reserve tends to avoid tightening monetary policy close to elections to remain politically neutral. If this were also true for state elections that do not coincide with Presidential elections, we would expect more fiscal manipulation in all states and less of our small country (viz. small state) effect.

Solving the problem of a lack of fiscal prudence in a monetary union is tricky. One might be tempted to think of a mechanism through which election dates in the EMU would be set close to one another. This would allow an independent European Central Bank to account properly for

Table 4
Extended fiscal sample.

Dependent: Primary Balance$_q$	(1) Main result	(2) 2000–2022	(3) Exclude PIIGS crisis	(4) Exclude all crisis
Primary Balance$_{q-1}$	0.0244	0.137**	0.0810*	0.102
	(0.28)	(2.71)	(2.11)	(1.51)
Primary Balance$_{q-2}$	0.0911	0.135***	0.113***	0.104**
	(0.82)	(4.31)	(4.17)	(2.44)
Primary Balance$_{q-3}$	0.0850	0.273**	0.142***	0.112*
	(1.59)	(2.71)	(4.14)	(1.87)
Primary Balance$_{q-4}$	0.166	0.187**	0.323***	0.478***
	(1.34)	(2.54)	(3.55)	(7.63)
Public Debt$_{q-4}$	0.0542*	0.0253***	0.0290*	0.0205
	(2.17)	(3.54)	(2.09)	(1.74)
Economic Growth$_{q-4}$	−0.0860	0.0841	0.00754	−0.0383
	(−0.36)	(1.29)	(0.09)	(−0.90)
Inflation$_{q-4}$	0.0914	0.131	−0.0318	0.0119
	(0.56)	(1.54)	(−0.38)	(0.11)
Predetermined Election$_q$	−1.915***	−0.955**	−1.283***	−1.657***
	(−4.53)	(−2.78)	(−3.61)	(−4.37)
Country Size$_q$	0.129	0.0288	−0.176	−0.0161
	(0.34)	(0.18)	(−1.13)	(−0.12)
Informed Voter Index$_q$	−1.312	2.173*	0.385	−0.269
	(−1.31)	(1.87)	(0.42)	(−0.30)
Country Size$_q$* Predetermined Election$_q$	0.0525***	0.0145	0.0194*	0.0283**
	(3.29)	(1.16)	(2.12)	(2.27)
Informed Voter Index$_q$* Predetermined Election$_q$	0.746**	0.535**	0.719***	0.840***
	(2.81)	(2.93)	(3.44)	(3.70)
Within R^2	0.831	0.728	0.772	0.810

Note: Robust t statistics in parentheses. Significance is denoted by (*) [**] {***} for the (90) [95] {99} levels. Model (1) is our main result and covers 320 observations in 13 countries during 2000–2007. Model (2) covers 1232 observations of 17 countries in the 2000–2022 period. Model (3) excludes all observations in Portugal, Ireland, Italy, Greece and Spain during 2008–2015 and 2020–2021 and thus covers 1020 observations of 17 countries. Model (4) excludes all observations of all countries during 2008–2015 and 2020–2021 and thus covers 636 observations of 17 countries. All models include quarter-year fixed effects, and quarter dummies interacted with all country dummies to account for quarter-specific events and country-specific seasonality.

excessive expansionary fiscal policy. However, smaller countries would still be able to free ride as their impact on the ECB's reaction would still be smaller and their own benefits larger. Somewhat ironically, coordinating election dates might also lead to more fiscal imprudence as it might unite all member states in *politically* pressuring the ECB not to counteract their fiscal stimuli, thereby endangering its independence. As an alternative, we could consider more stringent fiscal rules (Gootjes et al., 2021) and checks and balances (Streb et al., 2009) in the context of a monetary union. In a sense, our pre-crisis results could be seen as an additional indication of the lack of effectiveness of the Maastricht criteria. Furthermore, Gootjes et al. (2021) argue that the effects of fiscal rules are strongest post-crisis. Nevertheless, overall fiscal rules may still fail to deter especially small countries from wasteful spending; at the same time, implementing stricter general fiscal rules might lead to the overregulation of fiscal policy in large member states.

Declaration of competing interest

The authors declare to have no conflict of interest.

Data availability

The authors make available most data upon request. Consensus economics forecast data cannot be shared freely.

