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## **THE CHOICE OF FISCAL REGIMES IN THE WORLD**

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### **Resumen**

Los esquemas de política fiscal son cada vez más frecuentes en gobiernos que aspiran a estabilizar el ciclo económico y aumentar la resiliencia de las finanzas públicas frente a las presiones políticas. Este artículo presenta una amplia exploración empírica de las explicaciones posibles a la elección de régimen de política fiscal en los países. Además, se conforma y utiliza un amplio conjunto de datos de panel mundial para el trato y control de grupos de países, aplicando técnicas de estimación de datos de panel para variables dependientes de elección discreta, y se realizan pruebas de robustez para distintos grupos de control y períodos de tiempo. La evidencia muestra que la probabilidad de tener un régimen fiscal en vigor aumenta robusta y significativamente con el equilibrio fiscal, la estabilidad del gobierno y el PIB per cápita, y disminuye con el coeficiente de dependencia y el carácter procíclico del gasto.

### **Abstract**

Fiscal policy regimes are increasingly adopted by governments that aim at contributing to stabilize business cycles and make public finances more resilient to political pressure. This paper presents a comprehensive empirical exploration of the possible explanations of why countries choose fiscal policy regimes. The paper puts together and uses a large world panel dataset for treatment and control country groups, applies five panel-data estimation techniques for discrete-choice dependent variables, and conducts robustness checks for different control groups and time periods. The paper's evidence shows that the likelihood of having a fiscal regime in place increases significantly and robustly with the government balance, government stability, and GDP per-capita, and declines with dependency ratio and expenditure procyclicality.

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## 1. Introduction

The old debate on the role of macroeconomic policy in the economy stabilization was divided between those people who believe in the supremacy of monetary policy as the key economic policy tool and those that restate the effectiveness of fiscal policy on fostering aggregate demand through the operation of the so-called multiplier effects.

The literature, in general, has been influenced by the first advocates. Thus, early, Friedman (1968) proposed the money-growth constant rule for monetary policy due to the fact that monetary policy lags were so long and variable. Later, Taylor (1993) unveiled the practice of monetary policy in the U.S. by noting that Fed seems to move the interest policy rate as a function of deviation of GDP and inflation rate from target values or potential levels, spawning the explosion of the Taylor-rule literature in the academic realm.

Fiscal matters, instead, have received less attention mainly in the theoretical ground<sup>1</sup> and perhaps, consequently, the same occurred in the fiscal rules area.

Perhaps, the more prominent example of fiscal rules is the set of guidelines in fiscal matters contained in the Maastricht convergence criteria, and later in the Stability and Growth Pact of 1997 for European countries. These guidelines establish that the government budget deficit should not be in excess of 3 percent of each country-member GDP and that the gross debt to GDP ratio should not exceed 60 percent. These can be considered as flow and stock fiscal rules, respectively.

It is not surprising that the application of fiscal rules based on targeting of flows (e.g. numerical targets on fiscal deficits or ceilings imposed on fiscal expenditure) and/or stocks (e.g. ceilings applied to debt to GDP ratio) can result fruitless for an intertemporal and countercyclical policy view. The use of this kind of fiscal rules has been spurred mainly in the developed world (e.g. United Kingdom, Switzerland, Sweden and New Zealand) as a tool for being neutral during the cycle. Recently, Chile in 2001 adopts a structural fiscal rule following a same reasoning but also taking into account the deviation of copper price for its permanent value.

Even though the benefits of applying fiscal rules are well-known (since the contribution of Kydland and Prescott in 1977) the study of possible macroeconomic and institutional determinants behind the choice of a fiscal regime has been an unexplored area. In this paper, we try to fill this void by providing a comprehensive assessment of the determinants

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<sup>1</sup> Cochrane (2000) restate the role of fiscal policy focusing in a particular area, say the price level determination.

suggested by theory and the empirical practice in the likelihood of adopting a fiscal regime (in form of a flow, stock or even, countercyclical regime).

The paper is laid out as follows. The next section introduces the general specification for the probability of having a fiscal regime in place and describes the panel-data methods for discrete-choice dependent variables that are applied subsequently. Section 3 describes the data and stylized facts reflected by descriptive statistics and correlations. Estimation results are reported subsequently. Section 5 concludes.

## 2. Specification and Estimation Technique

Our general specification for the choice of a fiscal regime (that is, the likelihood of having a fiscal regime in place) broadens the set of potential determinants of the latter choice proposed by us. We start with a wide set of pre-conditions, which have been partly identified in the related theoretical literature. Table 1 list the full set of regressors used in this paper, identifying expected and estimated coefficient signs.

We allow for the role of institutional variables proxied by two measures. The first one is perhaps the most direct measure for the capability of a government for staying at office by carrying out serious and non-popular policy guidelines. The other variable is broader and consequently we expect that if included, it could compromise the empirical role of the rest of variables. We also control for some variables considered as structural, like the government balance, dependency ratio and the expenditure procyclicality.

Regarding the results, we expect that fiscal surplus raises the likelihood of adopting a fiscal regime as it is easier to adopt a fiscal regime when fiscal accounts are equilibrated or exhibit a favorable gap. Moreover, as the dependency ratio and expenditure procyclicality are included for taking into account structural preconditions for adopting a fiscal regime, we expected that positive/high values of these variables were associated to a positive likelihood for not adopting such a regime, reflecting an immature stadium for implementing fiscal rules. Finally, we expect that highly institutionalized and stable governments would be more prone to adopt a fiscal regime.

