Do Monetary Handcuffs restrain Leviathan?
Fiscal Policy in Extreme Exchange Rate Regimes
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Abstract

This paper is an empirical study of fiscal policy in countries with extreme monetary regimes. We study members of multilateral currency unions, dollarized countries that officially use the money of another country, and countries using currency boards. We find that belonging to an international common currency area is not associated with fiscal discipline; if anything, spending and taxes are higher inside currency unions. This effect is especially pronounced for dollarized countries that unilaterally adopt the currency of another country. Currency boards are associated with fiscal restraint.

Keywords: empirical; panel; government; spending; tax; revenue; budget.

JEL Classification Numbers:

1. Introduction

This paper studies fiscal policy in countries that have chosen an extreme monetary stance. We think of a country as having an extreme monetary policy if it is in either a currency board or a common currency area. In much of our analysis, we distinguish between multilateral currency unions (such as the East Caribbean Currency Area or ECCA) from countries that have unilaterally adopted the currency of an anchor country (such as Panama).

It is possible to motivate our analysis in a number of ways. A number of countries are considering whether to abandon national monetary sovereignty and unilaterally adopt the money of another country, including Mexico, El Salvador, and Argentina; Ecuador is already proceeding with dollarization. In Europe, eleven different countries have already abandoned national monetary discretion within Economic and Monetary Union (EMU).[1] More generally, there has been much discussion of the "disappearing center" of exchange rate regimes; countries are said to have a choice of either freely floating or going to an extreme monetary stance.

A tight monetary regime might be expected to be associated with a smaller fiscal presence, since it reflects generally conservative economic policies. It also might induce conservative fiscal policy to harmonize policy, avoid fiscal externalities, and enhance the sustainability of the monetary regime, as is the (partial) intent of the "Growth and Stability Pact" (Eichengreen and Wyplosz, 1998). More generally, if one interprets an extreme monetary regime as a credible commitment device to improve credibility by limiting discretionary economic policy, then one might expect a smaller fiscal presence in extreme monetary regimes. On the other hand, a tight monetary regime makes fiscal

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[1] Greece is scheduled to join EMU shortly.

policy a more potent tool of policy in a variety of models. For instance, the classic Mundell-Fleming logic dictates that fiscal policy grows in importance when monetary independence is abandoned. The role of fiscal policy might therefore be expected to be large in countries with extreme monetary regimes. The purpose of this paper is to explore if there is in fact any systematic difference between fiscal policy in extreme monetary regimes and that of typical countries that retain monetary sovereignty.

In our analysis we consider the issue of endogeneity. Some countries have experienced episodes of hyperinflation associated with loose fiscal policy that have in turn led towards tighter monetary regimes. This is very relevant in practice for currency boards; one thinks of Argentina as the quintessential example. Hence, one might expect to see very loose fiscal policy preceding the adoption of a currency board and much tighter policy after the date of adoption. We argue below that this endogeneity problem is not nearly so relevant for currency unions. Currency unions have not been adopted as a result of episodes of macroeconomic instability and, indeed, most of the currency unions in the data remain as such for the whole sample period. Still, our results are best viewed as correlations rather than causal statements, especially in the case of currency boards.

We find that currency boards and multilateral currency unions are characterized by conservative fiscal policies. Their governments are smaller and, on average, they have kept a larger budget surplus when compared to either all the other countries in our sample or a restricted sample of countries with fixed exchange rates. Unilateral currency unions, on the other hand, are characterized by governments that spend more, as a percent of GDP. This result supports the view that the implementation of fiscal policy in currency

boards is dominated by the goal of adding credibility to the monetary regime. In multilateral currency unions, the origin of the restrictions on fiscal policy might originate in the possible externalities associated to loose national fiscal policies. This type of reasoning has recently led to explicit restrictions on budget deficits in both EMU and the WAEMU.

The results of unilateral currency unions are in line with Rodrik (1998) who shows that countries exposed to larger external risk are associated to a larger safe government sector in order to stabilize economic fluctuations. Currency unions, where governments that have already tied their hands by adopting the currency of some other country, make use fiscal policy to insure the additional risk imposed by the extreme monetary regime. This logic also appears when we look at the composition of government spending and the type of taxes used by currency boards and multilateral currency unions. Despite the fact that they have smaller governments and larger surpluses, the composition of their budget is biased towards direct taxes on the revenues side and social spending and transfers on the expenditure side. These components of fiscal policy are generally associated to the role of automatic stabilizers.

The paper is structured as follows. Section 2 provides a brief discussion of the theory of fiscal policy under different exchange rate regimes. Section 3 describes the econometric methodology and Section 4 presents the dataset used. The empirical analysis starts with some preliminary statistics in Section 5, the main results appear in Section 6 and are followed by some sensitivity analysis in Section 7. Sections 8 and 9 extend the analysis to different measures of fiscal policy and Section 10 concludes.

2. Theory

Not much work has been done on the theoretical relationship between exchange rate regimes and fiscal policy. Although there is a large literature on the effects of the exchange rate regime on macroeconomic variables (volatility, trade), not much attention has been paid to the interaction between the exchange rate regime and the way fiscal policy should operate using modern techniques. This is even more true of the empirical relationship between the exchange rate regime and fiscal policy, about which little is known.

One way to rectify the empirical deficiencies in this literature would be to estimate the relationship between fiscal policy and the exchange rate regime for typical choices of the latter. Since most countries are in fixed, intermediate, or floating rate regimes, such an investigation would have classify countries into exchange rate regimes, and search for systematic differences in fiscal policy between say fixers and floaters. We choose to focus instead on the small number of countries that have chosen extreme monetary regimes. From a methodological perspective, we hope that these extreme regimes can shed light on the interaction that is blurred by other considerations when one compares fixers and floaters. Of course there is no guarantee that looking at extreme data points will clarify the situation since outliers are fundamentally … outliers.

Essentially there are three theoretical channels through which fiscal policy is related to the exchange rate regime: 1) fiscal policy as a credibility device, 2) fiscal policy as a stabilizing tool, and 3) the externalities associated with loose fiscal policies in multilateral currency unions.

A standard view on the connection between exchange rate regimes and fiscal policy is that fixed exchange rate regimes are associated with stricter fiscal policy because of the *credibility* role of economic policies. Because many exchange rate devaluations are associated with fiscal deficits and severe problems of credibility for governments and central banks, tighter fiscal policy becomes a required element in any exchange-rate-based stabilization. Also, the external visibility and impact of devaluations in a fixed exchange rate regime, raises the cost associated with irresponsible fiscal policy. Flexible exchange rates, on the contrary, not being subject to large realignments do not provide the type of punishment that will discourage governments from running irresponsible fiscal policies.

This argument has been recently challenged by Tornell and Velasco (2000), who use the same credibility logic to argue that flexible exchange rates in fact provide more discipline. The reason is that movements in the currency reflect the excesses of fiscal policy faster and in a more transparent way. Under fixed exchange rates, the indicators of future crises, such as foreign reserves, are not transparent enough to reveal unsustainable paths of fiscal policy. In fact, one can think of the difference between flexible and fixed rates as being reflected in the intertemporal allocation of the inflation tax burden. Under flexible exchange rates, the excesses of fiscal policy are paid immediately. Thus, if the fiscal authority is impatient enough, there will be more adjustment under flexible than fixed exchange rates.