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Appendix A. Theoretical model: elections and strategic interaction in a monetary union

In this section, we solve the theoretical model while allowing both governments to react strategically to the decisions of the other government. In Section 2, we left the two governments unresponsive to each other's decisions, as this reduces complexity while keeping the results qualitatively similar.

We start with the reaction function of government 1, equivalent to Eq. (9) in Section 2:

$$\tau_1 = \frac{(\phi\kappa^2+\zeta)\omega^2(1-s)^2\tau_2 + \omega(1-s)\zeta\delta\mathbf{E}_1}{\alpha+(\phi\kappa^2+\zeta)\omega^2(1-s)^2} \tag{17}$$

For simplicity, we assume government 2 is not in an election, i.e. $\mathbf{E}_2 = 0$. Analogously, the reaction function for government 2 is then:

$$\tau_2 = \frac{(\phi\kappa^2+\zeta)\omega^2 s^2\tau_1}{\alpha+(\phi\kappa^2+\zeta)\omega^2 s^2} \tag{18}$$

Substituting Eq. (18) into Eq. (17) and solving for τ_1 gives us the new reaction function of τ_1 in parameters and exogenous variables only:

$$\tau_1^* = \frac{\zeta\omega(1-s)\delta\mathbf{E}_1(\alpha+(\phi\kappa^2+\zeta)\omega^2 s^2)}{\alpha(\alpha+(\phi\kappa^2+\zeta)\omega^2(s^2+(1-s)^2))} \tag{19}$$

To find the effect of an election on deficit-financed spending, we take the difference of τ_1^* with and without fiscal manipulation:

$$\Delta\tau \equiv \tau_1^*(\mathbf{E}_1=1)-\tau_1^*(\mathbf{E}_1=0) = \frac{\zeta\omega(1-s)\delta(\alpha+(\phi\kappa^2+\zeta)\omega^2 s^2)}{\alpha(\alpha+(\phi\kappa^2+\zeta)\omega^2(s^2+(1-s)^2))} \tag{20}$$

Table 5
Descriptive statistics: Monetary analysis.

Variable	Observations	Mean	Std Dev.	Minimum	Maximum
MRR	108	3.01	0.89	2.00	4.75
Forecasted Inflation	108	1.87	0.24	1.14	2.33
Forecasted Growth	108	2.12	0.54	1.27	3.35
Weighted EMU Electoral Pressure	108	19.1	15.5	0.00	60.6
Unweighted EMU Electoral Pressure	108	2.32	1.54	0.00	5.00

Table 6
Descriptive statistics: Fiscal analysis.

Variable	Observations	Mean	Std Dev.	Minimum	Maximum
Primary Balance	320	0.89	3.83	−13.8	11.4
Predetermined Election	320	0.18	0.39	0.00	1.00
Public Debt	320	64.9	29.7	6.80	117.4
Economic Growth	320	0.67	0.95	−2.30	5.80
Inflation	320	2.47	0.96	−0.18	5.56
Informed Voter Index	320	1.30	0.69	0.00	2.47
ECB Capital Share (CS)	320	8.19	8.70	0.19	31.0

Table 7
EMU countries and number of elections.

Country	# Elections	Country	# Elections
Austria	1	Ireland	2
Belgium	2	Italy	2
Finland	2	Luxembourg	1
France	2	The Netherlands	1
Germany	1	Spain	2
Greece	1		

And to assess the effect of country size on the election-year deficit we take the derivative of Eq. (20) with respect to s:

$$\frac{\partial \Delta\tau}{\partial s} = \frac{\alpha\zeta\delta\omega[-\alpha+(\phi\kappa^2+\zeta)\omega^2(2s-3s^2)][\alpha+(\phi\kappa^2+\zeta)\omega^2(s^2+(1-s)^2)]}{\alpha(\alpha+(\phi\kappa^2+\zeta)\omega^2(s^2+(1-s)^2))^2} - \frac{\alpha\zeta\delta(\phi\kappa^2+\zeta)\omega^3(1-s)(4s-2)(\alpha+(\phi\kappa^2+\zeta)\omega^2s^2)}{\alpha(\alpha+(\phi\kappa^2+\zeta)\omega^2(s^2+(1-s)^2))^2} \quad (21)$$

The effect of country size on the deficit during an election is negative if the following condition holds:

$$\alpha\left(\frac{\alpha}{(\phi\kappa^2+\zeta)\omega^2}+s^2+2s-1\right) > (\phi\kappa^2+\zeta)\omega^2(2s-5s^2+4s^3-2s^4) \quad (22)$$