We exploit the cross-section and time dimensions of our world sample by using panel-data estimation techniques. The general specification of our regression model for the likelihood of having fiscal regime in place is as follows:

$$Y_{i,t} = \mu_i + \delta' X_{i,t} + \varepsilon_{i,t} \quad (1)$$

where  $Y$  is a vector of discrete-choice country-year variables for the fiscal regime (a dummy that takes a value of 1 for having a fiscal regime in place, 0 otherwise),  $X$  is a matrix of country-year explanatory variables that were introduced above,  $\mu$  is a vector of individual country effects that reflect unobservable country heterogeneity,  $\delta$  is a vector of slope coefficients that are common to all countries,  $\varepsilon$  is a vector of error terms, and  $i$  and  $t$  are country and time indexes, respectively.

Equation (1) is estimated using discrete-choice panel-data models, assuming either a logistic distribution (a logit model) or a normal distribution (a probit model) of the error term.

Any source of unobservable heterogeneity that may explain the decision of whether to adopt a fiscal regime is captured by individual country effects. The first approach to deal with this setup would be estimating individual effects jointly with the model's slope parameters. However, this practice has the problem that the joint estimation of country effects and slope parameters causes inconsistency of the latter in an asymptotic plan with large  $N$  and finite  $T$  (which is our case), a result due to Neyman and Scott (1948) and known as the incidental parameters problem. The incidental parameters are in this case the fixed effects because they compromise the large sample properties of  $\delta^2$ . In discrete-choice panel-data models the removal of the fixed effects is not as easy as in the linear panel-data model (e.g. the within estimator) and the strategy for doing so hinges on the specification of the model.<sup>3</sup> The basic fixed-effects discrete-choice panel-data estimator is known as the Conditional Logit Estimator (CLE) due to Andersen (1970) and extended by Chamberlain (1980).<sup>4</sup>

CLE evaluates the likelihood function as conditional on sufficient statistics that restrict estimation to those individuals whose choice varies over time. This means that CLE only

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<sup>2</sup> It could be argued that this asymptotic plan does not hold in a country panel data set since we know that  $N$  is fixed and  $T$  could be very large. However, it seems to be that the large sample properties do not depend on the physical properties and that it is enough to have  $N$  larger than  $T$ . We thank Manuel Arellano for this clarification.

<sup>3</sup> See Honoré and Kyriazidou (2000) for an analysis of the conditions for removing fixed effects in dynamic discrete choice models.

<sup>4</sup> It is worth emphasizing that the extension of this method to the case of normally distributed errors is unfeasible in practice because it involves evaluation of many integrals, which is very computer-intensive.

considers individual *movers* in the likelihood function.<sup>5</sup> Therefore the drawback of CLE is that sample size is reduced by all individuals that are *stayers* over the sample period time.

The panel-data literature distinguishes between fixed and random-effects estimators. In the case of discrete-choice models, selection between the two latter estimators is determined by different aspects than those found for linear models. CLE, the only feasible fixed-effects estimator for discrete-choice panel data, eliminates individual effects. The random effects estimator does not remove individual country effects; it assumes a typically normal distribution between individual effects and the variables of the model, using for the latter purpose semi non-parametric simulation techniques. Discrete-choice random effects for panel data is feasible available for both logit and normal distributions of the error term.

Hence the trade-off between the fixed-effects CLE and the random-effects estimator for discrete-choice panel-data is the benefit of robustness of the former (as it is not restricted by any assumption on the joint distribution of individual effects and explanatory variables) and the benefit of larger sample size of the latter.

Finally our estimation model is subject to potential endogeneity bias. For example, adoption of a fiscal regime may strengthen the fiscal position or act in favor of a counter-cyclical fiscal position— two key potential determinants of having a fiscal regime in place. Recent theoretical contributions by Arellano and Carrasco (2003) deal with this issue in the context of discrete-choice panel-data models using instrumental variables techniques, respectively. Yet the stringent assumptions on which the latter solutions rely are not very attractive. Therefore we follow an alternative approach by using first lags of most independent variables.

### 3. Data and Stylized Facts

Before turning to the regression results in the next section, we describe briefly our sample data, focusing on their distribution and pair-wise simple correlations.<sup>6</sup> Table 2 lists 111 countries that comprise our full sample by income groups. Figure 1 depicts the time trend of our dependent variable: the number of countries with a fiscal regime during the full time sample. These countries grew from less than 5 countries during most of 70s and 80s

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<sup>5</sup> In order to clarify the notion of a sufficient statistic consider the case of a binary choice panel-data set with two periods ( $T=2$ ). A sufficient statistic is given by a sum of observations equal to 1, since only in this case we know that the possible pairs are (0,1) and (1,0). Therefore the conditional fixed-effects estimator only considers individuals with choices that sum unity for all (two) periods.

<sup>6</sup> Data sources and definitions are discussed in the data appendix.

to 30 countries 15 years later. Indeed, this number starts to increase at the beginning of 90s.

Figure 2 (3) plots the country distributions of five independent variables for the full sample (separately for countries with and without a fiscal regime) by box plots. The boxes in each box plot account for all observations within the 25-50 and 50-75 percentile range of variable distribution. Medians are reported as thin white lines inside each box. Outliers – observations falling outside the 25-75 percentile ranges – are depicted as dots.

