

# Determinants of Fiscal Volatility: An Empirical Investigation of Latin American and Industrialized Countries

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## Abstract

This paper is an empirical investigation of sources of fiscal variability. It extends Gavin and Perotti (1997) by introducing a larger set of variables to explain the volatility of fiscal aggregates. The analysis is based on three sets of regressors. The first one investigates the effects of macroeconomic shocks on fiscal volatility. The second examines in more details the importance of the structural characteristics such as financial depth of an economy, its access to international capital markets and the composition of its budget on fiscal volatility. Finally, I investigate the relationship between fiscal volatility and institutional and political variables. The empirical results show that fiscal volatility is negatively correlated to the development of the financial system, to income inequality and positively correlated to macroeconomic shocks and political instability. I also find that the composition of the budget is a very important determinant of fiscal volatility. Budgeting procedures affect volatility indirectly through their effect on the composition of the budget.

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# 1 Introduction

This paper is an empirical investigation of sources of fiscal variability in a sample of 27 Latin American and Industrialized countries. The objective is to show that the structural and political characteristics of countries are a major determinant of volatility. Gavin et al. (1997) reveal that "the most striking difference between fiscal aggregates in Latin American and industrialized countries is not in their the first moment, but in their volatility". The authors shows that over the period 1970-1995, fiscal revenues were three times more volatile in Latin America than in industrialized countries. This ratio reaches four for fiscal expenditures and five for fiscal transfers. In another paper, Gavin and Perotti (1997) highlight that "the change in fiscal variables is the sum of two components: the first reflects the automatic adjustment of the fiscal variable to the underlying economic environment, while the second is the discretionary change implemented by the policy makers". The authors also found evidence that fiscal policy is procyclical in Latin America while it is countercyclical in industrialized countries. Exogenous macroeconomic shocks are amplified by the procyclicality of Latin American economies, which translates in highly volatile fiscal aggregates. The procyclicality is believed to be caused by structural characteristics of these economies such as the limited development of domestic financial systems, the lack of access to the international financial markets and the composition of the budget. However, their analysis remains mostly descriptive, and lacks empirical support. This paper's contribution to the existing body of research is two fold. First it extends previous research by introducing a larger set of variables to explain the volatility of fiscal aggregates. In the analysis, three sets of regressors are considered. One captures shocks to the economy. The second examines structural characteristics of countries, and seeks to analyze the extent to which the depth of the domestic financial system, the access to the international capital market and the structure of fiscal revenues and expenditures cause unstable fiscal outcomes. The third set of regressors investigates the relationship between institutional and political variables and fiscal volatility. The second contribution of this paper is that it introduces a new estimation that takes into account the time series dimension of the data.

The paper is organized as follows. Section 2 summarizes the evidence of the higher volatility of fiscal aggregate in Latin America. Section 3 defines the sets of regressors derived from analyzing the possible causes of volatility. Section 4 presents the estimation method and the results.

## 2 The volatility of fiscal aggregates

The fiscal data used here comes from the Gavin and Perotti (1996) database, the only database providing time series and disaggregated fiscal data for Latin America. Among the 29 countries included in the database, there are 13 Latin

American countries<sup>1</sup> and 16 Industrialized countries<sup>2</sup>. I left out two countries from the industrialized group: Japan and Ireland. Ireland was left out because of missing data and Japan was not included because of unexplained discrepancies between the Government Financial Statistics of the IMF and the Gavin and Perotti database. The database provides data for central governments, local governments and public enterprises. However, the two authors highlighted "that the difference in the structure and role of local governments are unlikely to explain the strikingly different macroeconomic features of fiscal policy in the two regions...and that public enterprises data are of lower quality than central government data, and possibly of local government data." Hence the following analysis is restricted to central government data.

The measure of volatility used through the rest of the paper is the coefficient of variation (standard error divided by the mean) is used. The coefficient of variation is used instead of the variance because the variance is sensitive to the unit of measurement (in this case, the currency). Furthermore, to eliminate the volatility in fiscal aggregates which could arise from the changes in the price level, series are expressed in real terms<sup>3</sup>.

The volatility of total and primary surplus<sup>4</sup> is presented in table 1. The volatility of other fiscal aggregates is shown in table 2. The average coefficients of variation for each country are presented in appendix A. Table 1 shows the absolute value<sup>5</sup> of the average coefficient of variation for the two regions. Table 1 and table 2 confirm that fiscal aggregates in Latin America are more volatile than in industrialized countries. The large difference between the volatility of total surplus in nominal and real term, in the Latin America group. The fact that the coefficient of variation between the volatility of the primary surplus in nominal term or in real term are similar support this point (table 1).

Table (2) shows the volatility of the components<sup>6</sup> of the budget in the two regions. On the revenue side of the budget, non tax revenue, is the most volatile for both regions. In addition, the sensitivity of Latin American countries to the business cycle is evidenced by the instability of the tax revenue in that group<sup>7</sup>. This is usually the case in countries suffering from an under developed tax system and subsequently relying on indirect taxation (taxes on imports or exports for example) which are intrinsically more unstable.

In summary, "The total volatility depends upon the interaction of shocks

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<sup>1</sup>These 13 countries are the Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, Mexico, Panama, Paraguay, Peru, Uruguay and Venezuela.

<sup>2</sup>The 14 industrialized countries are U.S.A, United Kingdom, Austria, Belgium, Denmark, France, Germany, Italy, Netherlands, Norway, Sweden, Finland, Spain and Australia.

<sup>3</sup>Series were deflated using the World Bank GDP deflator.

<sup>4</sup>The total surplus is equal to the primary surplus plus interest payments.

<sup>5</sup>The absolute value is used as the total and primary surplus are either negative or positive depending on the country.

<sup>6</sup>Total revenue is equal to current revenue plus capital revenue. Current revenue is the sum of non tax revenue plus tax revenue. Tax revenue regroups all taxes such as, income taxes, social security contribution, and indirect taxes.

<sup>7</sup>I could not look at the composition of taxes as there is no data by type of taxes for Columbia, Mexico, Panama, Paraguay, Peru and Uruguay.

	Nominal	Term	Real	Term
	IC	LA	IC	LA
Total Surplus	1.03	3.52	1.53	1.91
Primary Surplus	1.30	2.86	1.90	2.8

Table 1: Coefficient of Variation, Period average

	Nominal	Term	Real	Term
	IC	LA	IC	LA
Total Revenue	0.15	0.55	0.05	0.14
Current Revenue	0.15	0.56	0.05	0.14
Non Tax Revenue	0.19	0.58	0.11	0.24
Tax Revenue	0.15	0.56	0.05	0.17
Total Expenditure	0.16	0.55	0.05	0.14
Current Expenditure	0.16	0.55	0.06	0.13
Government Cons	0.15	0.54	0.05	0.13
Interest Payment	0.22	0.63	0.13	0.28
Transfers	0.17	0.58	0.07	0.20
Capital Formation	0.17	0.57	0.14	0.22

Table 2: Average Coefficient of Variation

with "shock absorber" or "amplifiers"... Shock absorbers or multiplier are a features of an economy or institutional environment that either dampen or multiply the effect of shocks on the economy" (Gavin and Perotti). In the next section, I present possible regressors, to capture, shocks and "shock absorbers".

