

Market Disciplining of the Developing Countries' Sovereign Governments

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Abstract

This paper contributes to the literature on market disciplining of the sovereign governments in two ways: Firstly, it distinguishes the both sides of the market discipline hypothesis (MDH) by adopting three-stage least square estimation (3SLS) to incorporate the contemporaneous feedback effects between primary structural budget balances and country default risk premium. Secondly, by utilizing the IMF's disaggregated government finance statistics data, primary structural budget balances are estimated to test the MDH for developing countries. The findings show that only one half of the MDH works: We find robust evidence that increased budget balances contributed to the decrease in country default risk premium, but do not find robust evidence that the change in country default risk premium had a significant effect on budget balances.

JEL Classification: C5; G1, G3

Keywords: Market Discipline Hypothesis; Structural Budget Balances; Country Default Risk Premium

1 INTRODUCTION

Over the last two decades, many developing and emerging economies have experienced an integration of their financial markets with the global markets. Both public and private sectors have started using external borrowing option of financing for their investment and consumption expenditures. The high amount of net external debt that these countries took on raised the attention on whether the global markets will have any disciplining effect on the sovereign governments of these countries. This is important because market disciplining is an essential element for an economy to function well. In a market where market forces are the sole determinant of prices, efficiency and productivity will be achieved by punishing the bad performing actors in the economy. Likewise, it is expected that the rational credit suppliers will respond to the bad performance of the sovereign borrowers by charging more to compensate the default risk of the sovereign borrowers in their external debt. In that context, the so-called Market Discipline Hypothesis (MDH) suggests that market mechanism works to discipline the bad-performing fiscal authorities by asking higher default risk premium from those of governments. In turn, the sovereign borrowers respond to this by improving their fiscal performance. Assuming that financial markets price the fiscal behaviors effectively, a government with higher level of public debt will have higher default risk which pulls up the premium on government bonds. Thus, higher default risk premium on government bonds decreases borrowing capacity of the sovereign governments. By this feedback mechanism of market disciplining, it is expected that governments will improve their fiscal balances in the long run as debt servicing would otherwise become a great burden to economy.

This paper seeks to analyze the MDH at the sovereign government level and aims to fill the gap in the literature by working with developing countries and by also focusing the second part of the MDH that deals with the sovereign governments' reaction to change in financial indicators pertaining to their performance. The most appealing factor of working on developing countries is that the financial markets do not show any mercy towards these countries' sovereign governments. Generally, emerging market governments face stronger and broader market constraints than their counterparts among the governments of developed countries. When it comes to developing countries,

credit suppliers consider many more risk factors than they would with the sovereign government of an advanced economy. Many aspects of government policy are therefore put under surveillance, which ties up sovereign borrowers in terms of domestic policy targeting. In addition, creditors do not want to share any risk that may arise from the borrower's currency and usually insist on buying bonds issued in foreign currency, mostly in U.S. Dollar. However, from the point of view of the borrower, borrowing in a foreign currency only increases the vulnerability to default risk. This increase in risk associated with borrowing in foreign currency stems from non-governmental effects such as global shocks, or demand shocks on imported and exported goods, which can devalue the domestic currency against major foreign currencies and therefore increase the cost of borrowing as the interest payments in these years deteriorate government fiscal balances. Therefore, it is an important phenomena if and how much the sovereign borrowers in the developing world are being affected from (global) financial market pressures.

The rest of the paper is constructed as follows: Section (2) describes the MDH and empirical literature on it. Section (3) explains the empirical methodology used to test the MDH. The data and estimation results are presented in this section. For robustness, results are checked for sensitivity to two alternative structural budget balance estimations. Then, section (4) concludes the paper.

2 THE MARKET DISCIPLINE HYPOTHESIS (MDH)

The existence of the market discipline is very important from different dimensions: A strong market discipline serves to guide funds or credits to their most productive uses which will increase efficiency and growth by allowing a more efficient allocation of capital in the economy. Also, it is an important condition to establish the financial stability: At the individual level, in a country with lack of market discipline, firms bankruptcy and bank runs will disturb the stability of the financial markets. At the level of sovereign governments, lack of market disciplining will hurt both the creditor and debtor sides. Creditors will face huge losses due to the defaulting governments or voluntary repudiation of the sovereign governments. Debt collection may take years and the cost of it will be a burden to the creditor countries. On the other hand, sovereign borrowers who default

on external obligations will face a sudden stop in capital inflows to their country, thus leading to a slow down in the integration of their domestic economy to the world economy. Importantly, this effect increases cost of borrowing from abroad, and on some occasions even prevents a government from being able to access any external financing.

The MDH has two halves: the first half, do financial markets react to fiscal imbalances, and the second half, does fiscal sector respond to the changes in the financial market indicators? Effective market disciplining necessitates financial markets to effectively monitor the sovereign borrowers and reflect this on the financial indicators. The way markets show their confidence on the fiscal authority is generally through debt instruments such that credit markets signal the perceived default risk by means of interest rates. In fact, in a well functioning market disciplining mechanism, there is a very strong market reaction to governments that deviate from preferred policy outcomes. This reaction is generally in the form of a dramatic change in interest rates and/or an increase in the risk premia charged to governments¹.

Most empirical studies find some evidence that financial markets in advanced economies correctly price fiscal performance². Alesina, Broeck, Prati & Tabellini (1992) found that in highly indebted countries, a higher stock of debt increases the country premium. Knot (1996) obtained that persistent deficits have put an upward pressure on long term interest rates. De Haan & Sturm (2000) found that increases in public debt decrease sovereign credit ratings. By using the observed yield curve on treasury bills and future inflation expectation, Laubach (2003) found that future real interest rate expectation is being affected by the projected government debt. As future anticipated government debt increases by 1 percent of GDP, the expected future real interest rate increases by 2.9 to 5.3 basis points for the United States. Bernoth, von Hagen & Schuknecht (2006) found a positive relation between yield spread and some several fiscal variables such as government debt

¹In the empirical literature, different measures are used to proxy market pricing of the sovereign government default risk: the commonly used variables are yield differential between government bonds and a safe private bond, sovereign government bond ratings, the difference between real interest rate on the sovereign government bond and real growth rate, the yield differential between the sovereign government bond and a benchmark country's sovereign government bond, real interest rate etc. But, none of the default risk premium measurements is without deficiency.