The following stylized facts emerge from Figure 2. The first panel report government budget balance ratio to GDP reflecting a trend increase in its median and reduction in its dispersion, consistent with fiscal strengthening observed in industrial and developing countries alike since the 1980s. Dependency ratio reflects an increase in its asymmetry as shown by the decreasing median across the time, with a slightly reduction in its dispersion during the last decade. Government stability exhibits an interesting pattern across the time. In the middle of 90s this qualitative measure reflects a time break around this period reflecting a change in the perception of the capability of governments to stay in office by fulfilling their main policy guidelines around the world. Expenditure procyclicality are biased toward positive values (hence, showing that a procyclical fiscal policy is a general pattern), although the median is corrected towards a more equally balanced distribution in the last decade. World median growth is reflected by the trend rise in the median per-capita GDP level, with little change in cross-country GDP dispersion over time.

Now let's turn to a comparison of medians and dispersions observed by the five latter independent variables in the treatment and control groups of country-year observations (Figure 3). It is difficult to arrive to clear conclusions on the comparison between medians across the choice of having or not in place a fiscal regime. We can say only that countries with some fiscal regime have a lower dependency ratio than countries without a fiscal regime.

Now we turn to the last piece of descriptive data statistics: cross-country and panel-data pair-wise correlations between our model variables reported in the upper and lower diagonal matrixes in Table 3, respectively. Three results emerge. First, there is not much difference between cross-country and panel-data correlation coefficients. Second, correlations between the fiscal regime dummy and most independent variables are significant and exhibit expected signs. Finally only two pairs of correlations between regressors are highly significant and large: it is the -0.8 correlation between dependency ratio and per-capita GDP (at both dimensions) and the 0.6 correlation between



government stability and GDP per-capita (only in the cross-section calculations). The latter correlations figures should be kept in mind when discussing our results below.

#### 4. Empirical results

We report estimation results for the choice of a fiscal regime (the likelihood of having a fiscal regime in place), based on equation (1). Our empirical strategy starts with reporting full-sample results for different specifications based on fixed and random-effects probit models (Table 4). Then we test for robustness by broadening our use of estimation techniques, reporting results based on pooled logit and probit models (which do not account for country heterogeneity), and on the random-effects probit model (Table 5). Subsequently we test our model for different sub-samples comprised by country groups according to income levels (Table 6) and a shorter time period (Table 7). We discuss the results subsequently.

Table 4 reports estimation results for 3 fixed-effect and 3 random-effect specifications, based on logit estimations. This set of specifications arises because we consider two alternative measures for the degree of institutional development. We report results coming for considering both measures.

The stiff trade-off between fixed-effect and random-effect results – robustness of the former versus larger sample size of the latter – is reflected by the large sample size difference in our results (some 712 country-year observations for fixed-effect and 2055 observations for random-effect estimations). The treatment group is the same under fixed and random effects – it is comprised by all country-year observations of countries with fiscal regime since their starting dates. Under fixed effects, the full sample is comprised only by those countries only – hence the control group is comprised only by fiscal regime country observations before they started the regime. In contrast, under random effects, the control group is broadened to include all country-year observations of 51 non-fiscal regime countries. Hence one should exercise care in comparing results across estimations based on such large differences in control groups and overall sample size.

We find significant evidence for the influence of our five variables on having a fiscal regime in place. This evidence is generally robust across fixed-effects and random-effects estimations, notwithstanding their large sample differences.

The first variable – government budget balance – is reflected by a positive, highly significant coefficient. Dependency ratio and our measure of expenditure procyclicality

exhibit the expected signs and are highly significant, as well. Hence, countries with a high proportion of dependent people (less than 15-year and older than 64) have a positive likelihood for not adopting a fiscal regime, reflecting the influence of child-care and pension programs as government responsibilities. This likelihood is also positive for countries whose fiscal expenditure commoves positively with output. These latter variables reflect the fact that in the near future, these kinds of countries have not the institutional tools for carrying out fiscal reforms in order to achieve a sustainable fiscal policy. Our alternative institutional variables also have the expected signs showing that stable governments are more prone to adopt a fiscal regime.

Next we broaden our search for robustness by subjecting several specifications to alternative estimation techniques. To a selective sub-set of our previous estimations, we add results for pooled data (without controlling for country heterogeneity), using both logit and probit models, and for random effects using a probit model (Table 5). For robustness analysis, we also report results for a logit-model random-effects estimation using the same (small) sample to which the comparable logit-model fixed-effects estimation is restricted. We derive two conclusions from these results. First, results in table 5 mimic, in terms of signs and statistical significance, those findings we sketched referring to table 4. Second, when we use the fixed-effect estimator, government balance is no longer significant, which is a similar result found when we run the random-effect regression with the restricted sample.

Extending our search for robustness using different control groups, we reduce our full-sample control-group comprised by all countries without a fiscal regime (results re-stated for comparison in columns 1-4 of Table 6) by focusing sequentially on results based on countries without a fiscal regime by income levels (results reported in columns 5-10 in table 6).<sup>7</sup> Most results remain largely unchanged, supporting robustness to different control groups. The one exception is the government balance, which turns out to be significant in our baseline regressions but is not significant when we vary the control group.

Next we focus on a shorter time period, starting in 1990 throughout our sample's end-year (2005). The estimation is based on the full country sample available under random effects.<sup>8</sup> The results, reported in columns 5-8 of Table 7, confirm significance of dependency ratio, expenditure procyclicality, government stability and GDP per-capita but reject a strong significant contribution of the government balance in the random-effect

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<sup>7</sup> We report only random-effects estimation results because fixed-effects estimation excludes all countries without fiscal regime, as discussed above.