### 3 The causes of volatility

Causes of unstable fiscal outcomes can be divided in to three groups The first one consists of shocks to the economy, the second one is the structural characteristic of the economy. The last includes the political features of an economy that may affect fiscal aggregates <sup>8</sup>.

Fiscal outcomes may be unstable for several reasons. For instance in developed countries, a recession may reduce income and consumption tax revenues while increasing unemployment compensation and welfare transfers. In developing economies the interaction between the tax structure and shocks to the fiscal accounts may have the most significant impact on fiscal outcomes.

<sup>8</sup>Fiscal data are from the Gavin and Perotti database. The other data are from the World Bank or the IMF unless otherwise specified.

### 3.1 Shocks

External shocks and changes in real GDP growth are the two types of uncorrelated<sup>9</sup> macroeconomic shocks considered here.

#### 3.1.1 External shocks

- The first type of external shocks is caused by the variation of international prices as represented by changes in the terms of trade. In countries suffering from an under developed tax system, taxes on export and tariffs on import are important sources of revenue. Terms of trade shocks are thus an important source of fiscal risk.

- The second type of external shocks is associated to changes on the international capital market which affect capital inflows and, therefore, the capital account. Capital inflows may be an important determinant of fiscal revenues. Capital inflows imply some spending boom and generate a rise in fiscal revenues through their effect on consumption and import tax. If the fiscal deficit is held constant, lower capital inflows make spending appears to be unsustainable, thereby generating fiscal risks.

#### 3.1.2 Changes in real GDP

- Changes in the annual growth rate of real per capita GDP can be caused by domestic factor, such as productivity shocks, transformation of the labor market etc...

In the next section, I review the structural characteristics of economy.

### 3.2 Structural Characteristics

#### 3.2.1 Financial development and limited access to the financial capital market

Indicators of financial development "First fiscal policy may also be volatile because it is subject to unusually large shocks, either to income or to available financing. In the absence of a sufficiently deep domestic financial market or access to international market, small uncovered financing requirements may have profound destabilizing effects on the economy"(Gavin and Perotti, 1997). The volatility of fiscal aggregates could be caused by the impossibility for countries to smooth shocks by issuing debt on domestic or international financial market. Hence the development of the domestic financial state of the financial market should influence the volatility of macroeconomic outcomes as well as the volatility of fiscal aggregates.

In their investigation of the effects of financial development on growth, Levine et al.(1998) isolated the following variables as representing the state of development of the domestic financial system.

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<sup>9</sup>The coefficient of correlation between the three shocks is always below 0.1.

	Liquidity	Central Bank	Credit
Liquidity	1		
Central	0.61	1	
Credit	0.86	0.57	1

Table 3: Correlation of the Financial Variables

1 - The traditional measure of financial depth, the ratio of liquid liabilities to GDP. Liquid liabilities are equal to currency plus demand and interest-bearing liabilities of financial intermediaries and nonbank financial intermediaries.

2 - The importance of the central bank in the domestic financial system. This is equal to the ratio of commercial bank domestic assets over commercial bank plus central bank domestic assets. Underdeveloped financial systems will exhibit a smaller ratio.

3 - The ratio of financial intermediary credits to the private sector relative to GDP. This measure excludes credits issued by the central bank and development banks. It also excludes credit to the public sector and cross claims of one group of intermediaries to another. "This measure more carefully distinguishes who is conducting the intermediation, and to where the funds are flowing" (Levine et al., 1998).

The last two measures are very interesting alternative definitions of financial development characterizing the nature of financial intermediation. The intuition underlying these measures is that commercial financial intermediaries are more likely to identify profitable investments, monitor managers, facilitate risk management and mobilize savings than public financial intermediaries such as the central bank.

These measures of financial development are highly correlated as shown in table 3. Because of their high correlation the indicator of credit and liquidity could not be used conjointly as regressors.

Levine et al. (1998), in their study, correct for possible simultaneity between financial development and growth by using the legal origin of each country as an instrumental variable for the financial development. The legal origin of each country has been shown by Laporta, Lopez de Silanes, Shleifer and Vishny (1998) to affect creditor rights, the system for enforcing debt contracts, and the standards of information disclosure. "Each of these features of the contracting environment helps explain cross-country differences in financial intermediary development" (Levine et al. 1999). Looking at investor rights in 49 countries Laporta et al. (1998) highlight four main legal systems: the common law which is British in its origin and the civil law implemented differently in French, German and Scandinavian systems. The authors concluded that "common law countries give both shareholder and creditors, relatively speaking, the strongest, and French civil law countries the weakest, protection. German civil law and Scandinavian countries generally fall between the other two. The quality of law enforcement is the highest in Scandinavian and German civil law countries, next highest in Scandinavian countries and again the lowest in French civil law

countries" (Laporta et al., 1998).

These three variables introduced here are used alternatively in the regressions of section 4, while a dummy representing the four legal systems is used as an instrument.

The variables representing the access of countries to international capital markets and exchange rate regimes and restrictions are presented in the next section.

### The access to international capital market and the exchange rate regime

The low access to international capital market could cause volatility. To capture the limited access of countries to the international market. I introduce two complementary dummies

- The first dummy is built using ratings from Moody's. Unfortunately countries are only rated when they issue sovereign debt. In the 1970s Latin American countries did not borrow on the international capital markets but directly from private banks. Hence these countries were not rated before the 1980s. Since ratings were not available over time for Latin American countries, I used approximations. I assigned a value of 1 for investment grade and a value of 0 for non investment grade<sup>10</sup>. When a Latin American country was not rated, I assumed that the country did not issue sovereign debt because of the weakness of its economy, giving a value of 0 to the dummy. On an other hand, when an industrialized country was not rated, I assumed that the country chose not to issue debt. In this case I gave a value of 1 to the dummy. Computed as such the dummy became equivalent to a regional dummy taking a value of 0 for Latin American countries and a value of 1 for Industrialized countries. This dummy is also perfectly correlated to the Sachs and Warner (1995) index of trade openness.

- The second dummy captures sovereign debt rescheduling. It was proposed by Bruno and Easterly (1998). The dummy takes the value of 1 the first year the debt is rescheduled., 0 otherwise. This variable is only available for the years 1980 to 1994.

**Exchange rate regimes and restrictions** To control for exchange rate regimes and restrictions, I used the black market premium as it is traditionally the case in the growth literature. The black market premium is the ratio of the black market exchange rate over the official exchange rate minus one. This ratio is different from minus one when there are restrictions on exchanges or when there is a fixed exchange rate system.