A second way of establishing a relationship between fiscal policy and exchange rate regimes is to think about fiscal policy as a *stabilizing tool* for business cycles.[2]

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[2] A discussion on the evidence that fiscal policy is an effective stabilizing tool can be found in Fatás and Mihov (forthcoming).

Different exchange rate regimes are associated with different type of risks and, in an environment where economic policy is designed optimally, we should expect different exchange rate arrangements leading to different design of fiscal policies. When governments abandon monetary policy by fixing the exchange rate, they eliminate an important stabilization tool. There is, therefore, a bigger need to make use of the other available tools such as fiscal policy. As a result, fiscal policy might be larger and be more responsive to business cycles under fixed exchange rates.[3,4] Along these lines, there is strong evidence (Rodrik, 1998) that openness and the additional risk that it imposes through terms of trade volatility are associated to larger governments (as a mechanism to stabilize fluctuations).[5]

The third connection between fiscal policy in extreme exchange rate regimes originates from the need to overcome the externality associated with the irresponsible fiscal policy of partners in multilateral currency unions. In the case of multilateral currency unions, countries might want to impose limits on fiscal policy because of the fear that partners in the currency union, having abandoned monetary policy, opt for fiscal policy that is too loose and imposes externalities on their neighbors. This is, for example, the principle behind the Growth and Stability Pact of EMU and the fiscal restrictions set out by the proposed WAEMU (West African Economic and Monetary Union).[6] The

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[3] Also, following the standard textbook Mundell-Fleming model, fiscal policy is much more effective as a stabilizing tool under fixed than flexible exchange rates.

[4] This possibility might be especially relevant if a credible conservative monetary policy anchors the public's expectations, allowing a strong stabilizing role for fiscal policy.

[5] How exchange rate mechanisms relate to this evidence is not straightforward from a theoretical point of view. One could argue that fixed exchange rates provide a more stable environment in terms of exchange rate volatility and, thus, they will be associated to smaller governments.

[6] For a detailed discussion of the theoretical arguments behind the Growth and Stability Pact of EMU, see Eichengreen and Wyplosz (1998).

absence of such strictures clearly played an important role in the disintegration of the ruble zone in the Former Soviet Union in the early 1990s.

In summary, the theoretical arguments are divided between those who put their emphasis on credibility and suggest that fixed exchange rates may be characterized by tighter fiscal policy and those who predict looser fiscal policy under fixed exchange rates given that is the only tool available to smooth out economic fluctuations. This theoretical ambiguity can only be resolved by an examination of the data. We next turn to that task.

3. Econometric Methodology

Our methodology consists on regressing different variables that characterize fiscal policy against dummy variables for the countries with extreme exchange rate regimes (currency unions or currency boards). We control for a set of variables that we expect to be related to both fiscal policy and the exchange rate regime. Our goal is to assess whether fiscal policy in these countries is significantly different than in the rest of our sample. We also perform a narrower comparison between currency boards, currency unions and countries with fixed exchange rates.

We estimate equations of the form

$$y_{it} = \alpha + \{\beta \bullet D_t\} + \gamma \bullet X_{it} + \delta_1 UniCU_{it} + \delta_2 MultiCU_{it} + \delta_3 CB_{it} + \varepsilon_{it} \qquad (1)$$

where: y is one of our measures of fiscal policy, the subscripts i and t denote countries and time periods respectively, $\{D_t\}$ is a comprehensive set of time dummy variables which we usually include, X is a set of control regressors which we discuss further

below, UniCU denotes a dummy variable for countries which have unilaterally adopted the money of another country, MultiCU is a dummy variable for membership in a multilateral currency union, CB is a dummy variable for countries in currency board arrangements, and ε is a well-behaved residual term denoting all other influences on fiscal policy. We estimate this equation with OLS and robust standard errors.

We are only really interested in the δ coefficients (the other coefficients are essentially nuisance terms). Positive δ estimates indicate a larger fiscal presence for countries in extreme monetary regimes.

4. The Data Set

We use a large data set with a broad range of countries. The fact that some of the countries in the sample in which we are interested in are small might raise questions about how general the results can be and the extent to which they can be applied to other countries. The advantage of this sample is that by focusing our analysis on extreme monetary regimes we have countries with well-defined exchange rate regimes and where the issues of endogeneity are minimized. The alternative would be to focus on a narrower sample of richer and better-known countries, excluding small countries or those for which the data availability is an issue. But if we were to follow this strategy we would struggle with both the measurement and the endogeneity problems associated to the classification of exchange rate regimes. At the same time, by looking at 'obscure' and small countries we are subjecting our theories to a strong test, as it might be more difficult to find any significant effect.

Our data set is data taken from the World Bank's *World Development Indicators* CD-ROM. The data set is annual, and includes observations for 206 countries from 1960 through 1998 (though there are many missing observations). The countries in our sample are tabulated in Table 1.

<center>**<<TABLE 1 NEAR HERE>>**</center>

In this data set, there are 1915 country-year observations (24% of the sample) on countries that are members of currency unions and 223 observations (3% of the sample) on countries in currency boards. Members of common currency areas are tabulated in Table A1.

Most currency unions occur where one of the geographic units does not issue its own currency, and uses that of another. A few occur where there is considerable currency substitution (also known as "dollarization") between two currencies with a long-term peg at 1:1 (to make price comparison trivial).[7]

In some of our work below, we distinguish between countries that have unilaterally chosen to surrender monetary sovereignty and countries that are members of the ECCA and the CFA franc zone, multilateral currency unions.[8,9] Currency boards are tabulated in Table A2.

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[7] We do not include countries that are informally or unofficially dollarized, German Unification in 1990, or the re-integration of Okinawa with Japan in 1972.

[8] We exclude the East African countries, given the analysis in Cohen (2000). The ECCA consists of Anguilla and Montserrat (British territories), Antigua and Barbuda, Dominica, Grenada, St. Kitts and Nevis, St. Lucia, and St. Vincent and the Grenadines). The CFA Franc zone includes: Benin; Burkina Faso; Cote d'Ivoire; Guinea-Bissau; Mali; Niger; Sénégal; and Togo using the Franc of the Communauté Financiére Africaine, Cameroon; Central African Republic; Chad; (Republic of) Congo; Equatorial Guinea; and Gabon using the Franc of the Coopération Financiére Africaine, and Comoros uses the Comorian franc (Eq. Guinea and Mali joined in 1984). There are some technical issues of little interest: for instance, the BEAC of the central region issues currency with similar appearance and identical name identifiable by member, while the BCEAO of the Western region issues a single currency.

[9] 725 of the currency union observations are for multilateral currency unions; 1190 observations are for unilateral membership in a common currency area.