<sup>8</sup> We were not able of obtaining convergence for fixed-effects estimations.

setup. Instead, this latter variable becomes not significant when we run fixed-effects estimations.

## **5. Conclusions**

In this paper, which is unique to the best of our knowledge, we find empirical evidence on the role of variables that summarize the capability of governments and structural issues for applying fiscal rules. Thus, variables associated to the degree of institutional development (i.e. government stability and GDP per-capita) play a role in favor of the probability of adopting a fiscal regime. Moreover, a high dependency ratio and a fiscal expenditure which commoves positively with output are included for reflecting the fact that not prepared countries are less prone to adopt a fiscal regime. Hence, previous fiscal reforms are needed for implementing successfully fiscal rules.

These results are quite robust to alternative specifications, econometric methods and time samples. The only one exception in government balance which becomes not significant when we vary the control group and restrict the time sample.

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## 7. Data Appendix

We construct an annual panel data set comprised of 111 countries for the period 1975-2005. See the list of countries in table 2.

For the dependent variable we construct a dummy variable which is set equal to 1 if the country has in place any form of fiscal rule (based on flows, stocks or countercyclical), and 0 otherwise. Our classification relies mainly in the classification found in Kopits and Simansky (1998), Kopits (2001), Kopits (2004) and OECD.

For the right-hand side variables we use primarily the World Bank data set (World Development Indicators) because it seems to be a revised version of the IFS database constructed by the IMF. This is the case for the dependency ratio and GDP per capita.

The overall budget balance is assembled based on the Government Financial Statistics (prepared by the IMF), the Economist Intelligence Unit and figures found in official government's web pages. The measure of government stability is taken for the ICRG database. We construct a measure for expenditure procyclicality as the rolling correlation coefficient between fiscal expenditure and GDP in local currency. These variables were obtained from the IFS database.

The details on the construction and the sources of all these variables we used in the estimations are shown in table 1.

**Table 1: Determinants of choice of fiscal regimes**

<b>Variable</b>	<b>Description</b>	<b>Source</b>	<b>Expected signs</b>	<b>Estimated signs</b>
Government budget balance	Government overall budget balance	GFS and EIU	Positive	Positive
Dependency ratio	Depends on working-age population. Dependents are people younger than 15 or older than 64. Working-age population is people ages between 15 and 64.	WDI (2007)	Negative	Negative
Government stability	It reflects the government's ability to carry out its declared programs, and its ability to stay in office. It is the sum of 3 categories (0-4, with low values for high risk). The sub-components are: government unity, legislative strength, and popular support. It assigns a value of 0 (4) for very high (low) risk.	Index of Country Risk Guide (ICRG)	Positive	Positive
Expenditure procyclicality	Calculated as the correlation between the HP-filtered figures for fiscal expenditure and GDP	IFS (2007), IMF	Negative	Negative
GDP per capita	Log of the GDP per capita	WDI (2007)	Positive	Positive

*Source: Own elaboration*

*Notes:*

*WDI: World Development Indicators*

*GFS: Government Financial Statistics*

*EIU: The Economist Intelligence Unit*

*IFS: International Financial Statistics+*

**Table 2: Country sample****Sample Countries***Annual data, 1975-2005***High income OECD (24)**

AUS	Australia	FRA	France	JPN	Japan	PRT	Portugal
AUT	Austria	DEU	Germany	KOR	Korea	ESP	Spain
BEL	Belgium	GRC	Greece	LUX	Luxembourg	SWE	Sweden
CAN	Canada	ISL	Iceland	NLD	Netherlands	CHE	Switzerland
DNK	Denmark	IRL	Ireland	NZL	New Zealand	GBR	United Kingdom
FIN	Finland	ITA	Italy	NOR	Norway	USA	United States

**High income non OECD (8)**

ISR	Israel	KWT	Kuwait
ARE	United Arab Emirates	SAU	Saudi Arabia
CYP	Cyprus	SGP	Singapore
HKG	Hong Kong	SVN	Slovenia

**Upper middle income (23)**

ARG	Argentina	HRV	Croatia	MYS	Malaysia	TTO	Trinidad and Tobago
BWA	Botswana	EST	Estonia	OMN	Oman	TUR	Turkey
CRI	Costa Rica	HUN	Hungary	PAN	Panama	URY	Uruguay
CHL	Chile	LBN	Lebanon	POL	Poland	VEN	Venezuela
CZE	Czech Republic	MEX	Mexico	ROM	Romania	ZAF	South Africa
GAB	Gabon	MUS	Mauritius	SVK	Slovak Republic		

**Lower middle income (27)**

BRA	Brazil	DOM	Dominican Republic	IRN	Iran, Islamic Rep.	PRY	Paraguay
BGR	Bulgary	DZA	Algeria	JAM	Jamaica	PHL	Philippines
BOL	Bolivia	ECU	Ecuador	JOR	Jordan	SLV	El Salvador
COL	Colombia	EGY	Egypt, Arab Rep.	LKA	Sri Lanka	SYR	Syrian Arab Republic
CHN	China	GTM	Guatemala	MAR	Morocco	THA	Thailand
CMR	Cameroon	HND	Honduras	NIC	Nicaragua	TUN	Tunisia
COG	Congo, Rep.	IDN	Indonesia	PER	Peru		