These two variables are very highly correlated with the depth of the domestic financial system and cannot be used in the regressions conjointly with indicators of financial development.

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<sup>10</sup>Investment grade corresponds to Moody's A and Baa rating. Non investments grade corresponds to grade below Baa.

In the next section, I look at the composition of the fiscal budget as an explanatory variable for the volatility of the primary surplus.

### 3.2.2 Composition

I review first, the composition of fiscal revenue, and then the composition of fiscal expenditures.

**Composition of fiscal revenue** Roubini and Sala-i-Martin (1995) demonstrated the importance of the development of the tax system for inflation and growth. The two authors mention that "in order to increase the revenue from money creation, governments subject to large income tax evasion choose to increase seignorage by repressing the financial sector and increasing inflation rates". There is no data on fiscal evasion, but the share of tax and non tax revenue in total fiscal revenue gives an indication of the level of development of the tax system. In effect countries suffering from a high tax collection cost rely more on non-tax revenue. This fact is verified in the case of Latin America as shown in table 4 and 5: the ratio of non tax revenue to tax revenue is significantly higher in Latin American countries.

**Composition of expenditure** Alesina and Perotti (1996) show that the composition of macroeconomic adjustments determine their "probability of success", per say their long term effect on the budget deficit. Table 5 and 7 show the composition of expenditure<sup>11</sup> for each country (region) in the sample. Capital formation is a larger component of total expenditure in Latin American than in industrialized countries. While government consumption and interest payment make the major part of current expenditure in Latin America. Alesina and Perotti (1996) emphasize that a change in the composition of expenditure affects macroeconomic outcomes through three channels: a change in expenditures modifies the expectations of economic agents, reinforces (or diminishes) the political credibility of the government, and a change in government wages may influence the labor market.

Such changes in the composition of expenditure are also likely to affect the volatility of macroeconomic aggregates through the same three channels. Therefore the ratio presented in table 5 will be used as regressors.

The ratio of government expenditures over current expenditures and the ratio of non tax revenues over current revenues are very highly correlated and

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<sup>11</sup>Total expenditure is equal to current expenditure plus capital formation; capital formation is equal to capital expenditure plus capital transfer. The two are similar in the industrialized countries but this is not the case for latin-American countries.

Current expenditure is equal to government consumption plus interest payment plus transfers.

	Nontax revenue	tax revenue
Usa	0.04	0.96
Uk	0.06	0.94
Aus	0.04	0.96
Bel	0.04	0.96
Den	0.07	0.93
Fran	0.03	0.97
Germ	0.03	0.97
Ita	0.04	0.96
Neth	0.10	0.90
Nor	0.07	0.93
Swed	0.10	0.90
Fin	0.06	0.94
Spa	.05	0.95
Austra	0.08	0.92
Arg	0.15	0.85
Bol	0.26	0.74
Bra	0.19	0.81
Chil	0.21	0.77
Col	0.25	0.75
Cori	0.11	0.89
Ecu	0.22	0.78
Mex	0.11	0.89
Pan	0.23	0.75
Par	0.16	0.84
Per	0.14	0.86
Uru	no data	no data
Ven	0.21	0.79

Table 4: Composition of Revenue by Country

	nontax	tax revenue
IC	0.05	0.94
LA	0.18	0.81

Table 5: Average Composition of Revenue by Region

	capfor/totexp	goverc/curexp	int/curexp	subtra/curexp
Usa	0.02	0.54	0.11	0.34
Uk	0.05	0.62	0.12	0.26
Aus	0.08	0.42	0.06	0.52
Bel	0.06	0.32	0.15	0.53
Den	0.05	0.51	0.10	0.39
Fran	0.04	0.41	0.05	0.54
Germ	0.06	0.33	0.05	0.62
Ita	0.07	0.38	0.16	0.46
Neth	0.05	0.33	0.11	0.57
Nor	0.07	0.44	0.07	0.50
Swee	0.04	0.50	0.08	0.42
Fin	0.07	0.50	0.04	0.47
Spa	0.08	0.42	0.03	0.55
Austra	0.03	0.56	0.09	0.35
Arg	0.15	0.51	0.08	0.41
Bol	0.17	0.74	0.06	0.18
Bra	0.12	0.36	0.25	0.38
Chil	0.12	0.44	0.07	0.49
Col	0.24	0.62	0.12	0.26
Cori	0.10	0.60	0.11	0.29
Ecu	0.20	0.68	0.13	0.18
Mex	0.15	0.45	0.29	0.28
Pan	0.07	0.65	0.14	0.20
Par	0.18	0.75	0.06	0.21
Per	0.15	0.64	0.17	0.18
Uru	0.08	0.48	0.05	0.47
Ven	0.14	0.68	0.10	0.21

Table 6: Composition of Expenditure by Country

	capfor/totexp	goverc/curexp	int/curexp	subtra/curexp
IC	0.055	0.44	0.087	0.46
LA	0.14	0.58	0.12	0.28

Table 7: Composition of Expenditures by Region

cannot be used simultaneously as regressors. These two variables are also correlated at 75% with the income distribution variable.

Political variables are analyzed next section.

### 3.3 Political Variable

#### 3.3.1 Budget institution

Two papers have analyzed the effect of budget institutions on fiscal deficit. A paper by Jurgen von Hagen (1992) looks at this relationship for member countries of the European Union, and a paper by Alesina et al. (1996) investigates this relationship for Latin American countries. Alesina et al. (1996) classify fiscal institutions on a "hierarchical/collegial" scale. "Hierarchical procedures are those that, for instance, limit the role of the legislature in expanding the size of the budget and its balance, and attribute a strong role to a single individual (typically the Treasury Minister) in the budget negotiations within the government, limiting the prerogatives of the spending ministers. In contrast, collegial procedures provide a greater balance of power between all the agent involved in the budgetary process" (Alesina et al., 1996). The authors demonstrate that "hierarchical" and transparent procedures have been associated with more fiscal discipline. Jurgen Van Hagen shows similar results for European countries. These studies emphasize the importance of budgeting procedures for fiscal outcomes. In this paper, I focus on the relationship between the structure of budget institutions and the volatility of fiscal aggregates.

The questions I aim to answer is: Are more hierarchical budget institutions less prone to imply volatile fiscal aggregates?

Jurgen Von Hagen (1992) and Alesina et al. (1996) used different method to develop their index. Jurgen Von Hagen (1992) created his index by studying European Union documents on fiscal procedure in member countries. Alesina et al. (1996) sent a questionnaire to finance ministries within Latin America. I combined both index into a single one in order to study the effect of budget institutions on volatility cross country. To make both index compatible, I use Jurgen Von Hagen (1992) tables and indexes to answer the Alesina et al. (1996) questions for European countries. Following the Alesina et al. scale, countries were assigned a score between 0 and 10 according to their answer; 10 for the most "hierarchical", and 0 for the most "collegial". The total index is a sum of the answer to all the questions<sup>12</sup>.