We note parenthetically that both currency unions and currency boards are associated with reduced exchange rate volatility. The effects of an extreme monetary regime on exchange rate volatility are both economically and statistically significant. In particular, nominal effective exchange rate volatility (the standard deviation of the percentage change in the trade-weighted effective exchange rate) is about 13 percentage points lower for members of unilateral currency unions, 9 points lower for members of multilateral currency unions, and 17 points lower for currency boards.[10] These reductions are somewhat lower for measures of real effective exchange rate volatility, and are independent of whether our effective exchange rates are constructed with import, export or total trade weights.[11]

The measures of fiscal policy that we use are proxies for the theoretical arguments developed in Section 2. We first need to capture the insurance that governments provide through fiscal policy and automatic stabilizers. The government share of GDP and the overall budget surplus are two indicators of the importance of automatic stabilizers. If we think as the government sector as being a safe sector that is less volatile than the private component of GDP, a larger share of government spending on GDP provides smoothes business cycles. [12] Also, the ratio of taxes to GDP is highly correlated to the responsiveness of taxes and transfers to business cycles, a common indicator of automatic

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[10] The average level of exchange rate volatility for the entire sample (including extreme regimes) is 16 percent per annum.
[11] Real effective exchange rate volatility is 4 percentage points lower for members of unilateral currency unions, two points lower for members of multilateral currency unions, and ten points lower for currency boards. Again, these results are all statistically significant at conventional levels.
[12] Rodrik (1998) formalizes these arguments when looking at the relationship between openness and government size.

stabilizers.[13] Both variables can also provide information on the second dimension of

fiscal policy that we are after, namely credibility. Smaller budget deficits and restrained

spending are always behind the standards recommendations to countries with fixed

exchange rates in order to gain the necessary credibility.

We therefore start our analysis by focusing on five key measures of fiscal policy.

Two broad measures of government size: a) total expenditures (WDI mnemonic

GB.XPD.TOTL.GD.ZS); b) current revenue (excluding grants, GB.RVC.TOTL.GD.ZS),

a measure of the budget balance: c) the overall budget surplus (including grants,

GB.BAL.OVRL.GD.ZS) and two narrower measures of government size d) general

government consumption (NE.CON.GOVT.ZS); and e) tax revenue

(GB.TAX.TOTL.GD.ZS). All these variables are expressed as percentages of GDP; to

ease interpretation we do *not* transform the regressands further.[14]

5. Descriptive Statistics

We begin our analysis with some descriptive statistics. The top panel of Table 2

tabulates means of our five key fiscal variables for the observations without extreme

monetary regimes (i.e., non-currency union/board observations), and the separate effects

of both currency unions and currency boards. P-values for two tests are also tabulated at

the right of the table. The first tests the hypothesis that the currency union effect equals

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[13] Van der Noord (2000) provides shows that, in a sample of OECD countries, government size is positively correlated to the cyclical elasticity of taxes and transfers. In the next section we also look at direct measures of the cyclical elasticity of taxes and the deficit.

[14] We have two measures of both government expenditures and revenues to confirm the robustness of our results across different definitions of fiscal policy. While government expenditures is a broader measure than government consumption, it can be subject to more measurement problems associated to certain categories of spending. Rodrik (1998), because of this reason, favors the use of government consumption as the measure of government size.

that of currency boards; the second tests the hypothesis that the two effects are jointly zero.

Table 2 provides mild evidence that extreme monetary rules are associated with tighter fiscal policy in terms of budget deficits. Both currency boards and currency unions are characterized by smaller budget deficits than other countries in the sample. The difference with the other observations in the sample varies from .8 of a percentage point (in the case of currency unions) to 1.8 percentage points (for currency boards); both effects are statistically significant. In the case of government size (measured by either spending or revenue), the differences are economically and statistically smaller. Larger governments characterize currency unions, despite the evidence of tight fiscal policy as measured by the budget deficit. Currency boards countries have slightly lower spending, but higher taxes.

One has to be careful interpreting these unconditional means because of the presence of variables that can be correlated with both fiscal policy and the exchange rate regime. For example, and following Rodrik (1998), openness is positively correlated with government size and we also know that the exchange rate regime is directly related to openness; currency unions tend to be more open to trade. Similarly, GNP per capita is related to government size and it can be argued that it could influence or be influenced by the exchange rate regime. For this reason, we now turn to a more sophisticated statistical analysis where controls are introduced for those variables that can be useful in explaining cross-country differences in fiscal policy.

6. Benchmark Results

In Table 3, we report benchmark regressions for our five key fiscal variables. The top panel uses two key controls (X's in equation 1 above): the natural logarithm of real GDP per capita, and the log of openness (trade as a percentage of GDP). This panel, in turn, is split into three parts. At the extreme left we record our benchmark results, which do not include time effects (so that we impose $\beta=0$ in equation 1). In the middle of the table we allow for time effects. Finally, at the right we estimate our benchmark regressions but include only data from extreme monetary regimes and fixed exchange rate observations. Thus extreme monetary regimes are compared only to fixes, not floaters or countries in intermediate exchange rate regimes.[15] The bottom panel of Table 3 is an analogue that adds four additional controls, the logarithms of: population, land area, and the urbanization and dependency rates. In all cases, we report point estimates for δ_1 through δ_3. In parentheses underneath we record absolute values of t-statistics; these test the hypothesis that the relevant coefficient is zero.

<<TABLE 3 NEAR HERE>>

Although unreported in Table 3, the basic controls in the regressions generally come out with the expected sign. Government size (measured by either spending or taxes) increases with openness. The size of the coefficient is similar in magnitude to the estimates reported in Rodrik (1998).[16] We find, unlike Rodrik (1998), that government

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[15] To measure the exchange rate regime, we rely on the classification from Ghosh et. al., whom we thank for providing us with their data sets. We have experimented with other exchange rate regimes classifications such as the IMF's official *Annual Report on Exchange Restrictions and Exchange Arrangements*, and found similar results.

[16] If, for comparison purposes, we introduce Government Size in logs, the estimated elasticity is about 0.29, close to the estimates reported in Rodrik (1998) of 0.2.

size is positively related to GDP per capita (Wagner's Law). The dependency ratio is always significant and, as expected, is positively correlated to government size.

The coefficients on the exchange rate regime dummies differ in magnitude and sign depending of the arrangement considered. When it comes to currency unions, the overall picture that emerges from Table 3 is that there is no evidence that currency unions restrain fiscal policy as measured by government size. In fact, in the case of unilateral currency unions, the regressions support the view that, on the contrary, these countries seem to have larger governments (measured by total expenditures or total taxes). This is also true when we compare them to countries with fixed exchange rate regimes (the right-hand block of columns). On average, unilateral currency unions have governments that spend (as % of GDP) 5 percentage points more than countries with fixed exchange rates.

In the case of multilateral currency unions, the evidence is not clear-cut. Most of the coefficients are not significant and not robust to the introduction of additional controls as in the bottom panel of Table 3. Overall, the evidence points in the direction that multilateral currency unions tend to have smaller governments. For example, in the bottom panel of Table 3, with the enlarged list of controls, multilateral currency unions have governments that, in comparison with other countries with fixed exchange rates, spend about 2.8 percentage points less (and this coefficient is significant).