**Lower income (29)**

BEN	Benin	HTI	Haiti	PAK	Pakistan	TZA	Tanzania
BFA	Burkina Faso	IND	India	PNG	Papua New Guinea	UGA	Uganda
BGD	Bangladesh	KEN	Kenya	RWA	Rwanda	ZAR	Congo, Dem. Rep.
CIV	Côte d'Ivoire	MDG	Madagascar	SDN	Sudan	ZMB	Zambia
ETH	Ethiopia	MLI	Mali	SEN	Senegal	ZWE	Zimbabwe
GHA	Ghana	MWI	Malawi	SLE	Sierra Leone		
GIN	Guinea	NER	Niger	TCO	Chad		
GMB	Gambia, The	NGA	Nigeria	TGO	Togo		

**Table 3: Pair-wise correlations**

<b>pair-wise correlations</b>	dummy regime	government budget balance	dependency ratio	government stability	expenditure procyclicality	GDP per capita
dummy regime	1	<b>0.075</b>	<b>-0.355</b>	<b>0.277</b>	-0.003	<b>0.375</b>
government budget balance	<b>0.146</b>	1	<b>-0.247</b>	<b>0.226</b>	<b>0.183</b>	<b>0.251</b>
dependency ratio	<b>-0.260</b>	<b>-0.219</b>	1	<b>-0.569</b>	<b>0.289</b>	<b>-0.852</b>
government stability	<b>0.184</b>	<b>0.173</b>	<b>-0.404</b>	1	<b>-0.255</b>	<b>0.630</b>
expenditure procyclicality	-0.010	0.017	<b>0.126</b>	<b>-0.094</b>	1	<b>-0.228</b>
GDP per capita	<b>0.294</b>	<b>0.191</b>	<b>-0.808</b>	<b>0.366</b>	<b>-0.105</b>	1

*Source: Own elaboration based on the WDI data set.*

*Numbers in bold denote correlation coefficients statistically significant at 5 percent at maximum*

*Numbers in the inferior triangle are the cross correlations across the time and countries (pooled correlations) while the numbers in the superior triangle are cross correlations across countries (among time demeaned variables)*



**Table 4**  
**Choice of Fiscal Regime: full sample estimations**

*Dependent variable: dummy for fiscal regime (with the regime=1, without the regime=0)*

*Estimation methods: Discrete choice panel data models*

*Sample: 1975-2005 (annual data)*

	Fixed Effects			Random Effects		
	1	2	3	4	5	6
Government budget balance	0.174 (0.03)	1.732 (0.25)	35.365 *** (6.79)	8.337 (1.29)	11.785 * (1.87)	36.811 *** (7.15)
Dependency ratio	-54.833 *** (5.05)	-57.268 *** (5.33)	-51.562 *** (7.94)	-42.595 *** (5.37)	-45.096 *** (7.04)	-45.996 *** (7.59)
Expenditure procyclicality (10 years)	-2.18 ** (2.38)	-1.990 ** (2.20)	-1.531 *** (3.23)	-2.195 *** (2.84)	-1.945 ** (2.51)	-1.362 *** (2.89)
Government stability	0.149 (1.27)	- -	0.357 *** (4.40)	0.262 ** (2.38)	- -	0.377 *** (4.59)
GDP per capita	30.011 *** (7.50)	31.507 *** (7.81)	- -	23.33 *** (17.36)	24.688 *** (17.77)	- -
Constant	- -	- -	- -	-209.577 *** (14.47)	-217.869 *** (14.65)	18.109 *** (5.35)
Observations	712	712	712	2005	2055	2005
Total number of countries	24	24	24	75	75	75
Countries with fiscal regime	24	24	24	24	24	24
Countries without fiscal regime (control group)	0	0	0	51	51	51
LR statistic	529.3	527.7	310.4	477.3	604.0	113.8
p-value	0.00	0.00	0.00	0.00	0.00	0.00

*Note: Absolute value of z statistics in parentheses*

*\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%*

**Table 5**

**Choice of Fiscal Regime: sensitivity to different estimation techniques**

*Dependent variable: dummy for fiscal regime (with the regime=1, without the regime=0)*

*Estimation methods: Discrete choice panel data models*

*Sample: 1975-2005 (annual data)*

*Preferred estimation techniques*

	Logit panel data models								Probit panel data models			
	Pooled		Random effects		Random effects		Fixed effects		Pooled		Random effects	
	1	2	3	4	5	6	7	8	9	10	11	12
Government budget balance	9.694 *** (5.29)	9.927 *** (5.30)	11.785 * (1.87)	36.811 *** (7.15)	10.398 (1.49)	36.358 *** (7.25)	1.732 (0.25)	35.365 *** (6.79)	5.154 *** (5.11)	5.005 *** (4.91)	6.652 * (1.85)	20.353 *** (7.26)
Dependency ratio	-3.914 *** (4.61)	-6.103 *** (9.97)	-45.096 *** (7.04)	-45.996 *** (7.59)	-53.662 *** (5.27)	-40.78 *** (6.78)	-57.268 *** (5.33)	-51.562 *** (7.94)	-1.899 *** (4.73)	-3.006 *** (10.22)	-25.127 *** (5.74)	-26.005 *** (7.70)
Expenditure procyclicality (10 years)	0.331 * (1.78)	0.276 (1.50)	-1.945 ** (2.51)	-1.362 *** (2.89)	-2.155 ** (2.52)	-1.076 ** (2.31)	-1.990 ** (2.20)	-1.531 *** (3.23)	0.217 ** (2.16)	0.197 ** (1.97)	-0.748 * (1.86)	-0.823 *** (3.12)
Government stability	- (3.38)	0.134 *** (3.38)	- (4.59)	0.377 *** (4.59)	- (4.46)	0.362 *** (4.46)	- (4.40)	0.357 *** (4.40)	- (3.66)	0.079 *** (3.66)	- (4.43)	0.202 *** (4.43)
GDP per capita	0.621 *** (4.79)	- (4.79)	24.688 *** (17.77)	- (17.77)	27.498 *** (7.63)	- (7.63)	31.507 *** (7.81)	- (7.81)	0.340 *** (5.37)	- (5.37)	12.898 *** (8.36)	- (8.36)
Constant	-4.831 *** (2.98)	1.099 ** (1.98)	-217.869 *** (14.65)	18.109 *** (5.35)	-234.775 *** (7.10)	19.224 *** (5.74)	- (7.10)	- (5.74)	-2.852 *** (3.65)	0.285 (0.99)	-113.450 *** (9.12)	10.367 *** (5.41)
Observations	2005	2005	2055	2005	712	712	712	712	2055	2005	2055	2005
Total number of countries	75	75	75	75	24	24	24	24	75	75	75	75
Countries with fiscal regime	24	24	24	24	24	24	24	24	24	24	24	24
Countries without fiscal regime (control group)	51	51	51	51	0	0	0	0	51	51	51	51
LR statistic	305.0	259.2	604.0	113.8	82.3	100.4	527.7	310.4	301.7	254.3	108.2	128.4
p-value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