Jurgen Von Hagen (1999) did not provide sufficient information to answer Alesina et al.'s question on the financing of public enterprises (question 9). Thus, answers to question 9 were remove from the index for all countries, and the values shown for Latin American countries (column 1, table 8) are not equal to the original values of Alesina et al's index. The construction of the index for each country is described in detail in Appendix B.

Alesina et al. also computed three sub-indices:

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<sup>12</sup>Alesina at al. check for the robustness of this index by comparing it with other one. They find that the index is robust.

	Total Index questions 1-10	Borrowing index questions 1,2,3,7 & 8	Agenda setting index questions 4, 5 & 6
Belgium	29.75	7.5	16
Denmark	27.25	15	6
France	56.25	22.5	27.5
Germany	42.5	26.5	16
Italy	50.25	20.5	23.5
Netherlands	39	19.5	19.5
Spain	26	7.5	18.5
UK	44	16.5	27.5
Argentina	43.5	27.5	16
Bolivia	46.6	19.1	23.5
Brazil	43.66	34.16	7
Chile	66.66	29.16	27.5
Colombia	66.55	34.8	25.5
Costa Rica	56.1	32.35	20
Ecuador	55	25	27.5
Mexico	65.96	38.46	23
Panama	59.25	27.5	25.5
Paraguay	52.99	29.99	18
Peru	38.37	19.04	13.08
Uruguay	56.82	28.32	23.5
Venezuela	58.49	27.49	23.5

Table 8: Indexes by Countries

1- A "borrowing<sup>13</sup> constraint sub-index" which regroups the answers to questions regarding the existence of constitutional constraints on the deficit, of borrowing constraints on the Central Government and the importance of macroeconomic plan as a constraint to the budget process.

2- An "agenda-setting<sup>14</sup>" index which refers to the timing of decisions.

3- A local government sub index that summarizes the ability of state and local governments to borrow directly. This index takes into account the responsibility of central government for debt contacted by governmental sub-entities.

Table 8 presents the total index for all countries, as well as the "borrowing constraint sub index" and "agenda setting sub index". The local government index could not be computed as Jurgen Von Hagen does not provide enough information on the ability for public enterprises to borrow money.

Indexes for Latin American countries are higher on average. This result can be explained by the waves of reforms undertaken by Latin American countries in the 90's. Those reforms affected the indexes which are not computed per

<sup>13</sup>It corresponds to the sum of question 1,2,3,7 and 8.

<sup>14</sup>It includes questions 4, 5 and 6

	Total index	Borrowing index	Agenda Index
European Union	39.37	16.39	19.31
Latin America	54.61	28.68	21.04

Table 9: Average of Indexes by Regions

year but for the entire sample period. The coefficient of correlation between the borrowing index and the total index is very high (0.81) but is lower between the borrowing index and the agenda setting index (0.70).

The last set of variables considered here relate to the degree of polarization and political instability of economies.

### 3.3.2 Political variable and the degree of polarization

The relationship between political instability and economic aggregates has been studied extensively. Alesina and Perotti (1993), Alesina et al. (1992), Barro (1989, 1991), Kormendi and McGuire (1985) looked at the link between political instability and growth. Ozler and Tabellini (1991) examined the relationship between political instability and external borrowing. Edwards and Tabellini (1991), and Cukierman, Edwards and Tabellini (1989) focused on the effect of political instability on inflation. This paper concentrates on the impact of political instability on the volatility of the primary surplus.

Political instability causes frequent changes in policy, which affects the fiscal stance. In the growth literature, revolutions and coups<sup>15</sup> and assassinations<sup>16</sup> are the two most common measures of political instability. Following Barro and Lee (1997), I use the sum of revolutions and coups averaged over a 5 year period.

Political factors are also represented by the degree of polarization. Income distribution was used as a proxy for the degree of polarization. In effect, the less equal the income distribution, the more widespread preferences over public goods, and the more polarized the economy.

In the next section, I present the results of three set of regressions involving the regressors introduced here and three dependent variables: the coefficient of variation of the primary surplus, the ratio of government expenditures over current expenditure and the ratio of non tax revenues over current revenues.

<sup>15</sup>Levine et al (1998) define revolution and coups as follow. " A revolution is defined as any illegal or forced change in the top governmental elite, any attempt at such change, or any successful or unsuccessful armed rebellion whose aim is independence from central government. A coup d'Etat is defined as an extraconstitutional or forced change in the top government elite and/or its effective control of the nation's power structure in a given year. Unsuccessful coups are not counted"

<sup>16</sup>Levine et al. define assassinations as the number of assassinations per thousand inhabitants.

## 4 Estimation

### 4.1 The volatility of the primary surplus: causes

All the variables used here are 5 years averages for the 1970-1990 period. Using 5 years average instead of yearly data is frequently done in the new literature on growth and convergence. The major benefit is that the time dimension of the panel is captured but variations related to the business cycle are avoided. As such, only structural relationships are estimated. The above series were not available for all cross sections. The final complete panel includes 19 countries<sup>17</sup> over four periods.

The dependent variable is the coefficient of variation of the primary surplus in real terms. The variance of the series is a 5 years rolling variance.

For example, in 1972<sup>18</sup>, the variance of the primary surplus (PS) at time  $t$  is:

$$\text{var}(PS_t) = \frac{1}{5} \sum_{i=t-2}^{t+2} (PS_{t,i} - \frac{1}{5} \sum_{j=t-2}^{t+2} PS_j)^2 \quad (1)$$

The horizon for the forward-looking variance is limited to five years as a rolling variance implies serial correlation and the serial correlation is increasing in the number of periods included. The coefficient of variation (CV ar) is the standard deviation over the mean and is averaged over 5 years. Using a five year average for the coefficient of variations also reduces the serial correlation associated with the rolling variance.

The following equation is being tested:

$$\begin{aligned} \text{CV ar}(PS_t) = & \beta_1(\text{CV ar}(\text{Trade}_t)) + \beta_2(\text{CV ar}(\text{Capital in}^\circ\text{ow}_t)) \quad (2) \\ & + \beta_3(\text{CV ar}(\text{GDP}_t)) \\ & + \beta_4(\text{financial}_t) + \beta_5(\text{black market premium}_t) \\ & + \beta_6(\text{government consumption}_t) + \beta_7(\text{non tax}_t) \\ & + \beta_8(\text{budgeting}) + \beta_9(\text{agenda}) \\ & + \beta_{10}(\text{coup and revolution}_t) + \beta_{11}(\text{income}) \\ & + \epsilon_{it} \end{aligned}$$

where:

$$\epsilon_{it} = \alpha_i + v_{it} \quad (3)$$

<sup>17</sup>Argentina, Belgium, Brazil, Costa Rica, Chile, Colombia, Denmark, Ecuador, France, Germany, Italy, Mexico, Netherlands, Panama, Paraguay, Peru, Spain, United Kingdom, Venezuela

<sup>18</sup>The first two years of the series (1970, 1971) and the last two years (1991, 1992) have been dropped.