²The consensus in the literature is that fiscal deficit is the fiscal policy outcome that has the most influence on interest rates or country default risk. However, another fiscal policy outcome is the stock of public debt.

ratio, fiscal deficit and debt service and they conclude that markets price sovereign risk³. Laban & Larrain (1997) investigated the market reaction to fiscal imbalances and they found that sovereign bond ratings change granger-cause yield spread. In a recent article, Ardagna, Caselli & Lane (2007) found that a 1 % point increase in the primary deficit to GDP ratio increases contemporaneous long-term interest rates by about 10 basis points for OECD countries. They found the impact of debts on interest rates are in a non-linear form such that only the countries with above average debt level are experiencing an increase in their real interest rates⁴. However, there are other studies that find no significant market reaction to the unsound fiscal imbalances: For instance, Obstfeld & Taylor (2004) found no significant influence of foreign debt of the central banks on their government bond default risk premium during the gold standard and interwar periods.

Unfortunately, there is lack of empirical studies that test the second half of the MDH -the fiscal response to the financial market indicators- in developing countries due to data limitations. As for advanced economies, empirical studies have produced mixed results depending on the estimation method and the sample selection. Bayoumi, Goldstein & Woglom (1995) find evidence in support of the MDH for the US states such that sovereign borrowers are forced to restrain borrowing due to the increasing risk premium. Another study by Capeci (1994) shows that, at the municipal level, credit markets impose substantial penalties for those with large debt burden. Heinemann & Winschel (2001) proxy the government default risk as the difference between the real government bond yields and real growth rate and find that, for the advanced countries, public surplus reacts to change in this variable. Another noteworthy study, Kula (2004), tests the credit market discipline for the U.S. states in intertemporally smoothing and credit constraint government frameworks, and in both settings the author rejects the credit market discipline hypothesis⁵. In this paper, the MDH

³They also found that after the implementation of European Monetary Union (EMU), debt ratios no longer affect yield spread, but debt service still has an important effect, hence the MDH didn't vanish but changes its focus from stock of debt to debt service in EMU countries.

⁴A recent study by Aisen & Hauner (2008) reports a highly significant positive effect of budget deficit on interest rates in countries with high budget deficits, high domestic debt ratios, less open or less financially depth countries.

⁵One explanation for the mixed results of the fiscal response to financial market indicators is the nature of the sovereigns. Sovereigns are a law unto themselves. It is their sovereignty whether they subject themselves to market disciplining. Therefore, there may be some occasions where sovereigns may overweight the domestic market stability compared to the external markets, and can choose not to keep their obligations.

will be tested for the developing countries.

3 EMPIRICAL METHODOLOGY

Empirical studies prove the first half of the MDH: sovereign governments' default risk premium increases with expansionary fiscal policies⁶. On the other hand, it is rare to find empirical evidence of a smooth response of public borrowers to change in default risk premium. The way sovereign governments are disciplined by the financial markets can be tested by checking if the fiscal indicators are being shaped by change in the country default risk premium. Yet, the measurement of country default risk premium is a challenge by itself.

Country Default-Risk Premium

In testing the MDH, reliable data for country default-risk premium and structural budget balances are scarce for many developing countries. In this paper, several different variables are utilized to capture the country default risk premium. Two measurements are used in cross sectional estimations: One is called *Effective Interest* which is calculated as the difference between interest rate on long-term sovereign government bonds and real GDP growth rate. The other measurement is called *Bond Rating*, and it measures the default spread in basis points against a safe sovereign bond with Aaa rating. The sovereign government bond ratings are the assessments of the economic, financial and political situation of a country and they are estimated by some private institutions such as Moody's, Investment Service, Standard and Poor's, etc. This variable is only useful for the developing countries as it only shows very small variability for the advanced countries. However, since data coverage for the developing countries is very limited, traditional econometric estimation doesn't apply. Table (1) shows available sample average sovereign government bond ratings for the set of countries analyzed in this paper. The numbers represent default spreads in percentage points for each sovereign government bond rating over a risk free bond rate (Aaa) which has a zero default probability. Most of the sovereign government's ratings have become available after 1990s

⁶See Alesina et al. (1992), Knot (1996), Laubach (2003) amongst others.

which prevents doing any time series regression. Yet, cross sectional regressions can explain some degree of association between sovereign bond ratings and structural fiscal balances. The table shows that countries in the sample face an average default risk premium of more than 5 percent over safe government bond.

As for time series analysis, the country default risk premium is measured by *Default* which is calculated as the difference between domestic real interest rate and risk-free world real interest rate. The risk-free world real interest rate is measured by interest rate on three-month US treasury bills minus a measure of US expected inflation where expected inflation is estimated by the average percentage increase in the US GDP deflator over the previous 4 years.

One caveat in the measurement of the sovereign government default risk is that, especially for the *Default* variable, the measurement includes both the default and liquidity risk components. Failing to control for the liquidity risk component may overestimate the disciplining effect of financial markets on sovereign borrowers. In the literature, liquidity risk of a country is captured by some alternative measurements of financial depth. In this paper, domestic credit to the private sector as a share of GDP (*Financial Depth*) is used as a measurement of financial depth to control for the liquidity risk⁷.

Simultaneity Problem

In econometric testing of the MDH, simultaneity problem could occur through several channels: Any type of shock to the default risk premium can also affect the fiscal balances through increasing debt servicing. As riskiness of a country increases, the real interest rate will rise which will increase the burden on the outstanding debt. Additionally, both fiscal variables and default risk factors can be influenced by some other common factors such as business cycles and productivity growth. For instance, movements in the business cycles can affect both fiscal deficits and country's risk premium simultaneously, and can create some spurious relation between these two variables⁸.

⁷A broader financial depth measurement which also includes the stock market capitalization could also be used, but, due to limited data coverage, we only used *Financial Depth* variable.

⁸ Even though there seems an obvious endogeneity, such that there are bidirectional relations between real interest rate and government budget balance, it is commonly asserted that economic integration of the countries with the rest

In line with the previous works, several attempts have been made to minimize the endogeneity problem. Structural budget balances are used in order to isolate the impact of business cycles' effects. Thus, the cyclical components of budget deficits which are the factors that move along with the business cycles are removed from the econometric analysis. There are some certain revenue and expenditure components of budget balances, such as personal income and corporate income tax revenues, unemployment related expenditures and indirect tax revenues, that fluctuate proportionally to the business cycle movements. Another remedy is to exclude the interest payments component of budget expenditures from the overall budget balances. Thus, the accounting effects of rising real interest rate on budget deficits through net interest payments on the outstanding government debts are excluded from the regressions by working with primary budget balances.