In the case of currency boards, the results are in line with those of multilateral currency unions but the economic effects are larger. The coefficients on government size are consistently negative and large. For example, in the bottom panel of Table 3, relative to all countries with fixed exchange rate regimes, currency boards have governments that spend 8 percentage points of GDP less.

It is clear that some of the regressions, especially those of currency boards, are difficult to interpret because of the problems of endogeneity. Do currencies boards lead to restrictive fiscal policy? Or are countries with the potential for restrictive fiscal policy more likely to adopt a currency board? We cannot distinguish here between these two explanations but we still find that the results shed light on the behavior of fiscal policy under extreme exchange rate regimes. We can confirm that while currency boards and multilateral currency unions are characterized by restrictive and conservative fiscal policies, unilateral currency unions are not. In fact, unilateral currency unions display governments that are significantly larger in size in comparison to either all countries in the sample or to a restricted sample of those that have fixed exchange rate regimes.

The third row in Table 3 uses the budget surplus as the indicator of fiscal policy. In this case, there is consistency across the three exchange rate regimes considered. The coefficient is always positive and significant. The only exception is the case of unilateral currency unions. In this case, and after the introduction of additional controls, the coefficient is not significant. This result confirms our previous conclusion that while there is evidence of restrictive fiscal policy for the cases of currency boards and multilateral currency unions in the form of smaller governments and larger budget surpluses, there is no such evidence for unilateral currency unions.

7. Sensitivity Analysis

The top panel of Table 4 is an analogue to Table 3 that removes all country-year observations where CPI inflation is either below 0% or above 100%.[17] The bottom panel

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[17] This removes some 343 country-year observations.

is an analogue that removes all countries with volatile nominal effective exchange rates.[18]

The motivation of excluding the above countries is twofold. First, we want to make sure that outlier observations are not driving any of our results. Second, we want to eliminate one possible source of endogeneity. Countries that have gone through exchange-rate-based stabilizations following hyperinflation could display a pattern where fiscal deficits take place before stabilization and fiscal discipline follows a successful stabilization. Also, large changes in inflation could have consequences on tax collection and budget deficits.

<div align="center">**<<TABLE 4 NEAR HERE>>**</div>

The estimates of Table 4 are comparable to those of Table 3 and, thus, confirm our basic results. For example, we confirm that, while currency boards and multilateral currency unions display smaller governments, unilateral currency unions have governments that spend more than those of the other countries in the sample. The size of the effects is similar to the ones found in Table 3. Regarding the budget surplus, even after removing these outliers, there is clear evidence that for all three exchange rate regimes, governments tend to keep healthier budget finances.

We have done additional sensitivity analysis by using different sets of controls, adding a control for OECD members (and appropriate interactions with the other controls), and adding country fixed effects. In all cases, there was little change in the results reported above. We have also introduced the currency dummies interacting with

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[18] We define a nominal effective exchange rate as one where the standard deviation exceeds 100% per annum, using trade-weighted effective exchange rates. This removes some 117 observations.

the degree of openness as in Rodrik (1998) and the interaction terms are always highly

significant and of the same sign as the ones reported in Table 3.[19]

8. Analysis of Elasticities

The analysis above has focused on only two dimensions of fiscal policy:

government size and the budget surplus. When discussing the stabilizing role of fiscal

policy, more attention is normally paid to the cyclical elasticities of taxes and

expenditures. [20] These elasticities are used as a direct indicator of the smoothing

properties of fiscal policy. [21]

In Table 5, we use fiscal elasticities as regressands in place of the key fiscal ratios

that we employed in Tables 2-4. The regressions we report are pure cross-sections; we

use country-specific period averages of the regressors as our controls.

<div align="center">**<<TABLE 5 NEAR HERE>>**</div>

We estimate our fiscal elasticities by using the coefficient estimate from a

regression of the change in the fiscal ratio against the growth rate of real GDP. That is,

we use the point estimate ζ in the time-series regression:

$$\Delta y_{it} = \alpha + \zeta \Delta \ln(GDP)_{it} + u_{it} \qquad\qquad i = 1, \ldots, N$$

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[19] If we introduce both the dummies and the interaction terms, then the interaction terms always come out
with the opposite sign as the dummies themselves, a result of the collinearity between the three variables.
[20] For example, the growth and stability pact signed by EMU members emphasizes cyclical elasticities
when imposing limits on fiscal policy.
[21] At the same time, although it is true that cyclical elasticities of taxes and expenditures can provide a
direct measure of the smoothing properties of fiscal policy, the difficulties in measuring them plus the fact
that they are correlated to the overall size of the budget has moved the debate from these elasticities to
measures of government size (for example, the MacDougall (1977) report on the need for a fiscal
federation in EMU talks about the required size of a European-wide budget).

where: Δ denotes the first-difference operator, u denotes a well-behaved residual term, and each of the N regressions is run over time for an individual country i. We require at least fifteen observations to estimate an elasticity.

To estimate the effect of extreme monetary regimes on fiscal elastiticities, we use:

$$\zeta(y)_i = \alpha + \gamma \bullet X_i + \delta_1 UniCU_i + \delta_2 MultiiCU_i + \delta_3 CB_i + \varepsilon_i \qquad (1')$$

where $\zeta(y)_i$ denotes an estimated fiscal elasticity for country i for fiscal variable y, X_i denotes the period-averages of the controls regressors for country i and so forth. Note that e.g., $CB_i \equiv \sum_t CB_{it}$, the period average membership in a currency board; this averaging is necessary since most countries were not currency boards over the entire period. At the extreme right of the table, we report probability values for the hypothesis Ho: $\delta_1 = \delta_2 = \delta_3 = 0$. Again, the top panel contains results with two key controls (real income and openness) while the bottom panel includes four other controls.

The results are essentially insignificant regardless of the fiscal variables used and the exchange rate regime analyzed. The only exception is the coefficient on the elasticity of government expenditures for the case of currency boards. This coefficient is positive and significant, which indicates that government expenditures in these countries are more reactive to cyclical conditions.

The lack of significance of all the other coefficients might be partly due to the fact that we only have one observation per country and that the estimation of these elasticities is not very precise because of the few data points used in some of the regressions. Because of all the measurement problems associated to cyclical elasticities, we turn now

to and indirect method to learn about these elasticities by exploring differences in the composition of expenditures and budget revenues. Different components of the budget can be more or less responsive to economic conditions and, therefore, evidence of differences in the relative size of these components can provide additional information on the cyclical responsiveness of fiscal policy.

9. Disaggregated Analysis

Table 6 contains analogues to Table 3, which examine fiscal policy at a more dis-aggregated level. We estimate equation (1) looking at sub-components of government spending and revenue, as well as some alternative measures of aggregate fiscal policy. We examine five components of revenue generation, including: 1) nontax revenue, 2) goods and services taxes, 3) trade taxes, 4) social security taxes, and 5) taxes on income and profits, all measured as percentages of revenue. We also examine five components of spending, including: 1) goods and services expenditures, 2) interest, 3) subsidies and transfers, 4) wages and salaries, and 5) capital, all measured as percentages of total spending. Finally we also examine two interesting adjuncts to our five aggregated fiscal measures: central government debt, and foreign financing, both measured as percentages of GDP.