A Wald test on the country dummy coefficient (fixed effect ( $\alpha_i$ )) from an OLS regression (2) shows them to be jointly significant. Therefore, the model can not therefore be estimated with a common intercept. Expressing equation (2) in first difference cancels the country dummies<sup>19</sup>, generating more degrees of freedom.

$$\begin{aligned}
 \text{CVar}(PS_t) = & \beta_1 \Phi(\text{CVar}(\text{Trade}_t)) & (4) \\
 & + \beta_2 \Phi(\text{CVar}(\text{Capital in}^\circ\text{ow}_t)) + \beta_3 \Phi(\text{CVar}(\text{GDP}_t)) \\
 & + \beta_4 \Phi(\text{financial}_{t-1}) + \beta_5 \Phi(\text{black market premium}_t) \\
 & + \beta_6 \Phi(\text{government consumption}_t) + \beta_7 \Phi(\text{non tax}_t) \\
 & + \beta_8(\text{budgeting}) + \beta_9(\text{agenda}) \\
 & + \beta_{10} \Phi(\text{coup and revolution}_{t-1}) + \beta_{11}(\text{income}) \\
 & + \epsilon_t
 \end{aligned}$$

The series for shocks (trade, capital in<sup>o</sup>ow, GDP), the level of financial development, the black market premium, the budget composition and coups and revolutions are available for each of the four time periods considered. While the series for budgeting procedure, agenda setting and income are an average on the sample period and cannot be differentiated.

The analysis of the residuals of a simple OLS estimation show the existence of group wise heteroskedasticity. "Assuming homoskedastic disturbances when heteroskedasticity is present will still result in consistent estimates of the regression coefficients, but these estimates will not be efficient. Also, the standard errors of these estimates will be biased unless one computes robust standard error correcting for the possible presence of heteroskedasticity" (Baltagi, 1995). Thus equation 4 is therefore estimated by a feasible GLS specification with the covariance matrix being the White covariance matrix for heteroskedasticity of unknown form<sup>20</sup>.

The results are given in table 10. The R<sup>2</sup> for the above regression is 0.41. The Arellano and Bond (1998) test for serial correlation show the absence of serial correlation. As table 10 indicates the significant regressors are the changes in trade and capital <sup>o</sup>ows, the indicators of financial depth and of exchange restrictions and the variables specifying the composition of the budget. The variables for budgetary procedures are non significant. The political instability

<sup>19</sup>Expressing the model in first difference is also of use when estimating the model using instrumental variables. Arellano and Bond (1998) note that "when there is no instrument that are uncorrelated with the individual effect, the transformation must eliminate this component of the error term. The first difference and orthogonal deviations transformations are two examples of transformation that eliminate the individual effect without at the same time introducing all lagged values of the disturbances into the error term. These transformations allow the use of suitable lagged endogeneous (and predetermined) variables as instrument."

<sup>20</sup>
$$w = \frac{1}{T-k} (X^0 X)^{-1} \left( \sum_{t=1}^T u_t^2 x_t x_t^0 \right) (x^0 x)^{-1}$$

Where  $T$  is the number of observation,  $k$  is the number of regressors and  $u_t$  is the least square residual.

Variables	Coefficient
CVar Trade	3:44 (1:5)
CVar capital in°ow	j 0:02 (i 1:80)
CVarGDP	j 0:11 (i 0:79)
Liquidity <sup>21</sup>	- 7:03 (i 1:55)
Central Bank	j 4:27 (i 1:06)
Black Market Premium	j 0:008 (i 1:14)
Non Tax Revenue <sup>22</sup>	27:21 (2:23)
Budgeting Procedure	0:027 (0:94)
Agenda Timing	0:009 (0:18)
Coup and Revolution	j 2:9 (i 1:3)
Income	j 0:02 (i 0:71)

Table 10: Estimation of Equation 4

variable is significant at the 20% level. A Wald test on the joint significance of the changes in GDP, the budgetary procedures and income support the null hypothesis stating that these coefficients are equal to zero.

These three variables were eliminated, and equation (4) was estimated on a reduced set of regressors. The results are presented in table 11

The results presented in table 11 are consistent with the Gavin and Perotti conjectures that the volatility of the primary deficit is negatively related to indicators of financial depth. As a result the ability of a government to smooth shocks is correlated with the resources of the domestic financial markets. The volatility of the primary surplus increases with the flexibility of the exchange rate regime (the coefficient for the black market premium is negative). The higher the level of political instability the higher the volatility of the primary surplus.

The composition of the budget also matters for volatility. This analysis expands in the next section to investigate determinants of the share of government expenditures and the share of non tax revenues over total revenues

## 4.2 The importance of government expenditure: causes

This section presents the results of a regression with the ratio of government consumption<sup>23</sup> over current expenditures as the dependent variable. The fol-

<sup>23</sup>Regressions were run with the ratio of transfers over current expenditure as the dependent variable. Result were inconclusive.

Variables	Coefficient
Cvar capital flow	i 0:018 (i 3:38)
Cvar Trade	1:88 (1:5)
Liquidity	i 0:71 (i 1:64)
Central	i 1:70 (i 1:39)
Non tax	21:02 (1:9)
Black market premium	i 0:044 (i 1:59)
Barro	i 1:75 (i 1:21)

Table 11: Estimation of Equation 4 on a Restricted Set of Regressors

Variables	Coefficient
Black market premium	i 0:0010 (i 7:39)
Liquidity	i 0:0016 (i 2:78)
Budgeting Procedure	i 0:12 (i 1:46)
Agenda	0:0018 (1:74)
Regime	0:005 (0:63)

Table 12: Estimation of Equation 5

Following model is evaluated in first difference<sup>24</sup>:

$$\begin{aligned} \Phi(\text{Gov Cons}_t) = & \beta_1 \Phi(\text{black market premium}_t) + \beta_2 \Phi(\text{financial}) \\ & + \beta_3(\text{budgeting}) + \beta_4(\text{agenda}) \\ & + \beta_{10} \Phi(\text{coup and revolution}_{t-1}) + \beta_{11}(\text{income}) \end{aligned} \quad (5)$$

The R<sup>2</sup> is 0.31. The coefficients and T-statistics are given in table (12).

The budgeting procedure and agenda setting variables are significant. The more hierarchical the budgeting procedures the lower the ratio of government consumption over current expenditure. Governments with hierarchical budgeting procedures exhibit lower budget deficits on average (Jurgen Von Hagen, 1992, Alesina et al., 1996). These countries also exhibit a smaller ratio of government consumption over current expenditures; which are not the most efficient lines of the budget. Also government in countries with a strong financial market spend on average less on government consumption.

Next section examines the importance of political variable as a determinant of the ratio of non tax revenue over current revenue.