Keeping aside the fact that, in theory, there are bidirectional relations between sovereign government default risk premium and government budget balances, in most of the empirical studies, only the one half of the theory is tested by instrumental variable regressions⁹. This paper distinguishes both sides of the MDH by adopting the three-stage least square estimation (3SLS) to incorporate the contemporaneous feedback effects between primary structural budget balances and country default risk premium. Thus, it will produce more efficient estimate of the MDH than the 2SLS instrumental variable estimation.

In the rest of the empirical part, after giving the data description, first cross sectional association between average primary structural budget balances and average country default risk measurements is estimated by between effect panel regressions. Then, by using *Default* as a proxy for the sovereign government default risk premium, 3SLS estimation results are shown for all countries in the sample as well as across countries with different exchange rate regimes and across governments with different political ideology¹⁰. As for robustness, estimated primary structural budget balances are replaced by two alternative estimations. One is calculated as the residuals obtained

of the world employ downward pressures on fiscal deficits. Garrett (1998) finds support for this in the significant associations between increasing financial openness and smaller budget deficit. His work supports the idea that market disciplining increases with capital market integration.

⁹In the literature, instrumental variable 2SLS estimation method is applied to test whether the financial markets correctly price the fiscal performance of the sovereign governments.

¹⁰The conventional wisdom is that fixed exchange rates provide more fiscal discipline than do flexible rates.

from country by country regression of primary budget balances on a constant and output gap. The other is based on Blanchard (1993) where, for each country, each revenue and expenditure component as a share of GDP is regressed on a constant and the unemployment rate, then the estimated parameters and the residuals obtained from country by country regressions are used to compute what each fiscal budget component would have been in any period if the unemployment rate had remained constant from the previous period.

3.1 Data

There are 20 countries in the sample and the data spans 1975-2000 period. The list of countries are provided at the end. In the selection of the sample countries, the World Bank's classification of lower-middle and upper-middle income countries are chosen. On the other hand, low-income countries and high-income non-OECD countries are excluded from the sample. Another criteria in sample selection is the data availability. Countries that have majority of their data missing for at least half of the sample period are also excluded from the sample countries¹¹.

One of the major problems in testing the MDH for developing countries is the limited coverage of reliable economic data. It is proposed that by utilizing the International Monetary Fund (IMF)'s disaggregated Government Finance Statistics (GFS) data, the MDH can be tested for developing countries. Currently, the IMF is providing developing countries' data on GFS at the aggregate level which prevents measuring cyclical and structural component of actual budget balances that are the crucial variables necessary to test the MDH. However, data on the budget balances of governments at the disaggregated level are available for the period from 1972 to 2000¹². By utilizing this data, the structural component of the overall fiscal balances is measured by means of measuring budgetary elasticities of various revenue and expenditure components of budget balances¹³. Sovereign

¹¹A number of the sample countries underwent severe crisis during the sample period: Mexico in 1994, Malaysia and Thailand in 1997, Venezuela in 1994, Argentina in 1980-1982, Chile in 1982-1985, etc. These periods and countries are controlled in the regression analysis.

¹²This data is available in William Easterly's web site at <http://www.nyu.edu/fas/institute/dri/Easterly/>.

¹³The estimation result of this variable as well as the elasticity measurements are available from the author upon request.

government bond ratings are also used as a proxy for the sovereign government risk premium and the data is provided from Moody's website. The variables such as fractionalization, index of democratization, government quality, and majority seats are obtained from International Country Risk Guide (ICRG). Other control variables such as real GDP per capita, elderly and young population ratios, trade openness, current account, external debt, financial development, exchange rate regimes, and party ideology are provided from several different sources such as World Bank World Development Indicators (WDI), Teorell, Holmberg & Rothstein (2008), Bacchetta & van Wincoop (2000), Reinhart & Rogoff (2004), and Vanhanen (2003).

3.2 Cross-Sectional Analysis

A first look at the data shows a clear positive association between average primary structural budget balances as a fraction of potential GDP and average real interest rates. Figure (1) shows that sample countries with higher real interest rates are running higher primary structural balances. Given the caveat that real interest rate is not a good proxy for default risk, still the observation that the countries that are facing higher real interest rates are also running higher budget balances could be a sign that those countries are being efficiently disciplined by financial market. A better understanding of the efficiency of the MDH is tested in a cross-country regression of primary structural budget balances separately on two default risk premium measurements by controlling for government quality, productivity growth and openness. The following regression equation is estimated in a panel setting by evaluating variables at their sample means:

$$Budget_i = \alpha + \beta_1 Premium_i + \beta_2 \mathbf{X}_i + \varepsilon_i \quad (1)$$

The dependent variable in regression equation (1), *Budget*, refers to the primary structural budget balances as a fraction of potential output and it is estimated based on OECD methodology¹⁴. *Premium* is the sovereign government default risk premium and two different measurements are used as a proxy: *Bond Rating* measures the default spread in basis points against a safe sovereign

¹⁴Detailed information and elasticity measurements can be provided from the author upon request.

bond with Aaa rating. *Effective Interest* is an alternative country risk premium measurement, and it is calculated as the difference between the interest rate on long-term sovereign government bonds and real GDP growth rate. X is the vector of possible control variables that can affect the dependent variable: *Govern Quality* is the mean value of the several government quality variables such as corruption, law and order, and bureaucracy quality. It is scaled between 0 and 1 where higher numbers show a better quality of government. *Productivity* is measured by percentage growth in GDP per capita variable. *Openness* is measured as the fraction of trade volume to GDP. *Government fractionalization* and *index of democratization* variables are used to control for the institutions¹⁵.

As shown in Table (2), the cross sectional regressions show mixed results. It is found that countries that historically have higher default spread than average are the ones that run higher than average positive primary structural budget balances. Specifically, countries with default spread 1 basis point above the risk-free bond rate run higher structural balances by 0.95 per cent of potential GDP. On the other hand, when interest rate on long-term sovereign government bonds net of real GDP growth rate is used as a proxy for default risk, the estimation results show a significantly negative association. Other parameter estimates are mostly at their expected sign: High quality governments on average run lower structural balances, and more open economies give its governments freedom to borrow from abroad to run larger deficits. On the other hand, coefficient estimates of institution variables are at their wrong signs. The results show that governments which have more democratic and less polar parliaments run higher structural budget balances. Since the between effect regressions cannot clearly determine the direction of the causality, the 3SLS estimation is applied to better test the MDH in sample countries.