*Note: Absolute value of z statistics in parentheses*

*\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%*

**Table 6**  
**Choice of Fiscal Regime: sensitivity to alternative control country groups**

*Dependent variable: dummy for fiscal regime (with the regime=1, without the regime=0)*

*Estimation methods: Discrete choice panel data models*

*Sample: 1975-2005 (annual data)*

*Different country control groups*

	Country control group									
	All countries				High-income OECD countries		Middle-income countries		Low-income countries	
	Random effects		Fixed effects		Random effects		Random effects		Random effects	
	1	2	3	4	5	6	7	8	9	10
Government budget balance	11.785 *	36.811 ***	1.732	35.365 ***	9.787	36.481 ***	9.205	36.946 ***	9.961	36.629 ***
	(1.87)	(7.15)	(0.25)	(6.79)	(1.44)	(7.13)	(1.35)	(7.20)	(1.44)	(7.19)
Dependency ratio	-45.096 ***	-45.996 ***	-57.268 ***	-51.562 ***	-52.692 ***	-43.292 ***	-53.493 ***	-44.983 ***	-52.176 ***	-43.107 ***
	(7.04)	(7.59)	(5.33)	(7.94)	(7.21)	(7.14)	(5.53)	(7.49)	(7.00)	(7.24)
Expenditure procyclicality (10 years)	-1.945 **	-1.362 ***	-1.990 **	-1.531 ***	-2.271 ***	-1.356 ***	-2.231 **	-1.337 ***	-2.236 ***	-1.295 ***
	(2.51)	(2.89)	(2.20)	(3.23)	(2.66)	(2.87)	(2.56)	(2.84)	(2.63)	(2.74)
Government stability	-	0.377 ***	-	0.357 ***	-	0.386 ***	-	0.375 ***	-	0.384 ***
	-	(4.59)	-	(4.40)	-	(4.71)	-	(4.58)	-	(4.69)
GDP per capita	24.688 ***	-	31.507 ***	-	28.052 ***	-	29.045 ***	-	27.925 ***	-
	(17.77)	-	(7.81)	-	(10.46)	-	(9.99)	-	(8.47)	-
Constant	-217.869 ***	18.109 ***	-	-	-232.661 ***	20.383 ***	-252.680 ***	19.056 ***	-232.315 ***	21.227 ***
	(14.65)	(5.35)	-	-	(8.67)	(5.60)	(10.13)	(5.56)	(7.33)	(5.85)
Observations	2055	2055	712	712	952	937	1512	1492	1249	1204
Total number of countries	75	75	24	24	32	32	54	54	44	44
Countries with fiscal regime	24	24	24	24	24	24	24	24	24	24
Countries without fiscal regime (control group)	51	51	0	0	8	8	30	30	20	20
LR statistic	604.0	113.8	527.7	310.4	180.7	110.9	124.4	113.2	125.7	111.4
p-value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

*Note: Absolute value of  $\chi^2$  statistics in parentheses*

*When we allow for different country control groups we consider both the countries that have the regime in place (movers) and those countries that have not experienced a regime change (stayers)*

*\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%*

**Table 7**  
**Choice of Fiscal Regime: sensitivity to alternative time samples**

*Dependent variable: dummy for fiscal regime (with the regime=1, without the regime=0)*