<sup>24</sup>Measure of shocks to the economy and the income distribution are non significant.

Variables	Coefficient
Cvar capital flow	0:0012 (3:94)
Black market premium	0:00254 (1:71)
Income	0:0026 (3:45)
Budgeting	$\beta_8$ 0:0020 ( $\beta_8$ 2:09)
Agenda	$\beta_9$ 0:001 ( $\beta_9$ 0:98)
Coup and revolution	0:11 (2:69)

Table 13: Estimation of Equation 6

### 4.3 The importance of non tax revenue: causes

The ratio of non tax revenue over total revenue is the dependent variable of the following regression<sup>25</sup>:

$$\begin{aligned}
 \Phi(\text{Non Tax}_t) = & \beta_1 \Phi(\text{Cvar capital flow}_t) \\
 & + \beta_2 \Phi(\text{black market premium}_t) \\
 & + \beta_8(\text{budgeting}) + \beta_9(\text{agenda}) \\
 & + \beta_{10} \Phi(\text{coup and revolution}_{t-1}) \\
 & + \beta_{11} \Phi(\text{income})
 \end{aligned} \tag{6}$$

The  $R^2$  of this regression is 0.51. The results are given in table 13

Countries that suffer from highly volatile capital flows, that use a fixed exchange rate regime and/or exchange rate restrictions, and that are being politically instable tend to rely more on non tax revenue relatively to other sources of fiscal revenues. The sign of the coefficient for the income distribution variable, and the coups and revolutions variable support the argument developed by Cukierman, Edwards and Tabellini (1990) that a country's tax system is technologically constrained by the level of development of its economy. Countries suffering from very high tax collection choose inflation tax and trade tax. The authors looked at the evolution of the tax system of a country depending on the features of its political system, not just those of its economy. Their central hypothesis is that an inefficient tax system acts as a constraint on the revenue-collecting capacities of the government. This constraint may be welcomed by those who disagree with the goals pursued by the current government. Hence, the higher the degree of polarization, the more likely it is that the inefficient tax system will be sustained.

Budgeting procedures are also affecting the composition of fiscal revenues. Countries with a hierarchical structure relies less on inefficient forms of taxation.

<sup>25</sup>Changes in the term of trade, changes in real GDP as well as financial variables have no explanatory power for the ratio of non tax revenue over current revenue.

In conclusion, this last two regressions show that political variables do not act directly on the volatility of the primary surplus but indirectly through the composition of the budget.

## 5 Conclusion

Previous studies have showed the effect political instability and the composition of the budget have on budget deficit over time. This paper extend that research by showing empirically that political instability and the composition of the budget also are determinants of the volatility of fiscal aggregates. It has been demonstrated that financial development is of primary importance for growth. This paper shows that the level of financial development also affect fiscal volatility. Volatility alters individual expectations as such it has a negative impact on growth.

In conclusion, political instability and collegial budgeting procedures affect growth through two channels. First, they determine the average budget deficit and therefore may affect growth through crowding out. Second rational agent expectations are distorted by the high volatility of fiscal aggregates which in turns effects growth. This relationship is stronger when the financial system is weak. Growth is also weakened by the underdevelopment of the financial system directly and through the negative effect of weak financial system on volatility and the resulting distorted expectations.

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	Nominal Term		Real Term	
	Total Surplus	Prim Surplus	Total Surplus	Prim Surplus
Usa	-0.61	-1.98	-0.60	-1.66
Uk	0.45	0.27	0.33	0.19
Aus	-0.31	-1.11	-0.44	-9.36
Bel	-0.20	-0.24	-0.17	-0.22
Den	0.03	0.14	0.39	0.10
Fran	-0.96	-0.63	-2.00	-0.93
Germ	-0.82	-2.7	-0.85	-3.15
Ita	-0.25	-0.27	-0.12	-0.14
Neth	-0.48	0.81	-0.46	0.81
Nor	0.55	0.28	0.54	0.26
Swee	0.55	0.60	7.47	0.53
Fin	0.007	0.34	0.63	0.26
Spa	-0.4	-0.122	1.16	-0.21
Austra	-2.39	2.74	-1.78	2.44
Arg	-1.59	1.08	-0.67	-1.53
Bol	-1.01	0.21	-1.88	-0.24
Bra	-0.18	1.09	-2.66	0.51
Chil	0.25	1.26	1.89	-0.34
Col	-0.18	1.09	-2.66	0.51
Cori	0.25	1.26	1.89	-0.34
Ecu	-0.44	9.68	-0.43	-4.44
Mex	-0.54	1.08	-0.50	0.13
Pan	-0.03	-0.03	0.022	0.07
Par	-0.18	-1.02	-2.24	1.72
Per	-0.96	0.04	-0.48	-6.16
Uru	-0.49	-2.99	-2.8	6.97
Ven	-15.96	1.30	2.85	1.40

Table 14: Average of coefficient of Variation of budget deficit

**A Total Surplus and Primary Surplus coefficients of variation for all countries**

## B Budget institutions in Latin America (Alesina et al., 1996) and in industrialized countries (Jurgen Von Hagen, 1992)

The appendix is organized as follow. For each of the 10 questions Alesina et al. asked to governments in Latin America, I first review the corresponding point studied by Jurgen Von Hagen. Then on the basic of the Alesina et al. scale I give an index to Industrialized countries.

The Jurgen Von Hagen (JVH) study also includes Greece, Ireland, Luxembourg and Portugal. These countries were not part of the sample considered and are not included in the following tables.

There is no information in JVH to answer Alesina et al.'s question 9 (Does the central Government typically assume debt originally contracted by other public agencies).

The total index are therefore computed without question 9. It explain the discrepancies between the total index computed here and the total index computed by Alesina et al.

- Amen = amendment
- bud = budget
- cab= cabinet
- cong = congress
- def = deficit
- dom = domestic
- ext = external
- exp = expenditure
- gov = government
- inc= increase
- rev = revenue
- MB = Minister of budget
- MF = minister of finance
- Par = parliament
- PM = prime minister
- restri = restriction
- 4/12 = 4 months

	General constraint	Nature of the commitment	JVH
Belgium	Expenditure and deficit	Not binding	0
Denmark	Expenditure and deficit	some level of constraint	4
France	Def/gdp, exp, debt/gdp	some level of constraint	4
Germany	Golden Rule	some level of constraint	3
Italy	Debt/gdp Def/gdp	some level of constraint	2
Netherlands	Def/gdp Debt/gdp	some level of constraint	1
Spain	no		0
UK	Exp/Def, Def	def target is indicative	4

Table 15: Question 1 - Jurgen Von Hagen

Question 1- What constitutional constraints are there on the fiscal deficit?

Information on the general constraint can be found in JVH's table A-3.

Alesina gives a 10 for some constraint and 0 for no constraint. JVH rates countries between 0 and 4. Countries with a 4 in JVH got a 5 on Alesina et al.'s scale. For the other countries, I upgrade the JVH index by 1, except for the countries with a zero which kept a zero.