¹⁵The theoretical relationship between those control variables and the dependent variable is explained more in detail in section (3.3).

3.3 The 3SLS Estimations

In light of the above discussion, the following simultaneous equation system is estimated by 3SLS to test the validity of the MDH in developing countries:

$$\begin{aligned} Budget_{i,t} &= \alpha_i + \beta_1 Default_{i,t} + \psi \mathbf{X}_{i,t} + \varphi \mathbf{Y}_{i,t} + \varepsilon_{i,t} \\ Default_{i,t} &= \gamma_i + \theta_1 Budget_{i,t} + \tau \mathbf{Z}_{i,t} + \phi \mathbf{Y}_{i,t} + \nu_{i,t} \end{aligned} \quad (2)$$

\mathbf{X} = {*Left-winged, Size, Development, Elderly Population, Young Population, Public Debt, Public Debt Square, Fractionalization, Majority Seats* }

\mathbf{Y} = {*Trade Openness, Current Account, External Debt, Population Growth, Financial Depth, Capital Uncertainty, Year Fixed effects*}

\mathbf{Z} = {*Fixed Regime, Terms of Trade Uncertainty, Crisis Dummy*}

In the system of simultaneous-equation (2), the first endogenous variable, *Budget*, refers to the primary structural budget balances as a percentage of potential output. The other endogenous variable, *Default*, is the country spread which is calculated as the domestic real interest rate minus the risk-free world interest rate. Variable \mathbf{Y} includes all the exogenous variables common to both equations. It includes total trade to GDP ratio (*Trade Openness*), current account balances to GDP ratio (*Current Account*), external debt to GDP ratio (*External Debt*), population growth rate (*Population Growth*), domestic credit provided to private sector as a share of GDP (*Financial Depth*), and volatility of capital prices (*Capital Uncertainty*). Empirical evidence on the association between trade openness and budget deficit is mixed: Rodrik (1998) and other trade literature show evidence that countries with high degrees of trade openness are more likely to have higher government expenditures and large budget deficit. On the other hand, a country with open trade and financial regimes will have to run sound policies. As for the country default risk, it is expected that more open economies can reduce the country default risk premium because trade liberaliza-

tion reduces the risk associated with a sovereign's assets, and thereby lowers the risk premium embodied in domestic interest rates¹⁶. Countries with high current account deficits or net external debt to GDP ratios will experience upward pressure on their country default risk premium. On the other hand, it could create current account targeting motive or limit the borrowing capacity of the public sector, therefore structural budget can be affected by these two ratios. As supported in Kim (2003), a higher current account deficit will increase the public compensation expenditures to the individuals or sectors that are being negatively affected from trade, therefore, we expect a positive association between structural budget balances and current account balances. Population growth can affect both of the dependent variables whether through changing the credit demand or increasing the public spending on education and infrastructure. Financial depth is included to the system of equations to control for the liquidity risk. The relative price of investment goods is a key macroeconomic variable where the constructed dispersion of the unpredictable innovations in this variable is used to measure the corresponding macroeconomic uncertainty. It is very much correlated with the user cost of capital and volatility of this variable measures the uncertainty on aggregate investment profitability¹⁷.

X is the vector of control variables that are believed to only affect the primary structural budget balances, therefore they are the excluded variables from the *Default* equation, and it includes political orientation of the incumbent party (*Left-winged*), natural logarithm of real GDP (*Size*), natural logarithm of real GDP per capita (*Development*), demographic variables, public debt to GDP ratio and its square, government fractionalization, and majority votes in the parliament. The political ideology of the incumbent party as left-wing, right-wing, or centrist matters in government expenditures: right-wing governments are more benevolent than the left-wing ones and are reluctant to increase taxes. Left wing governments, on the other hand, are more expenditure and deficit prone. Therefore a dummy variable for the political orientation of the incumbent party as left-wing and

¹⁶Rating agencies such as Standard and Poor's and Moody's include openness as a factor in their ratings of a country's sovereign risk.

¹⁷In the construction of this sample-based uncertainty variable, a univariate GARCH (1,1) model with a constant and/or a trend is fitted for each country to measure the conditional variance as a proxy for uncertainty. Estimation results are available from the author upon request.

right-wing is included into the *Budget* equation¹⁸. Even though there is not a clear relationship between the size of the economy and the level of structural budget balances, one can argue that large economies are more prone to achieve higher government expenditures, thus run lower structural budget balances. We expect a positive correlation between development and structural budget balances: relatively advanced economies spend less on large scale government expenditures on infra-structure, education, and health, therefore, these countries can run higher budget balances. Also, highly productive developed nations can collect more income tax, thus can run higher budget balances. The percentages of elderly and young population to the overall population are used to characterize the role of demographic factors on budget deficit, and it is expected that an expanding elderly population will put negative pressure on the budget balances due to the social security and health expenses of the non-tax payer elderly population. Similar to that of the elderly, an increase in the share of the youth in the total population (*young population*) tends to increase the budget deficit. With a larger share of the population as young persons, public expenditures by the government which are specifically directed at the youth, such as education expenditures, will increase. Public debt ratio and its square are also included to the *Budget* equation to see if level of public debt has any linear and non-linear detrimental effect on structural budget balances. It is also expected that powerful governments with higher majority seats can run higher budget deficits, while large fractionalization of the parliament and/or of the government has negative impact on the budget surplus and positive impact on government expenditure.

The vector of \mathbf{Z} denotes the control variables that are assumed to affect only the sovereign government default risk premium, the *Default* equation, and it includes exchange rate regime (*Fixed Regime*), terms of trade uncertainty, and financial crisis dummy variable. Especially for the developing countries, exchange rate risk constitutes a major investment risk components and the sustainability of the exchange rate or the credibility of the exchange rate regime can help im-

¹⁸In Beck, Demirgüç-Kunt & Levine (2000), the party's orientation is classified leftist, rightist or center. Right-wing parties are defined as conservative and Christian democrat. Left-wing parties are defined as communist, socialist, or social democratic. Due to the data limitation, centrist parties are classified under the right-wing parties, and a dummy variable, *Left-winged*, is constructed which takes the value of 0 for right-wing and centrist governments and 1 for the left-wing governments at the time of the recording.

proving the soundness of the financial markets, therefore a dummy variable for the exchange rate regime is included in the *Default* equation¹⁹. Sovereigns with higher macroeconomic uncertainties tend to have higher risk of default than the more macro-economically stable ones. Therefore, as a measurement of uncertainty, the volatility of the innovation to the terms of trade variable is used to capture the variation of the relative profitability of exporting and importing sectors. Finally, the crisis dummy variable is included to the *Default* equation to control for the countries such as Mexico, Malaysia, Thailand, and Argentina who actually defaulted on their external debts. The *Crisis Dummy* variable takes the value of 1 for those countries who had experienced severe financial or currency crisis, and to control for the long run impact of crisis, the dummy variable takes the value of 1 during the crisis period and 1 year after the crisis period.