Applying the quadratic formula and knowing that $\alpha > 0$ leads to the following condition for α:

$$\alpha > \frac{(\phi\kappa^2+\zeta)\omega^2(-s^2-2s+1+\sqrt{-(s-1)^3(7s+1)})}{2} \quad (23)$$

To allow for a succinct expression, we define Ω as:

$$\Omega = \frac{(-s^2-2s+1+\sqrt{-(s-1)^3(7s+1)})}{2}, \quad (24)$$

leading to:

$$\alpha > (\phi\kappa^2+\zeta)\omega^2\Omega \quad (25)$$

Equivalent to Inequality (12) in Section 2, Inequality (25) is affected by three components. First, for s large in Ω, it becomes more likely that an *additional* increase in size leads to a decrease in deficit-financed spending in election years. As we have already seen in Eq. (8), deficit-financed spending is less effective for larger countries.

Therefore, in order to get closer to its election year output target (elevated by $\delta\mathbf{E}_i$ in Eq. (1)), the fiscal authority of a larger country should be more reluctant to employ a larger deficit, given the stronger counter-reaction by the central bank. Second, α is the direct utility cost to the government of missing the balanced budget target. Third, $[(\phi\kappa^2+\zeta)\omega^2]$ can be interpreted as the government's utility loss from missing the inflation and the output targets, given that the central bank responds to the government's deficit spending.

There are several similarities with Inequality (12) in Section 2. As before, if α is substantially large to the extent that it exceeds the government's utility loss from missing the inflation and output targets in the case of no central bank response ($s = 0$), an increase in s will always lead to a decline in fiscal manipulation. In the case that α is lower, the response to an additional increase in country size will depend on the initial level of s.

The key difference with respect to Section 2 is that the effect of country size on the right-hand side of the inequality, Ω, is now much more complex, as opposed to the simple $(1-s)^2$ term in Inequality (12). This is the result of allowing government 2 to respond to government 1's output stimulation which lowers government 2's output via the interest rate mechanism. In more detail: The central bank reacts to government 1's stimulus by raising rates, which also negatively impact output in government 2 as they are both member states of the same monetary union. Government 2 finds itself with a country-specific inflation rate below target, and an output level below target, which means that government 2 will always respond to government 1's fiscal stimulus with a fiscal stimulus of its own, even though we set $\mathbf{E}_2 = 0$.

The reason why this mechanism is not directly relevant for the main result is that it works in the same direction as the interaction between the government of country 1 and the central bank. That is, both the central bank, but also government 2, react stronger as the size of country 1 increases. The reactions of both government 2 and the central bank diminish the effectiveness of the fiscal instrument. At lower levels of α and s, it may be optimal for government 1 to counteract the ineffectiveness of its fiscal instrument by using it more. However, as country size increases, the net benefits of fiscal manipulation ultimately decline to the point where it is more optimal to submit to the deterrence of the central bank, and now also to that of government 2. (The main result shows this effect without the strategic response by government 2.)

Fig. 3 graphically represents the theoretical relationship between country size and the increase in fiscal manipulation for two values of α. In panel A, we assume a value of α which is larger than 0, but lower than $(\phi\kappa^2+\zeta)\omega^2$.[36] Our condition (Inequality (25)) is only fulfilled for certain values of Ω. An increase in country size leads to increased fiscal manipulation up to a country size of about 0.4, after which country size

[36] In this case, $\alpha = 0.5$. From the literature, we infer that κ should be stable between 0.1 and 0.15. Jarociński and Lenza (2018) estimate the slope of the Philips curve for the euro area for the 2003–2016 period. In this case, $\kappa = 0.1$. Further, we posit that ϕ and ζ (the two coefficients in the loss function, Eq. (1)), should be stable, positive, and not extremely large. In this case, $\phi = \zeta = 1$. Lastly, we assume a stable economic environment, which implies a period with government multiplier $\omega = 1$ (Amendola et al., 2020).