<div align="center">**<<TABLE 6 NEAR HERE>>**</div>

The reason for looking at different components of spending and taxes is that they play different stabilizing roles. For example, direct taxes are generally more progressive and therefore more likely to help smoothing out business cycles fluctuations. On the spending side, spending on welfare and transfers are more accurate measures of the

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insurance provided by governments. Along these lines, Rodrik (1998) shows that spending in social security and welfare is more sensitive than other components of the budget to measures of risk (i.e. countries that are exposed to more risk because of a higher degree of openness tend to have more spending in social security and welfare).

On the revenue side, the first two rows, which represent measures of direct taxes, indicate that currency boards and multilateral currency unions are more likely to use direct taxes. In both cases, social security taxes are responsible for this result. In the case of currency boards, although taxes on income and profits are smaller, social security taxes are larger enough to make the sum of the two higher than in other countries in the sample. In the case of unilateral currency unions, the evidence is mixed. Although social security taxes represent a higher share of total taxes, they are compensated by lower taxes on income and profits so that total direct taxes are not significantly higher.

On the spending side, currency boards are the ones that make more use of subsidies and transfers relative to other forms of spending while in the case of currency unions there is no significant pattern that distinguishes their expenditures components from other countries in the sample. Therefore, and in line with the results on the use of direct taxes, currency boards appear as countries where the composition of the budget is more biased towards expenditures and revenues that are better suited to provide insurance against economic fluctuations.

How does the above result relate to our previous results on government size? Rodrik (1998) convincingly shows that more open countries face higher external risk (because of e.g., terms of trade volatility), and thus tend to choose large governments. Our findings in Section 7 on the smaller size of governments under currency boards (and

also to some extent on multilateral currency unions), goes somewhat against Rodrik's finding. In currency boards, as in any other form of extreme exchange rate regime, monetary policy is absent as a stabilizing tool; thus one might expect a large fiscal presence. Our findings suggest that, on the contrary, currency boards and multilateral currency unions have smaller governments. The evidence of Table 6 on the components of the budget might explain some of this apparent contradiction. Although currency boards display conservative fiscal policies from the perspective of the size of the government and the budget deficit, the composition of their budgets is tilted towards some of the components that can provide more social insurance (transfers and subsidies, social security taxes). This is confirmed by the fact that the cyclical elasticity of government expenditures was larger under currency boards. Fiscal policy faces a trade off between credibility and the need to provide stabilization and the way it is resolved is by limiting the size of the government and the budget deficit and putting emphasis on components that ensure the functioning of automatic stabilizers.

10. Discussion

We have found that there are significant differences in fiscal policy between the three types of extreme exchange rate regimes considered. These differences are only present when we look at government size and some of the components of the budget but do not appear when we look at the cyclical elasticities of taxes, spending or the budget deficit.

Do these differences correspond to the standard recommendations of economic policy given to these countries? Do they conform to conventional wisdom?

In the case of *currency boards*, the results favor the hypothesis that these countries show more fiscal discipline relative to all countries in the sample and even relative to countries characterized with fixed exchange rate regimes. This fits the common advice given to governments in order to make currency boards sustainable. Part of the fiscal discipline can come from the reform of the central bank and the impossibility of direct monetary financing of government expenditures. But much of the fiscal impact can be interpreted an attempt to give economic policy as much credibility as possible.

A few examples of recent currency boards can illustrate this argument. A recent joint assessment of the economic policy priorities of the Republic of Estonia by the European Commission and the Estonian Government makes clear that although *"fiscal policy remains the main tool of macroeconomic policy to foster the emergence of the right conditions for strong and balanced growth", "maintaining strict fiscal policy and prudent debt management are key conditions to ensure the full benefits provided by the currency board".* [22] Indeed, the consolidated budget was balanced in Estonia during the period 1984-98. Also in the cases of Lithuania and Bulgaria, significant fiscal efforts have been made during the years that the currency board has been in place.[23] Argentina presents a similar scenario. The introduction of the currency board has been associated with unprecedented reductions in public spending. Total public sector spending fell from 39.3% of GDP in 1989 to less than 28% in 1996.

Regarding the composition of the fiscal adjustment, the case of Argentina presents some interesting insights that corroborate several of our results. The fall in total spending

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[22] Government of the Republic of Estonia and European Commission, 29 March 2000.
[23] A detailed discussion on these cases together with an analysis of the advantages of these strategies in the run-up to EMU membership can be found in Gulde et al. (2000).

has taken place despite the fact that social spending has increased faster than GDP. [24]

This anecdotal evidence confirms our results of Table 6 where it was shown that currency boards are associated to larger subsidies and transfers (as well as larger social security taxes). One could argue that the restriction on the general level of spending is the pillar of the credibility needed by the currency board, while social spending is kept at levels that guarantee social insurance and the operation of fiscal automatic stabilizers.

What is different about *currency unions*? First of all, the results of Table 3 suggest interesting differences between the behavior of unilateral and multilateral currency unions. While in the case of multilateral currency unions there is some mild support for the idea that fiscal policy is restrictive, in the case of unilateral currency unions, there is clear evidence that fiscal policy is bigger as measured by a larger government size. This result on unilateral currency unions is close in spirit to the results of Rodrik (1998) on the connection between external risk and government size. In Rodrik (1998), more open economies choose larger governments as a form of insurance against the additional risk imposed by terms of trade volatility combined with a higher degree of openness. Our result could be justified by arguing that in the case of unilateral currency unions, the lack of monetary and exchange rate policies impedes a stabilizing mechanisms against shocks that needs to be compensated by a larger government that can provide the required insurance. For this analysis to be correct, it has to be the case that, unlike in the case of currency boards, the issues of credibility are not so relevant for the cases of unilateral currency unions. This is plausible, given the origin of these currency unions and the fact that most of them have remained as such for the whole sample period.

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[24] See IMF (1998) for a detailed analysis of these figures.

Why are multilateral currency unions different? The multilateral arrangement of these currency unions can have two effects that might explain why they are different. First of all, the multilateral nature of the agreement can make the currency union less stable and, therefore, more subject to the problems of credibility. As we argued in the case of currency boards, this tilts fiscal policy towards a more restrictive stance. Second, and more importantly, multilateral currency unions suffer from the externalities that loose fiscal policy can impose on other members of the union. The recent Stability Pact adopted by the European EMU and its analogue in the proposed West African EMU are good examples of this type of behavior.[25] It is interesting to see that fiscal restrictions of the type set in these multilateral currency unions are not commonly observed in countries that decide to adopt unilaterally the other country's currency.

11. Summary and Conclusion

This paper has studied the role that fiscal policy plays in extreme monetary regimes (currency unions and currency boards). Our analysis is empirical and relies on a large cross-country panel data set that includes almost forty years of data for some two hundred countries. Our analysis is non-structural; while we are most interested in the impact of extreme monetary regimes on fiscal policy, fiscal policy may well affect the choice of monetary regime (especially in the case of currency boards).