Estimation Results

Table (3) shows the 3SLS estimation results of the system of equations in (2) for the full sample. Coefficient estimates validate the efficient market disciplining hypothesis in the sense that an increase in the structural budget balances by 1% of potential GDP reduces the country spread by 1.472% and the effect is sizable and significant at conventional levels. In regards to fiscal response to the market indicators, the sign of the coefficient estimate is in favor of the MDH: a 1% increase in the country default risk premium improves the primary structural budget balances by 0.11% of potential GDP, yet it is not statistically significant at any conventional level. Amongst the set control variables that are included only in the *Budget* equation, (**X**); all variables but *Left-winged* and *Majority Seats* have statistically significant predictive power. The results indicate that larger economies on average run lower structural budget balances. On the other hand, relatively more advanced economies run higher structural budget balances which shows that those countries whether receive more tax revenues or spend less on some basic expenditure components such as infra-structure, education, and health. As expected, the results show that an increase in the elderly population put negative pressures on the structural budget balances. But, *Young Population*

¹⁹*Fixed Regime* is a dummy variable and it takes the value of 1 if the economy is under a fixed exchange rate regime, and 0 if it floats. Countries with codes 1 and 2 in Reinhart & Rogoff (2004) are classified as fixed countries while the ones with a code 3 or above are coded as floating countries.

variable in the *Budget* equation has the statistically significant wrong sign: an increase in the young population by 1% increases the structural budget balances on average by 0.98%. It is hard to justify this finding with the economic theory as an increase in the share of the youth in the total population tends to increase the budget deficit due to the public expenditures on education. In regards to budgetary response to public debt ratio, the results indicate that structural budget balances worsen with increasing level of public debt which could be a sign that public borrowings are channeled to finance more government expenditures. However, very high level of public debt measured by the square of the public debt ratio has a disciplining effect on the fiscal authorities. Finally, coefficient estimate of government fractionalization is in contrast with the theoretical expectation; as the probability that two randomly chosen deputies in the legislature belong to different parties increases by 1%, structural budget balances improves by 0.06% on average.

Amongst the set of control variables that are included only in the *Default* equation, (**Z**), it is found that exchange rate regime matters and fixed exchange rate seeking countries face higher default risk premium than floating countries. As for uncertainty measurements, the findings show that an increase in the terms of trade uncertainty by one standard deviation reduces the country default risk premium by 0.081% which is in contrast to the expectation that uncertainty will induce more risk.

As for the control variables that are common to both the *Budget* and the *Default* equations, (**Y**), the results show that a 1% increase in the trade openness increases the structural budget balances by 0.81% which confirms the Garrett (1998)'s finding that increasing trade openness puts a downward pressure on the country's structural budget deficits. In contrast with the prediction of the current account targeting motive, the results show that a 1% increase in the current account to GDP ratio improves the structural budget balances by 0.124% of potential output. External debt to GDP ratio, on the other hand, fails to explain any variation in both the *Budget* and the *Default* equations in a statistical sense. Population growth rate has a sizable effect on the variation in the country default risk premium, and the findings show that one tenth of one percent increase in the population growth rate increases the country's default risk premium by 1.21%. One can argue that

population increase puts upward pressure on the real interest rate through higher credit demand, thus increases the country default risk premium. The results also show that the deeper the financial depth, the higher the country default risk premium. As discussed before, financial depth variable is included to the regression equations to control for the liquidity risk component in the country default risk premium measurement, yet, the findings show that increasing liquidity increases country default risk premium which should be the otherway around: In the case that country default risk measurement includes the liquidity risk component, an increase in the financial depth will reduce the liquidity risk, thus the county default risk premium. Table (3) reports also the χ^2 p-value of the Hansen-Sargan overidentification test for the system of equations. If the chi-square statistic in the Hansen-Sargan test does not reject the null hypothesis, this implies that the instruments are valid and the system is correctly specified. As p-value is very high, Hansen-Sargan tests fail to reject the null hypothesis of overidentifying restrictions confirming the validity of the specification.

Exchange Rate Regime and Party Ideology

In this part, it is tested if there is a difference in the sovereign governments' response to financial market indicators across left-winged and right-winged governments. For this purpose, an interaction term (*Left-Winged*Default*) which is formed by the product of political ideology of the incumbent party (*Left-winged*) with country default risk premium is included to the *Budget* equation. Beside, the role of exchange rate regime on the market disciplining of the financial markets on sovereign governments is tested by generating another interaction term (*Fixed Regime*Budget*) by multiplying exchange rate regime dummy (*Fixed Regime*) with the structural budget balances and adding this to the *Default* equation²⁰. Therefore, the following system of equations is estimated by 3SLS and the results are shown in Table (4):

$$\begin{aligned}
 Budget_{i,t} &= \alpha_i + \beta_1 Default_{i,t} + \beta_2 Left\ Winged * Default_{i,t} + \psi \mathbf{X}_{i,t} + \varphi \mathbf{Y}_{i,t} + \varepsilon_{i,t} \\
 Default_{i,t} &= \gamma_i + \theta_1 Budget_{i,t} + \theta_2 Fixed\ Regime * Budget_{i,t} + \tau \mathbf{Z}_{i,t} + \phi \mathbf{Y}_{i,t} + \nu_{i,t} \quad (3)
 \end{aligned}$$

²⁰*Fixed Regime*Budget* is a dummy variable and it takes the value of 1 if the economy is under a fixed exchange rate regime, and 0 if it floats.