I did not take into account the countries participating in the Maastricht treaty. In effect the Maastricht was signed in 1992-1993, and could not be considered a binding criteria for the considered period.

I assimilated countries with some level of constraint to countries with budget that includes proper financing for the deficit.

	No restriction	Budget includes financing Def	Debit are not allowed	Score
Belgium	X			0
Denmark		X		5
France		X		5
Germany		X		4
Italy		X		3
Netherlands		X		2
Spain	X			0
UK				5
Argentina		X		5
Bolivia	X			0
Brazil		X		5
Chile		X		5
Colombia		X		5
Costa Rica		X		5
Ecuador		X		5
Mexico		X		5
Panama		X		5
Paraguay		X		5
Peru		X		5
Uruguay		X		5
Venezuela		X		5

Table 16: Question 1 - All countries

	Multi annual Budget plan	Multi annual Projection	Target	Commit- -ment
Belgium	no	no		
Denmark	no	no	exp & rev	Indicative
France	no	yes	no	Unpublished
Germany	no	no	Budget	Political
Italy	no	no	Budget	Political
Netherlands	no	no	Budget	Binding
Spain	no	yes	no	Unpublished
UK	no	no	debt exp	Indicative Political

Table 17: Summary of Table A-2 Jurgen Von Hagen

Question 2 - Is there a legal requirement for the approval of a macro program to precede the presentation of the budget to Congress? How important is this requirement in practice?

There is no JVH index including the Alesina et al. characteristics.

UK and Denmark are in between other countries. For Denmark, indicative is stronger than unpublished and weaker than political. I therefore assigned a value of 2.5 to Denmark. For the UK it is indicative for the budget but political for expenditure. I therefore assign a value of 4 to the UK.

	Very Important	Relatively Important	Not important not required	Score
Belgium			X	0
Denmark		X	X	2.5
France			X	0
Germany		X		5
Italy		X		5
Netherlands	X			10
Spain			X	0
UK		X	X	4
Argentina	1993	1980-92		5
Bolivia	86-86&93	80-84&87-92		5.77
Brazil	X			10
Chile			X	0
Colombia	90-93	80-89		6.15
Costa Rica	88-91	80-87&92-93		6.53
Ecuador		X		5
Mexico	84-93	80-83		8.46
Panama		X		5
Paraguay	X			10
Peru	91-93		80-90	1.54
Uruguay	X			0
Venezuela		X		5

Table 18: Question 2 - All countries

	Borrowing constraint	Nature of the commitment	JVH score
Belgium	Nothing on debt		0
Denmark	Nothing on debt	some constraint	0
France	Debt/gdp	some constraint	4
Germany	Golden Rule <sup>26</sup>	some constraint	3
Italy	Debt/gdp	some constraint	2
Netherlands	Debt/gdp	some constraint	1
Spain	no		0
UK	no		4

Table 19: Question 3 - Jurgen Von Hagen

Question 3 - Alesina -What kind of borrowing constraint are there on the government?

JVH table A-2 does not provide information as precise as Alesina et al. table A-3.

JVH does not assign any specific value for the debt but does for the general level of constraint. I assume that the constraint IN JVH was equivalent to a ceiling set by the government (Alesina). JVH's countries get a index of 5.

	No Constraint	Ceiling by Gov	Ceiling by cong	Cong approved each operation	Score m
Belgium	X				0
Denmark	X				0
France		X			5
Germany		X			5
Italy		X			5
Netherlands		X			5
Spain	X				0
UK	X				0
Argentina	80-92		93	93	0
Bolivia				X	3.33
Brazil			X	X	6.66
Chile			X		10
Colombia			X		10
Costa Rica			X	X	6.66
Ecuador	X				0
Mexico			X		10
Panama			X		10
Paraguay				X	3.33
Peru			X		10
Uruguay			X	X	6.66
Venezuela			93	80-92	3.33

Table 20: Question 3 - All countries

	Agen-da	Type	Budget negotiation	Exp control	MF can block Exp
Belgium	MF	guideline	cabinet	MF	
Denmark	cab	target	bilateral	Ministeries	
France	PM	guideline	bilateral	MF	exp (Gov)
Germany	MF	guideline	bilateral	MF	yes
Italy	MF	target	multilateral	MB & MF	
Netherlands	cab	target	bilateral	MF	
Spain	cab	target	cabinet	MF	
UK	MF	guideline	bilateral	MF	

Table 21: Question 4 - Jurgen Von Hagen

Question 4- Alesina - Is the authority of the Minister of Finance greater than that of the spending ministers on budgetary issue?

The following information comes from Table A-6, Table A-7 and Table A-8.

The Netherlands and Spain are considered as a "somewhat greater power" as the agenda is set by the cabinet. Netherlands have an index a little bit higher than Spain as the negotiations are bilateral.

	Yes-considerably greater	Somewhat greater	No	Score
Belgium	X			10
Denmark			X	0
France	X			10
Germany	X			10
Italy	X			10
Netherlands		X		6
Spain		X		5
UK	X			10
Argentina	X			10
Bolivia	X			10
Brazil		X		5
Chile	X			10
Colombia	X			10
Costa Rica	X			10
Ecuador	X			10
Mexico	X			10
Panama	X			10
Paraguay	X			10
Peru	91-93		80-90	1.54
Uruguay	X			10
Venezuela	X			10

Table 22: Question 4 - All countries

	Parl Proposal	Amen limited	Amen o@setting <sup>28</sup>	can cause fall of Gov	JVH <sup>27</sup>
Belgium	n	n		y	0
Denmark	n	n	y	y	4
France <sup>29</sup>	n	y		y	8
Germany	n	n		y	0
Italy	n	y		n	4
Netherlands	n	n		y	4
Spain	n	y	y	n	4
UK	n	y		y	4

Table 23: Question 5 - Jurgen Von Hagenfkey

Question 5 - Alesina - Restrictions on the contents of amendments to the budget by congress?

Information comes from table A- 6 in JVH.  
Amendment are authorized in all countries

	not inc de - cit	not incr exp	not inc def or exp	With Gov approval	no restr	Score
Belgium					X	0
Denmark					X	0
France		X		X		7.5
Germany					X	0
Italy		X				7.5
Netherlands		X				7.5
Spain		X				7.5
UK		X				7.5
Argentina	93				80-92	0
Bolivia					X	7.5
Brazil			X	X		0
Chile			X	X		7.5
Colombia			X	X		7.5
Costa Rica					X	0
Ecuador			X	X		7.5
Mexico	X					5
Panama			X	X		7.5
Paraguay					X	0
Peru			91-93		80-90	1.54
Uruguay			X	X		7.5
Venezuela		X				7.5

Table 24: Question 5 - All countries

	Prolongation <sup>30</sup>	
Belgium	12	
Denmark	12	
France	decree of government	
Germany	no data	
Italy	max 4/12	
Netherlands	4/12	entry
Spain	previous budget	entry
UK	decree of government	entry

Table 25: Question 6 - Jurgen Von Hagen

Question 6 - What happens if the congress rejects the budget

Information comes from table A-6 in JVH.