From a theoretical point of view, there is ambiguity about the nature of fiscal policy in extreme monetary regimes. When fixed exchange rate regimes are viewed from the perspective of countries that are in the process of establishing the credibility of their

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[25] In the WAEMU, even before the adoption of the Convergence, Stability and Solidarity Pact of December 1999, there were restrictions (during the period 1994-98) on the composition and level of certain components of the fiscal budget. See Dore and Nachega (2000) for details on these arrangements.

economic policies, it is to be expected that fiscal policy should be more restrictive (compared to other countries) to add to the credibility of tight monetary policy. On the other hand, if we abstract from the issue of credibility, countries have abandoned monetary policy under fixed exchange rate regimes might be more likely to use fiscal policy (than floaters) to stabilize business cycles. If this is the case, we should see larger governments and more responsive fiscal policy under extreme monetary regimes.

The evidence that we present offers partial support for both views. In the case of unilateral currency unions, the fact that larger governments characterize them lends support to the view that fiscal policy has to grow in importance as the need for stabilization increases once monetary policy has been abandoned. However, in the case of currency boards, the effect goes in the opposite direction, as we find that governments of currency boards are smaller in size, giving support to the idea that credibility issues are more important in the case of these countries. Does this mean that in currency boards fiscal policy does not address the lack of policy flexibility imposed by the exchange rate regime? No. Looking at the composition of government spending and revenues, we find that currency boards tend to favor direct taxes and spending on transfers, which are associated with automatic stabilizers and insurance.

Table 1: Countries in the Data Set

Afghanistan	Dominica	Lesotho
Albania	Dominican Republic	Liberia
Algeria	Ecuador	Libya
American Samoa	Egypt Arab Rep.	Liechtenstein
Andorra	El Salvador	Lithuania
Angola	Equatorial Guinea	Luxembourg
Antigua and Barbuda	Eritrea	Macao China
Argentina	Estonia	Macedonia FYR
Armenia	Ethiopia	Madagascar
Aruba	Faeroe Islands	Malawi
Australia	Fiji	Malaysia
Austria	Finland	Maldives
Azerbaijan	France	Mali
Bahamas The	French Polynesia	Malta
Bahrain	Gabon	Marshall Islands
Bangladesh	Gambia The	Mauritania
Barbados	Georgia	Mauritius
Belarus	Germany	Mayotte
Belgium	Ghana	Mexico
Belize	Greece	Micronesia Fed. Sts.
Benin	Greenland	Moldova
Bermuda	Grenada	Monaco
Bhutan	Guam	Mongolia
Bolivia	Guatemala	Morocco
Bosnia and Herzegovina	Guinea	Mozambique
Botswana	Guinea-Bissau	Myanmar
Brazil	Guyana	Namibia
Brunei	Haiti	Nepal
Bulgaria	Honduras	Netherlands
Burkina Faso	Hong Kong China	Netherlands Antilles
Burundi	Hungary	New Caledonia
Cambodia	Iceland	New Zealand
Cameroon	India	Nicaragua
Canada	Indonesia	Niger
Cape Verde	Iran Islamic Rep.	Nigeria
Cayman Islands	Iraq	Northern Mariana Islands
Central African Republic	Ireland	Norway
Chad	Isle of Man	Oman
Channel Islands	Israel	Pakistan
Chile	Italy	Palau
China	Jamaica	Panama
Colombia	Japan	Papua New Guinea
Comoros	Jordan	Paraguay
Congo Dem. Rep.	Kazakhstan	Peru
Congo Rep.	Kenya	Philippines
Costa Rica	Kiribati	Poland
Cote d'Ivoire	Korea Dem. Rep.	Portugal
Croatia	Korea Rep.	Puerto Rico
Cuba	Kuwait	Qatar
Cyprus	Kyrgyz Republic	Romania
Czech Republic	Lao PDR	Russian Federation
Denmark	Latvia	Rwanda
Djibouti	Lebanon	Samoa

Sao Tome and Principe
Saudi Arabia
Senegal
Seychelles
Sierra Leone
Singapore
Slovak Republic
Slovenia
Solomon Islands
Somalia
South Africa
Spain
Sri Lanka
St. Kitts and Nevis
St. Lucia
St. Vincent and the
Grenadines

Sudan
Suriname
Swaziland
Sweden
Switzerland
Syrian Arab Republic
Tajikistan
Tanzania
Thailand
Togo
Tonga
Trinidad and Tobago
Tunisia
Turkey
Turkmenistan
Uganda
Ukraine

United Arab Emirates
United Kingdom
United States
Uruguay
Uzbekistan
Vanuatu
Venezuela RB
Vietnam
Virgin Islands (U.S.)
West Bank and Gaza
Yemen Rep.
Yugoslavia FR
(Serbia/Montenegro)
Zambia
Zimbabwe

Table 2: Fiscal Policy and Extreme Monetary Regimes: Descriptive Statistics

	Mean for non-Unions/Boards	Currency Union Effect	Currency Board Effect	Test CU=CB (P-value)	Test CU=CB=0 (P-value)
Spending	28.2	1.3	-.1	.48	.12
	(.29)	(1.9)	(.3)		
Revenue	23.9	.5	1.6	.54	.44
	(.2)	(.6)	(1.7)		
Budget Deficit	-3.7	.8	1.8	.18	.00
	(.1)	(.3)	(.7)		
Taxes	19.2	1.2	2.6	.27	.01
	(.2)	(.5)	(1.2)		
Government Consumption	15.3	1.5	-.3	.11	.00
	(.1)	(.3)	(1.1)		

Standard errors in parentheses.

Table 3: Fiscal Policy and Extreme Monetary Regimes: Regression Analysis

Results with income and openness controls

	Benchmark Results -----				With Time Effects ----				Against Fixes ------			
	Uni-lateral	Multi-lateral	CB	R^2	Uni-lateral	Multi-lateral	CB	R^2	Uni-lateral	Multi-lateral	CB	R^2
Total Expenditures	3.02 (2.4)	-1.81 (2.4)	-6.41 (8.6)	.26	2.80 (2.3)	-1.94 (3.0)	-5.97 (7.6)	.26	2.49 (2.1)	-3.30 (4.6)	-5.82 (7.0)	.25
Revenue	2.22 (2.5)	-.73 (1.6)	-3.20 (3.7)	.41	2.08 (2.3)	-.74 (1.6)	-3.21 (3.6)	.41	1.95 (2.1)	-1.40 (2.8)	-3.25 (3.4)	.39
Budget Surplus/Deficit	1.65 (2.5)	1.98 (4.3)	3.13 (6.8)	.04	1.73 (2.7)	2.05 (4.4)	2.24 (4.6)	.08	1.87 (2.8)	2.40 (5.0)	2.63 (5.2)	.08
Taxes	2.33 (2.5)	.27 (0.7)	-.67 (0.7)	.37	2.30 (2.4)	.30 (0.8)	-.78 (0.8)	.37	2.83 (2.9)	.09 (0.2)	.31 (0.3)	.33
Gov't Consumption	2.61 (3.4)	.10 (0.3)	-6.31 (5.0)	.15	2.41 (3.2)	-.01 (0.0)	-5.94 (4.4)	.16	.76 (1.0)	-1.80 (4.4)	-6.85 (5.1)	.20

Controls included in each regression are: natural logarithms of real GDP per capita and log of trade/GDP ratio.
Absolute values of t-statistics (calculated with robust standard errors) recorded in parentheses.