As shown in Table (4), the coefficient estimate of the interaction term *Left-Winged*Default* in the *Budget* equation is not statistically different than zero which implies that the sovereign response to market indicators pertaining to their actions are not statistically different between left-winged and right-winged governments, yet, similar to the findings in Table (3), we do not find robust evidence that the change in country default risk premium had a significant effect on budget balances. On the other hand, statistical significance of the coefficient estimate of *Budget* in the *Default* equation does not change after including the interaction term *Fixed Regime*Budget*. Since the coefficient estimate of the interaction term *Fixed Regime*Budget* is not statistically different than zero, we can conclude that market response to fiscal indicators do not change in between fixed exchange rate regime seeking and floating countries.

3.4 Robustness Checks

As a robustness, our calculation of structural budget balances are replaced by two alternative measurements that are used in the literature, then the systems (2) and (3) are estimated by replacing the *Budget* variable with each alternative measurement of structural budget balances²¹. The first method uses the residuals obtained from country by country regression of primary budget balances to GDP ratio on a constant and output gap to extract the structural budget balances net of the effects on the budget of cyclical fluctuations of growth and unemployment²². Then, the following simultaneous-equation systems are estimated by replacing the *Budget* variable in systems (2) and (3) with the first alternative measurement, *Budget 2* and the results are shown in Table (5):

$$\begin{aligned}
 Budget\ 2_{i,t} &= \alpha_i + \beta_1 Default_{i,t} + \psi \mathbf{X}_{i,t} + \varphi \mathbf{Y}_{i,t} + \varepsilon_{i,t} \\
 Default_{i,t} &= \gamma_i + \theta_1 Budget\ 2_{i,t} + \tau \mathbf{Z}_{i,t} + \phi \mathbf{Y}_{i,t} + \nu_{i,t}
 \end{aligned} \tag{4}$$

²¹Detailed information on the estimation of alternative structural budget balances are available upon request.

²²Output is assumed to follow a quadratic trend in output gap measurement.

$$\begin{aligned}
Budget\ 2_{i,t} &= \alpha_i + \beta_1 Default_{i,t} + \beta_2 Left\ Winged * Default_{i,t} + \psi \mathbf{X}_{i,t} + \varphi \mathbf{Y}_{i,t} + \varepsilon_{i,t} \\
Default_{i,t} &= \gamma_i + \theta_1 Budget\ 2_{i,t} + \theta_2 Fixed\ Regime * Budget\ 2_{i,t} + \tau \mathbf{Z}_{i,t} + \phi \mathbf{Y}_{i,t} + \nu_{i,t} \quad (5)
\end{aligned}$$

The second method to construct the primary structural budget balances is based on Blanchard (1993) which implies a calculation of how the government budget would be if unemployment had not changed from the previous year²³. Specifically, this cyclical adjustment is aimed to eliminate the impact of business cycles on budget balances channeling through tax collections and transfer payments. For each country, each spending and revenue component of primary budget balances as a share of GDP is regressed on a constant and unemployment rate. The estimated parameters and residuals obtained from each regression and for each budget component is, then, used to compute what each budget component would have been in year (t), if the unemployment rate had remained constant between year (t-1) and year (t). The following simultaneous-equation systems, then, are estimated by 3SLS by replacing the *Budget* variable in systems (2) and (3) with this alternative measurement, *Budget 3*:

$$\begin{aligned}
Budget\ 3_{i,t} &= \alpha_i + \beta_1 Default_{i,t} + \psi \mathbf{X}_{i,t} + \varphi \mathbf{Y}_{i,t} + \varepsilon_{i,t} \\
Default_{i,t} &= \gamma_i + \theta_1 Budget\ 3_{i,t} + \tau \mathbf{Z}_{i,t} + \phi \mathbf{Y}_{i,t} + \nu_{i,t} \quad (6)
\end{aligned}$$

$$\begin{aligned}
Budget\ 3_{i,t} &= \alpha_i + \beta_1 Default_{i,t} + \beta_2 Left\ Winged * Default_{i,t} + \psi \mathbf{X}_{i,t} + \varphi \mathbf{Y}_{i,t} + \varepsilon_{i,t} \\
Default_{i,t} &= \gamma_i + \theta_1 Budget\ 3_{i,t} + \theta_2 Fixed\ Regime * Budget\ 3_{i,t} + \tau \mathbf{Z}_{i,t} + \phi \mathbf{Y}_{i,t} + \nu_{i,t} \quad (7)
\end{aligned}$$

²³In Table (7), the descriptive statistics of actual primary budget balances and the estimated structural budget balances as well as the pairwise correlations are displayed.

Tables (5) and (6) show the results of 3SLS estimation of systems (4) - (5), and (6) -(7), respectively. The initial results are robust to two alternative measurements of structural budget balances. The findings show that the *Default* variable has no predictive power to explain the variation in the country default risk premium in any of the specifications. On the other hand, the results indicate that financial markets of the sample countries function very well in terms of pricing the fiscal performance: an increase in the structural budget balances by 1% of potential GDP reduces the country default risk premium by 1.654% when *Budget 2* is used as the measure of structural budget balances, and by 1.084% when *Budget 3* is used. Controlling for the exchange rate regime and political ideology of the incumbent part does not change the overall outcome, yet, it is found that the sensitivity of the country default risk premium to structural budget balances is higher in floating countries.

4 CONCLUSION

This paper contributes to the current literature on market disciplining of the sovereign governments in two ways: Firstly, it distinguishes both sides of the MDH by adopting 3SLS to incorporate the contemporaneous feedback effects between primary structural budget balances and country default risk premium. By this way, the bidirectional relationships between sovereign government default risk premium and government budget balances are controlled in a 3SLS framework to get an efficient estimate to test the existence of the MDH. Secondly, despite the fact that we have limited data for the developing countries, by the utilization of the IMF's disaggregated government finance statistics data, structural primary budget balance is estimated to test the MDH for the developing countries.

The 3SLS estimation results do not show a disciplinary effect of the financial markets on the sovereign governments in the developing countries sample. As for the markets' response to change in the fiscal indicators, the results show well-functioning financial markets in the sample countries. The findings conclude that financial markets require lower default risk premium from the sovereign governments that run higher structural budget balances as a fraction of their potential output. The

effect is sizeable and statistically significant. Controlling for the political ideology does not change the conclusion but financial markets seem to function more efficient in the floating countries. When alternative measurements of structural budget balances are used, it is found that the response of the financial markets to the behavior of the fiscal authority is in line with prediction of the MDH which implies that higher structural budget balances are priced in the market in a way to decrease the country default risk premium.