	Previous Year	Govern Budget	New Budget	No funds	Gov resigns	Score
Belgium	X					6
Denmark	X					6
France		X				10
Germany	X					6
Italy	X					6
Netherlands	X					6
Spain	X					6
UK		X				10
Argentina	X					6
Bolivia		if not appro	if reject			6
Brazil			X			2
Chile		X				10
Colombia	if rejec	if not appro				8
Costa Rica		X				10
Ecuador	Decent agencies	Central Gov				10
Mexico				X		8
Panama	if rejec	if not appr				8
Paraguay	if rejec	if not appr				8
Peru		X				10
Uruguay	X					6
Venezuela	X					6

Table 26: Question 6 - All countries

	Budget changes authorized by
Belgium	new law
Denmark	new law
France	new law
Germany	MF
Italy	new law
Netherlands	Government
Spain	New law
UK	New law

Table 27: Question A-7 -Jurgen Von Hagen

Question 7- Can the budget be modified later congress approval?

Information comes from Table A-8 in Jurgen von Hagen study.

Jurgen Von Hagen provides more detail, on transfers between ministries etc. But the author does not precise if budget changes are take into account all types of changes or only increases in the total budgets.

	Gov initiative congress appro	Gov initiative no approval	Congress Initiative	No	Score
Belgium	X				7.5
Denmark	X				7.5
France	X				7.5
Germany	X	X			7.5
Italy	X				7.5
Netherlands		X			2.5
Spain	X				7.5
UK	X				7.5
Argentina	X				7.5
Bolivia	X		X		0
Brazil		X			2.5
Chile	X				7.5
Colombia	90-93	80-89			3.65
Costa Rica	X				7.5
Ecuador	X				5
Mexico		X (speci c items)			5
Panama	X				7.5
Paraguay		X (up to 5%)			5
Peru		X			2.5
Uruguay			X		10
Venezuela	X				7.5

Table 28: Question 7 - All countries

m	Expenditure can be block
Belgium	
Denmark	
France	yes
Germany	yes
Italy	
Netherlands	
Spain	
UK	

Table 29: Question 8 - Jurgen Von Hagen

Question 8- Is the Government legally empowered to cut spending after the budget has been approved?

	Gov discretion on all items	Gov discretion for non-earmarked exp	Only rev are lower exp	No	score
Belgium				X	0
Denmark				X	0
France			X		5
Germany			X		5
Italy				X	0
Netherlands				X	0
Spain				X	0
UK				X	0
Argentina			X		10
Bolivia			X		10
Brazil			X		10
Chile		X			6.66
Colombia			X		10
Costa Rica		X			6.66
Ecuador		X			10
Mexico			X		10
Panama				X	0
Paraguay	X				6.66
Peru				X	0
Uruguay		X			6.66
Venezuela	X				6.66

Table 30: Question 8 - All countries

	Borrowing authorized	Authorization
Belgium	Yes	From higher government
Denmark	yes	From higher government
France	no data	
Germany	yes	no requirement
Italy	yes	limited
Netherlands	yes	no requirement
Spain	yes	no requirement
UK	yes	no requirement

Table 31: Question 10 - Jurgen Von Hagen

**Question 10- Can these agencies borrow autonomously ?**

This information is given by table A-1 in JVH study.

In Belgium Denmark and Italy, regional governments are required to obtain authorization for borrowing from the general government. In Spain lower governments are autonomous in their budget plans.

Alesina et al 's table give information about the state and local government as well as public enterprises while JVH only gives information regarding state and local government.

	Local Legis approval	Central Gov approval	Congress approval	no	Yes no Rest- -riction	score
Belgium		X				6.25
Denmark		X				6.25
France						
Germany					X	0
Italy		X				6.25
Netherlands					X	0
Spain					X	0
UK					X	0
Argentina					X	0
Bolivia	X ( dom)		X (ext)			4
Brazil		93	80-92			2.5
Chile				X		10
Colombia		X				6.25
Costa Rica	X					3.75
Ecuador					X	2.5
Mexico	X (dom)			X (ext)		4.5
Panama		X				6.25
Paraguay			X			5
Peru		X				6.25
Uruguay			X			5
Venezuela				X		7.5

Table 32: Question 10 - All countries

## C List of Variables for Section 4

- Terms of trade: World Bank Development Report
- Capital flows: World Bank Development Report
- GDP: Gavin and Perotti database (1998)
- Liquidity: Levine, Ross, Norman Loayza and Thorsten Beck (1999)  
Definition:  $f(0.5) * [F(t)/P_e(t) + F(t-1)/P_e(t-1)]g / [GDP(t)/P_a(t)]$ ,  
where F is liquid liabilities (line 55l), GDP is line 99b, P\_e is end-of period  
CPI (line 64) and P\_a is the average annual CPI
- Commercial-Central Bank: Levine, Ross, Norman Loayza and Thorsten  
Beck (1999)  
Definition:  $DBA(t) / (DBA(t) + CBA(t))$ , where DBA is assets of  
deposit money banks (lines 22a-d) and CBA is central bank assets (lines 12  
a-d).
- Private Credit: Levine, Ross, Norman Loayza and Thorsten Beck (1999)  
Definition:  $f(0.5) * [F(t)/P_e(t) + F(t-1)/P_e(t-1)]g / [GDP(t)/P_a(t)]$ ,  
where F is credit by deposit money banks and other financial institutions to  
the private sector (lines 22d + 42d), GDP is line 99b, P\_e is end-of period CPI  
(line 64) and P\_a is the average CPI for the year.
- Legal origin: Levine, Ross, Norman Loayza and Thorsten Beck (1999)  
Definition: Dummy variables for British, French, German and Scandi-  
navian legal origin
- Black market premium: Global Development Network Growth Database,  
William Easterly and Hairong Yu  
World Bank  
Definition (%),  $\text{parallel } X_{\text{rate}} / \text{official } X_{\text{rate}} - 1 * 100$  ); values for indus-  
trial countries are added as 0
- Sovereign debt rescheduling: Bruno, Michael, and William Easterly  
(1998), "Inflation Crises and Long-Run Growth." Journal of Monetary Eco-  
nomics.
- Fiscal aggregate: Gavin and Perotti database (1998)
- Coup and revolution: Global Development Network Growth Database,  
William Easterly and Hairong Yu  
World Bank
- Income distribution: Global Development Network Growth Database,  
William Easterly and Hairong Yu  
World Bank  
Bruno, Michael, and William Easterly.  
"Inflation Crises and Long-Run Growth."  
1998 Journal of Monetary Economics 41 (1): 3-26.