Results with additional controls

	Benchmark Results ----				With Time Effects ----				Against Fixes ------			
	Uni-lateral	Multi-lateral	CB	R^2	Uni-lateral	Multi-lateral	CB	R^2	Uni-lateral	Multi-lateral	CB	R^2
Total Expenditures	5.14 (3.2)	-.34 (0.4)	-6.44 (7.9)	.25	4.67 (2.9)	-.50 (0.6)	-5.82 (7.0)	.27	5.39 (3.7)	-2.83 (2.9)	-8.07 (7.8)	.25
Revenue	3.72 (3.3)	.61 (1.1)	-3.23 (3.7)	.40	3.40 (3.0)	.54 (1.0)	-2.87 (3.2)	.41	4.28 (4.0)	-.53 (0.9)	-4.73 (4.5)	.40
Budget Surplus/Deficit	1.00 (1.2)	1.88 (3.2)	2.95 (5.5)	.04	.71 (0.9)	1.91 (3.2)	2.18 (4.0)	.07	1.02 (1.2)	2.77 (4.1)	3.00 (4.7)	.10
Taxes	2.84 (2.6)	1.04 (2.3)	-.84 (0.9)	.35	2.80 (2.5)	1.04 (2.4)	-.57 (0.6)	.36	3.72 (3.6)	.22 (0.4)	1.03 (1.0)	.32
Gov't Consumption	.89 (1.5)	-1.77 (4.7)	-3.67 (4.3)	.27	.77 (1.3)	-1.75 (4.6)	-3.68 (4.2)	.28	-.18 (0.3)	-3.33 (7.0)	-3.81 (4.5)	.32

Controls included in each regression are natural logarithms of: a) real GDP per capita; b) openness; urbanization; dependency; population; and land area.
Absolute values of t-statistics (calculated with robust standard errors) recorded in parentheses.

Table 4 : Fiscal Policy: Sensitivity Analysis

Results with all inflation observations (0,100]

	Benchmark Results ------			With Time Effects -------			Against Fixes ---		
	Uni-lateral	Multi-lateral	CB	Uni-lateral	Multi-lateral	CB	Uni-lateral	Multi-lateral	CB
Total Expenditures	3.31 (2.6)	-1.69 (2.3)	-6.46 (8.5)	3.13 (2.5)	-1.80 (2.5)	-6.16 (7.7)	2.73 (2.3)	-3.07 (4.0)	-6.03 (7.1)
Revenue	2.35 (2.6)	-.59 (1.2)	-3.29 (3.6)	2.21 (1.2)	-.57 (1.2)	-3.40 (3.6)	2.08 (2.2)	-1.15 (2.2)	-3.47 (3.5)
Budget Surplus/Deficit	1.51 (2.2)	1.73 (3.4)	2.82 (5.9)	1.56 (2.4)	1.85 (3.6)	1.98 (3.8)	1.80 (2.6)	2.19 (4.2)	2.41 (4.6)
Taxes	2.44 (2.5)	.50 (1.2)	-.54 (0.5)	2.38 (2.4)	.52 (1.3)	-.68 (0.7)	2.70 (2.8)	.26 (0.6)	.28 (0.3)
Gov't Spending	2.92 (3.8)	.33 (0.9)	-6.03 (4.6)	2.75 (3.6)	.26 (0.7)	-5.65 (4.0)	1.04 (1.3)	-1.55 (3.6)	-6.72 (4.7)

Controls included in each regression are: natural logarithms of real GDP per capita and log of trade/GDP ratio.
Absolute values of t-statistics (calculated with robust standard errors) recorded in parentheses.

Results without countries with highly volatile effective exchange rates.

	Benchmark Results ------			With Time Effects -------			Against Fixes ---		
	Uni-lateral	Multi-lateral	CB	Uni-lateral	Multi-lateral	CB	Uni-lateral	Multi-lateral	CB
Total Expenditures	3.00 (2.4)	-1.86 (2.8)	-6.42 (8.6)	2.81 (2.3)	-1.98 (3.0)	-6.05 (7.7)	2.58 (2.2)	-3.17 (4.5)	-5.76 (7.0)
Revenue	2.12 (2.4)	-.89 (2.0)	-3.26 (3.8)	2.00 (2.2)	-.89 (2.0)	-3.31 (3.7)	1.93 (2.1)	-1.42 (2.8)	-3.31 (3.4)
Budget Surplus/Deficit	1.62 (2.4)	1.92 (4.2)	3.09 (6.8)	1.67 (2.6)	1.98 (4.3)	2.25 (4.7)	1.77 (2.6)	2.26 (4.7)	2.52 (4.9)
Taxes	2.30 (2.4)	.20 (0.5)	-.69 (0.8)	2.28 (2.4)	.23 (0.6)	-.83 (0.9)	2.86 (2.9)	.13 (0.8)	.31 (0.3)
Gov't Spending	2.88 (3.8)	.37 (1.1)	-6.16 (4.9)	2.69 (3.5)	.28 (0.8)	-5.76 (4.3)	1.13 (1.5)	-1.42 (3.6)	-6.67 (5.0)

Controls included in each regression are: natural logarithms of real GDP per capita and log of trade/GDP ratio.
Absolute values of t-statistics (calculated with robust standard errors) recorded in parentheses.

Table 5: Fiscal Policy Elasticities and Extreme Monetary Regimes

Results with income and openness controls

	Unilateral	Multilateral	CB	P coeff=0
Total Expenditures	-.01 (0.1)	.06 (1.2)	.44 (3.1)	.02
Revenue	-.03 (0.3)	-.11 (1.1)	-.14 (1.0)	.52
Budget Surplus/Deficit	.03 (0.2)	-.17 (1.4)	-.00 (0.0)	.52
Taxes	-.03 (0.3)	-.12 (1.6)	-.06 (0.8)	.39
Gov't Consumption	-.09 (1.3)	-.07 (1.3)	.63 (1.0)	.51

Controls included in each regression are: natural logarithms of real GDP per capita and log of trade/GDP ratio.
Absolute values of t-statistics (calculated with robust standard errors) recorded in parentheses.

Results with additional controls

	Unilateral	Multilateral	CB	P coeff=0
Total Expenditures	.01 (0.1)	.05 (0.8)	.22 (.15)	.47
Revenue	.03 (0.5)	-.09 (1.0)	-.11 (0.8)	.55
Budget Surplus/Deficit	.10 (0.6)	-.15 (1.5)	.31 (0.6)	.31
Taxes	.03 (0.4)	-.10 (1.5)	-.04 (0.5)	.43
Gov't Consumption	-.12 (1.1)	-.07 (1.1)	.67 (1.0)	.70

Controls included in each regression are natural logarithms of: a) real GDP per capita; b) openness; urbanization; dependency; population; and land area.
Absolute values of t-statistics (calculated with robust standard errors) recorded in parentheses.