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Table 1: Sovereign Governments' Bond Ratings by Moody's

Country	Coverage	Average Country Default Risk Premia
Argentina	1986-2006	0.09
Bolivia	1998-2006	0.09
Colombia	1993-2006	0.07
Costa Rica	1997-2006	0.07
Malaysia	1986-2006	0.06
Mexico	1990-2006	0.07
Panama	1978-2005	0.06
South Africa	1994-2006	0.06
Thailand	1989-2006	0.06
Uruguay	1993-2006	0.07
Venezuela	1976-2006	0.07

Notes: 11 of the 20 countries in the sample with long span of country ratings data are observed in this graph. Country-average risk premium is calculated with respect to a risk free government with a bond rating of Aaa. The numbers represent the default spreads in decimal points for each assigned sovereign government bond rating over a risk free bond rate (Aaa) which has a zero default probability.
Data Source: Moody's.

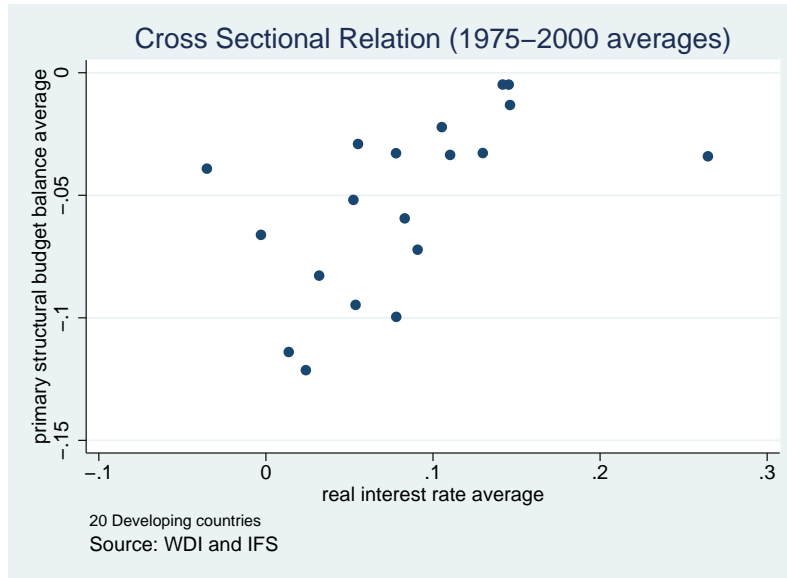


Figure 1: Cross Sectional Real Interest Rates and Structural Budget Balances

Table 2: Cross-sectional Regressions

Model: $Budget_i = \alpha + \beta_1 Premium_i + \beta_2 \mathbf{X}_i + \varepsilon_i$

	(1)	(2)
Bond Rating	0.948* (0.430)	
Effective Interest		-0.244*** (0.023)
Govern Quality	-0.205** (0.052)	-0.205** (0.023)
Productivity	0.975** (0.341)	0.266 (0.120)
Financial Openness	-0.015** (0.005)	-0.015** (0.002)
Fractionalization	0.104* (0.051)	
Index of Democratization		0.084** (0.018)
Observation	92	78
R^2	0.81	0.99
Number of countries	11	8

Notes: The dependent variable, *Budget*, refers to the primary structural budget balances as a fraction of potential output and it is the author's estimation based on OECD methodology. *Premium* is the sovereign government default risk premium and two measurements are used as a proxy: *Bond Rating* measures the default spread in basis points against a safe sovereign bond with Aaa rating. *Effective Interest* is an alternative country risk premium measurement and it is calculated as the difference between the interest rate on long-term sovereign government bonds and real GDP growth rate. \mathbf{X} is the vector of possible control variables that can affect the dependent variable. *Govern Quality* is the mean value of the ICRG variables "Corruption", "Law and Order" and "Bureaucracy Quality", and scaled 0-1. *Fractionalization* measures the probability that two randomly chosen deputies in the legislature belong to different parties. *Index of Democratization* is in between 0 and 100 and it measures the percentage of votes not cast for the largest party (Competition) times the percentage of the population who actually voted in the election (Participation). The data span 1975-2000 period and there are 20 countries in the full sample but due to data availability, not all countries in the sample are included to each regression model. The table shows the between effect panel regression results. Data limitation prevents controlling many variables at a time. Conventional standard errors are in parenthesis. ***, ** and * denote significance at 1 percent, 5 percent and 10 percent, respectively.
Data Sources: Moody's (www.moody.com), IMF's International Financial Statistics (IFS), International Country Risk Guide (ICRG), Chinn & Ito (2006), Beck, Demirgüç-Kunt & Levine (2000), Vanhanen (2003), World Development Indicators (WDI), and William Easterly's website: <http://www.nyu.edu/fas/institute/dri/Easterly/>.

Table 3: 3SLS Instrumental Variable Regression: Annual Data (1975-2000)

	(1)	(2)
	Budget	Default
Default	0.114 (0.108)	
Budget		-1.472*** (0.439)
Trade Openness	0.081*** (0.027)	-0.042 (0.074)
Current Account	0.124* (0.066)	-0.233 (0.170)
External Debt	0.039 (0.037)	-0.049 (0.041)
Population Growth	0.348 (1.414)	12.143*** (3.059)
Financial Depth	-0.017 (0.024)	0.082* (0.046)
Capital Uncertainty	-0.013 (0.011)	0.052 (0.033)
Left-Winged	-0.000 (0.009)	
Size	-0.565*** (0.123)	
Development	0.540*** (0.117)	
Elderly Population	-12.693*** (2.417)	
Young Population	0.979*** (0.283)	
Public Debt	-0.391*** (0.087)	
Public Debt Square	0.233*** (0.057)	
Fractionalization	0.066*** (0.024)	

Continued on next page

Table 3 – continued from previous page

	(1)	(2)
	Budget	Default
Majority Seats	0.026 (0.020)	
Fixed Regime		0.058*** (0.021)
Terms of Trade Uncertainty		-0.081** (0.039)
Crisis Dummy		-0.074 (0.059)
Observations	225	225
R-Square	0.71	0.68
Hansen - Sargan (p-value)	0.55	

Notes: The table shows three-stage OLS estimation for the system of simultaneous-equation (2); *Budget* refers to primary structural budget balances as a fraction of potential output and it is the author's estimation based on OECD methodology, *Default* is the measurement for sovereign government default risk premium. Both country and year fixed effects are controlled in the estimations, yet the coefficient estimates are not shown due to space constraint. The data span 1975-2000 period and there are 20 countries in the full sample. Standard errors with small sample adjustments are in parenthesis. ***, ** and * denote significance at 1 percent, 5 percent and 10 percent, respectively. P-value shows the Hansen-Sargan overidentification statistic which is a test of the null hypothesis that the excluded instruments are valid instruments.