*Estimation methods: Discrete choice panel data models*

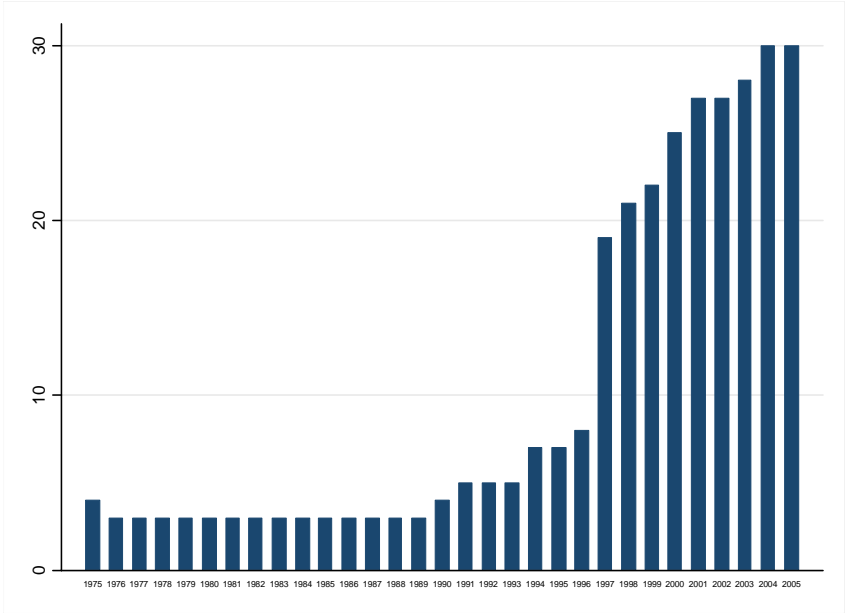
*Different time samples*

	1975-2005 (full sample)				1990-2005			
	Fixed effects		Random effects		Fixed effects		Random effects	
	1	2	3	4	5	6	7	8
Government budget balance	1.732 (0.25)	35.365 *** (6.79)	11.785 * (1.87)	36.811 *** (7.15)	2.210 (0.31)	17.629 *** (2.70)	12.388 * (1.71)	20.397 *** (3.24)
Dependency ratio	-57.268 *** (5.33)	-51.562 *** (7.94)	-45.096 *** (7.04)	-45.996 *** (7.59)	-53.454 *** (4.04)	-59.082 *** (5.41)	-48.226 *** (3.87)	-45.835 *** (5.06)
Expenditure procyclicality (10 years)	-1.990 ** (2.20)	-1.531 *** (3.23)	-1.945 ** (2.51)	-1.362 *** (2.89)	-1.676 * (1.71)	-1.785 ** (2.29)	-1.702 * (1.80)	-1.223 (1.63)
Government stability	- -	0.357 *** (4.40)	- -	0.377 *** (4.59)	- -	0.683 *** (6.20)	- -	0.683 *** (6.27)
GDP per capita	31.507 *** (7.81)	- -	24.688 *** (17.77)	- -	28.908 *** (6.85)	- -	23.287 *** (5.99)	
Constant	- -	- -	-217.869 *** (14.65)	18.109 *** (5.35)	- -	- -	-204.744 *** (5.51)	16.171 *** (3.46)
Observations	712	712	2055	2005	384	384	1167	1166
Total number of countries	24	24	75	75	24	24	75	75
Countries with fiscal regime	24	24	24	24	24	24	24	24
Countries without fiscal regime (control group)	0	0	51	51	0	0	51	51
LR statistic	527.7	310.4	604.0	113.8	231.6	164.9	56.8	73.4
p-value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

*Note: Absolute value of z statistics in parentheses*

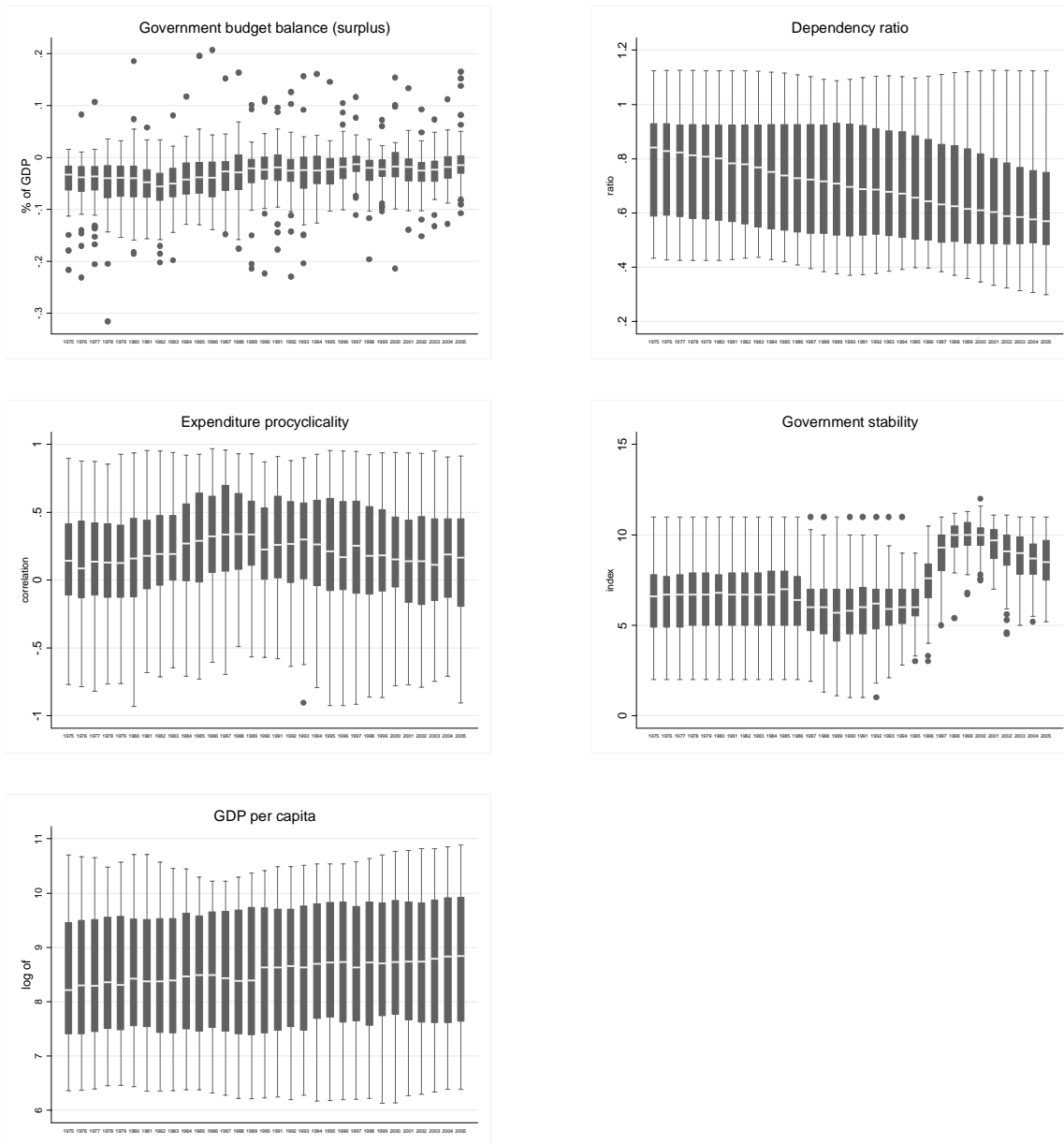
*\* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%*