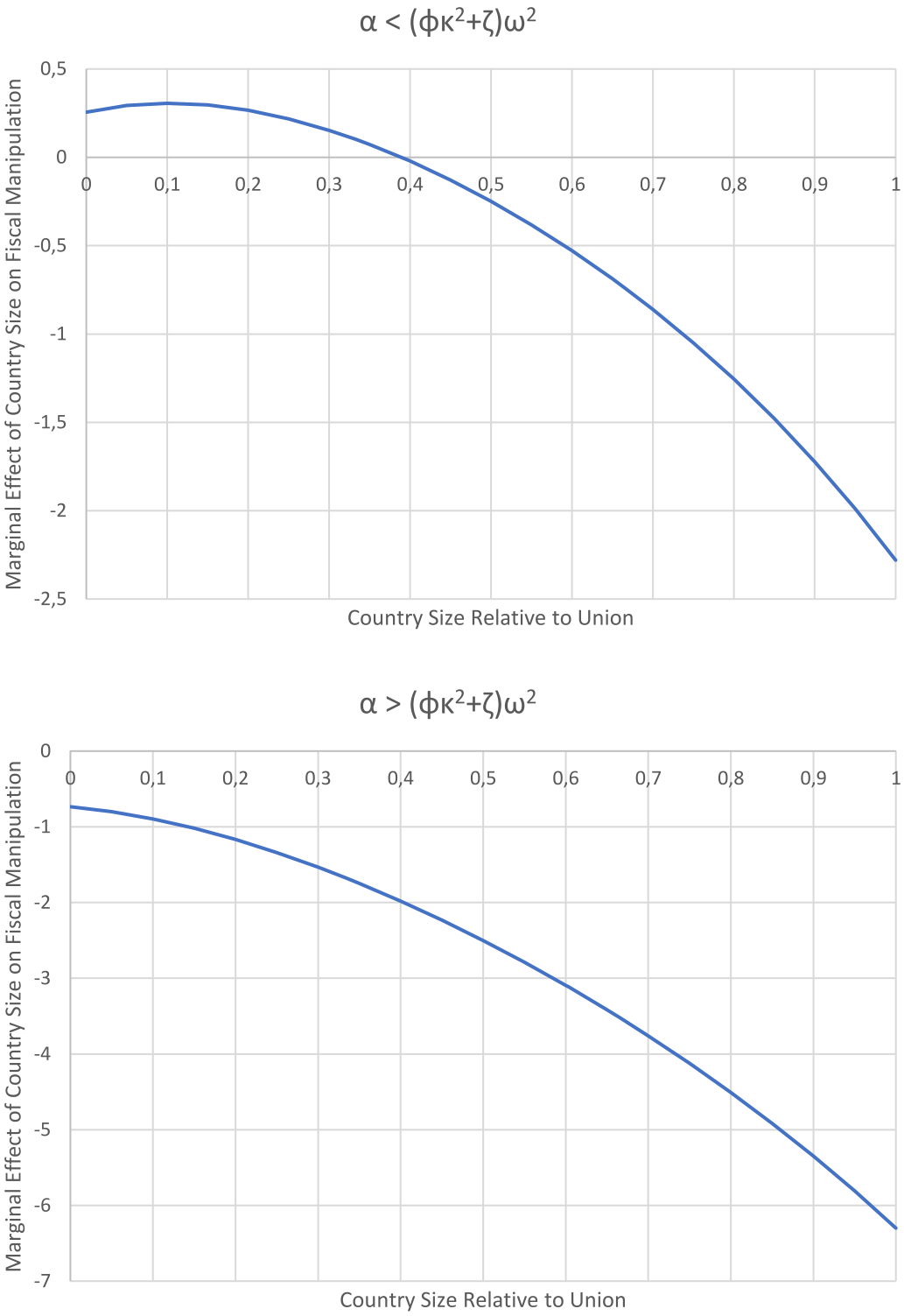

Fig. 3. Marginal impact of country size on fiscal manipulation depending on α.

decreases fiscal manipulation. In panel B, we assume a value of α larger than $(\phi\kappa^2+\zeta)\omega^2$.[37] When the direct cost of the deficit is this large, our condition is always fulfilled. An increase in country size will always reduce fiscal manipulation, regardless of the initial level of country size. This case is more in line with our empirical finding, i.e. that smaller countries free-ride in that they manipulate their fiscal policy more than larger countries.

Appendix B. Additional sample information

Table 5 shows the descriptive statistics of our monetary sample:
Table 6 shows the descriptive statistics of our fiscal sample:
Table 7 shows a list of all the countries, and the number of elections that are included in the main sample.

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[37] In this case, $\alpha = 1.5$.