Table 6: Dis-aggregated Analysis of Fiscal Policy and Extreme Monetary Regimes

| | Benchmark Results ------ | | | With Time Effects ------- | | |
	Uni-lateral	Multi-lateral	CB	Uni-lateral	Multi-lateral	CB
Social Security Taxes (% revenue)	3.23 (4.3)	4.07 (6.9)	18.0 (9.7)	3.44 (4.5)	4.16 (7.0)	17.6 (9.2)
Taxes on Income and Profits (% revenue)	-4.52 (4.2)	.99 (0.9)	-9.62 (3.9)	-3.85 (3.5)	.97 (0.9)	-8.09 (3.4)
Goods and Services Taxes (% revenue)	-7.32 (6.8)	-8.41 (9.9)	7.57 (3.3)	-7.90 (7.2)	-8.39 (9.9)	5.54 (2.5)
Nontax revenue (% revenue)	5.26 (2.6)	-2.06 (1.8)	-8.87 (5.5)	4.37 (2.2)	-2.20 (1.9)	-9.04 (5.7)
Trade taxes (% revenue)	6.19 (2.5)	3.88 (3.1)	-4.89 (3.1)	6.73 (2.7)	3.90 (3.1)	-4.12 (2.5)
Subsidies and Transfers (% spending)	-1.88 (1.3)	.14 (0.1)	6.90 (4.2)	-1.09 (0.7)	.47 (0.4)	6.63 (3.4)
Goods and Services Expenditures (% spending)	-.18 (0.1)	-.13 (0.1)	.78 (0.4)	-.20 (0.1)	-.09 (0.1)	.81 (0.4)
Capital (% spending)	4.50 (2.8)	.81 (0.5)	-3.66 (4.3)	5.28 (3.3)	1.08 (0.6)	-2.91 (3.1)
Interest (% spending)	.99 (1.5)	-2.53 (2.9)	-3.79 (2.7)	-.49 (0.7)	-3.26 (3.8)	-4.30 (2.7)
Wages and Salaries (% spending)	2.21 (1.5)	.91 (0.7)	-2.24 (2.0)	1.98 (1.4)	.82 (0.7)	-2.31 (2.0)
Central Government Debt (% GDP)	-15 (2.6)	19 (1.9)	-39 (6.5)	-23 (3.7)	12 (1.2)	-30 (2.1)
Foreign Financing (% GDP)	.35 (0.7)	.94 (1.7)	-.32 (0.9)	.49 (1.0)	.94 (1.7)	-.12 (0.3)

Controls included in each regression are natural logarithms of: a) real GDP per capita; b) openness; urbanization; dependency; population; and land area.
Absolute values of t-statistics (calculated with robust standard errors) recorded in parentheses

Table A1: Currency Unions in the Data Set

American Samoa
Andorra
Antigua and Barbuda
Bahamas (after 1970)
Benin
Bermuda (after 1968)
Bhutan
Burkina Faso
St. Lucia
Brunei
Cameroon
Central African Republic
Chad
Channel Islands
Comoros (before 1994)
Congo Rep.
Cote d'Ivoire
Dominica

Equatorial Guinea (after 1984)
Faeroe Islands
Gabon
Greenland
Grenada
Guam
Guinea-Bissau (after 1971)
Ireland (before 1979)
Isle of Man
Kenya (before 1973)
Kiribati (before 1971 and after 1973)
Lesotho
Liberia
Liechtenstein
Luxembourg
Mali (after 1984)
Marshall Islands
Mayotte

Micronesia Fed. Sts.
Monaco
Namibia
New Caledonia
Niger
Northern Mariana Island
Palau
Panama
Puerto Rico
Senegal
St. Kitts and Nevis
St. Vincent and the Grenadines
Swaziland
Tanzania (before 1973)
Togo
Tonga (before 1971)
Uganda (before 1973)
Virgin Islands (U.S.)
West Bank and Gaza

Table A2: Currency Boards in the Data Set

Argentina (after 1990)
Bahrain (before 1974)
Bosnia (after 1997)
Bulgaria (after 1996)
Cayman Islands (after 1971)
Djibouti
Estonia (after 1991)
Fiji (before 1976)

Gambia (before 1972)
Hong Kong (before 1975 and after 1982)
Lithuania (after 1993)
Oman (before 1975)
Qatar (before 1974)
Tonga (after 1970 and before 1975)
Western Samoa (before 1974)
Yemen (before 1974)

References

Cohen, Benjamin J. (2000) "Beyond EMU: The Problem of Sustainability" in *The Political Economy of European Monetary Unification* (Eichengreen and Frieden, eds: Westview Press).

EC Commission (1977), Report of the Study Group on the Role of Public Finance in European Integration (MacDougall Report), Brussels.

Eichengreen, Barry and Charles Wyplosz (1998) "The Stability Pact: more than a minor nuisance?" *Economic Policy*.

Fatás, Antonio and Ilian Mihov (forthcoming) "Government Size and Automatic Stabilizers: International and Intranational Evidence" *Journal of International Economics*.

Frankel, Jeffrey A. and Andrew K. Rose (2000) "An Estimate of the Effect of Currency Unions on Trade and Growth" NBER WP #7857.

Government of the Republic of Estonia and European Commission (2000) "Joint Assessment of the Economic Policy Priorities of the Republic of Estonia", 29 March 2000.

Gosh, Atish R., Anne-Marie Gulde, Jonathan D. Ostry and Holger Wolf (1996) "Does the Exchange Rate Matter for Inflation and Growth", *Economic Issues*, 2. IMF.

IMF (1998) "Recent Developments in Argentina", *Staff Country Report*, 98/38, April 1998.

IMF (Several years) "Annual Report on Exchange Arrangements and Exchange Restrictions".

Dore, Ousmane and Jean-Claude Nachega (2000) "Budgetary Convergence in the WAEMU: Adjustment Through Revenue or Expenditure?" IMF Working Paper, 00/109.

Eichengreen, Barry and Charles Wyplosz (1998) "The Stability Pact: More than a Minor Nuisance?" *Economic Policy*.

Gulde, Anne-Marie, Juha Kahkonen and Peter Keller (2000) "Pros and Cons of Currency Board Arrangements in the Lead-up to EU Accession and Participation in the Euro Zone" IMF Policy Discussion Paper, 00/1.

Rodrik, Dani (1998) "Why do More Open Economies have Bigger Governments?" *Journal of Political Economy*.

Rose, Andrew K. (2000) "One Money, One Market: Estimating the Effect of Common Currencies on Trade" *Economic Policy*.

Rose, Andrew K. and Charles Engel (2000) "Currency Unions and International Integration" NBER WP #7872.

Tornell, Aaron and Andres Velasco (2000) "Fixed versus Flexible Exchange Rates: Which Provides more Fiscal Discipline?" *Journal of Monetary Economics*, 45, 399-436.

van den Noord, Paul (2000). "The Size and Role of Automatic Fiscal Stabilizers in the 1990s and Beyond". OECD Working Paper, ECO/WKP 2000 (3).