**Figure 1: Adoption of Fiscal Regimes  
(number of countries)**



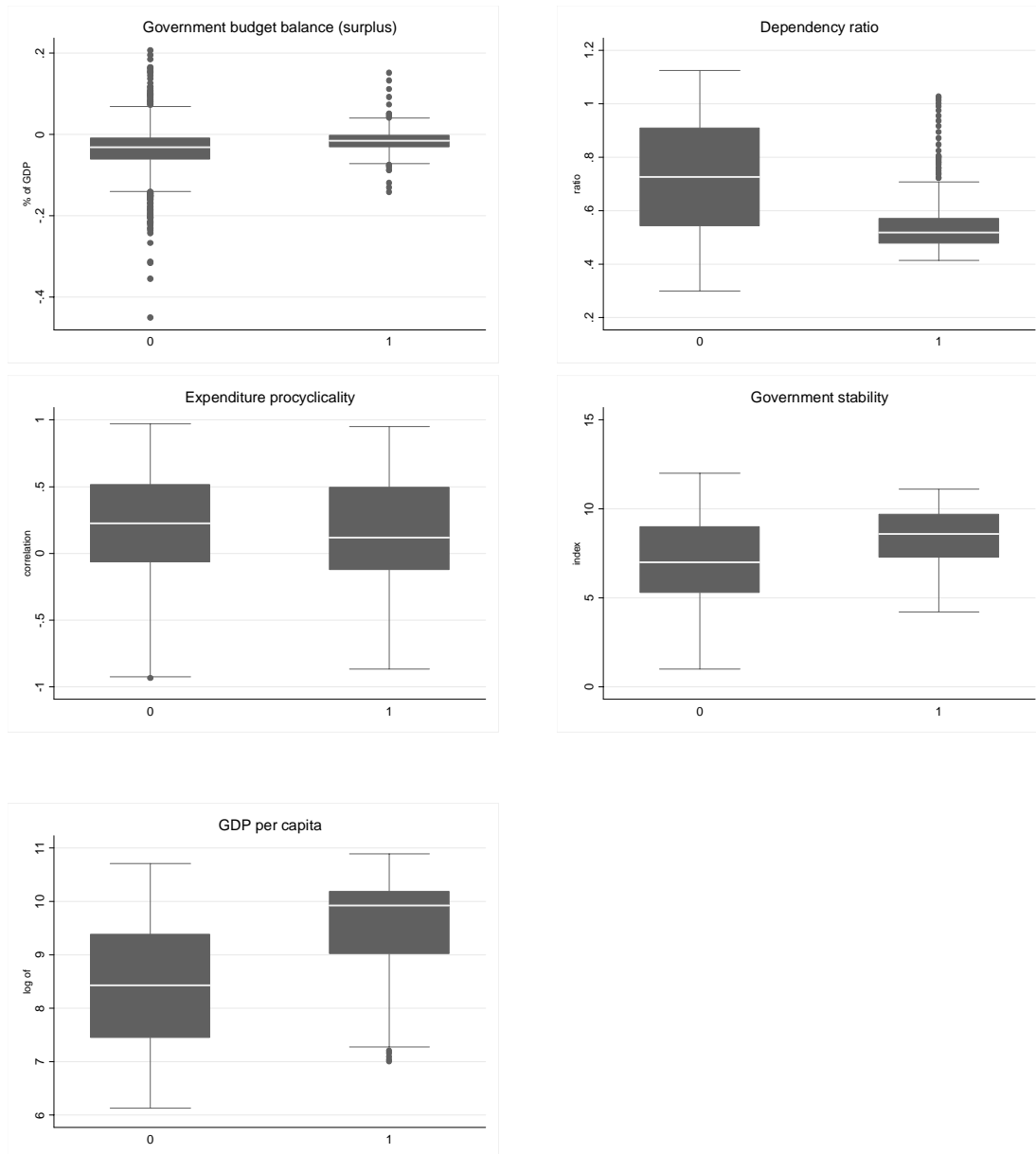
*Source:* Own elaboration

Figure 2: Full-Sample Distribution of 13 Explanatory Variables, 1975-2005



Source: Own elaboration based on the WDI data

**Figure 3: Fiscal Regime and Non-Fiscal Regime Country-year Distribution of 13 Explanatory Variables, 1975-2005**



*Source: Own elaboration based on the WDI data*





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