Data Sources: IMF's International Financial Statistics (IFS), International Country Risk Guide (ICRG), Beck, Demirgüç-Kunt & Levine (2000), World Development Indicators (WDI), and William Easterly's web-site: <http://www.nyu.edu/fas/institute/dri/Easterly/>.

Table 4: 3SLS Instrumental Variable Regression: Controlling for Exchange Rate Regime and Party Ideology, Annual Data (1975-2000)

	(1)	(2)
	Budget	Default
Default	-0.112 (0.429)	
Left-Winged*Default	0.833 (1.338)	
Budget		-1.662** (0.810)
Fixed Regime*Budget		0.392 (1.321)
Trade Openness	0.122 (0.091)	-0.069 (0.115)
Current Account	0.410 (0.486)	-0.201 (0.200)
External Debt	0.039 (0.082)	-0.058 (0.049)
Population Growth	2.978 (5.897)	12.025*** (3.128)
Financial Depth	-0.063 (0.090)	0.081* (0.047)
Capital Uncertainty	0.001 (0.037)	0.052 (0.033)
Left-Winged	-0.052 (0.093)	
Size	-0.512 (0.333)	
Development	0.587** (0.249)	
Elderly Population	-16.416** (7.592)	
Young Population	2.124 (2.069)	
Public Debt	-0.361*	

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Table 4 – continued from previous page

	(1)	(2)
	Budget	Default
	(0.209)	
Public Debt Square	0.252**	
	(0.127)	
Fractionalization	0.036	
	(0.077)	
Majority Seats	-0.090	
	(0.200)	
Fixed Regime		0.070
		(0.049)
Terms of Trade Uncertainty		-0.085**
		(0.039)
Crisis Dummy		-0.063
		(0.061)
Observations	225	225
R-Square	0.79	0.67
Hansen - Sargan (p-value)	0.52	

Notes: The table shows three-stage OLS estimation for the system of simultaneous-equation (3); *Budget* refers to primary structural budget balances as a fraction of potential output and it is the author's estimation based on OECD methodology, *Default* is the measurement for sovereign government default risk premium. Both country and year fixed effects are controlled in the estimations, yet the coefficient estimates are not shown due to space constraint. The data span 1975-2000 period and there are 20 countries in the full sample. Standard errors with small sample adjustments are in parenthesis. ***, ** and * denote significance at 1 percent, 5 percent and 10 percent, respectively. P-value shows the Hansen-Sargan overidentification statistic which is a test of the null hypothesis that the excluded instruments are valid instruments.

Data Sources: IMF's International Financial Statistics (IFS), International Country Risk Guide (ICRG), Beck, Demirgüç-Kunt & Levine (2000), World Development Indicators (WDI), and William Easterly's web-site: <http://www.nyu.edu/fas/institute/dri/Easterly/>.

Table 5: Robustness 1: 3SLS Instrumental Variable Regression: Annual Data (1975-2000)

	(1)	(2)	(1)	(2)
	Budget 2	Default	Budget 2	Default
Default	-0.027 (0.092)		-0.187 (0.311)	
Left-Winged*Default			0.591 (0.946)	
Budget 2		-1.654*** (0.581)		-2.064* (1.200)
Fixed Regime*Budget 2				0.629 (1.693)
Trade Openness	0.101*** (0.023)	0.016 (0.090)	0.135** (0.068)	-0.005 (0.107)
Current Account	0.103* (0.056)	-0.167 (0.181)	0.314 (0.355)	-0.135 (0.205)
External Debt	-0.100*** (0.030)	-0.112** (0.047)	-0.132* (0.069)	-0.114** (0.048)
Population Growth	2.102* (1.190)	13.720*** (3.304)	3.910 (4.291)	13.418*** (3.396)
Financial Depth	-0.010 (0.020)	0.037 (0.048)	-0.037 (0.065)	0.042 (0.049)
Capital Uncertainty	-0.006 (0.009)	0.045 (0.035)	0.005 (0.028)	0.043 (0.036)
Left-Winged	0.009 (0.007)		-0.024 (0.065)	
Size	-0.265*** (0.100)		-0.183 (0.266)	
Development	0.282*** (0.096)		0.278 (0.199)	
Elderly Population	-6.965*** (1.970)		-8.479* (4.967)	
Young Population	0.443* (0.233)		1.202 (1.448)	
Public Debt	-0.075 (0.070)		0.006 (0.170)	

Continued on next page

Table 5 – continued from previous page

	(1)	(2)	(1)	(2)
	Budget 2	Default	Budget 2	Default
Public Debt Square	0.115** (0.047)		0.119 (0.097)	
Fractionalization	0.059*** (0.019)		0.038 (0.059)	
Majority Seats	0.025 (0.016)		-0.056 (0.141)	
Fixed Regime		0.043** (0.021)		0.038 (0.025)
Terms of Trade Uncertainty		-0.079** (0.040)		-0.076* (0.042)
Crisis Dummy		-0.031 (0.059)		-0.068 (0.068)
Observations	226	226	226	226
R-Square	0.61	0.64	0.61	0.63
Hansen - Sargan (p-value)		0.45	0.41	

Notes: The first two columns show the results of 3SLS estimation of system in (4), and the last two columns for the system in (5). *Budget 2* refers to primary structural budget balances as a fraction of potential output and as a robustness, it is calculated as the residuals obtained from country by country regression of primary budget balances on a constant and output gap. *Default* is the measurement for sovereign government default risk premium. Both country and year fixed effects are controlled in the estimations, yet the coefficient estimates are not shown due to space constraint. The data span 1975-2000 period and there are 20 countries in the full sample. Standard errors with small sample adjustments are in parenthesis. ***, ** and * denote significance at 1 percent, 5 percent and 10 percent, respectively. P-value shows the Hansen-Sargan overidentification statistic which is a test of the null hypothesis that the excluded instruments are valid instruments.

Data Sources: IMF's International Financial Statistics (IFS), International Country Risk Guide (ICRG), Beck, Demirgüç-Kunt & Levine (2000), World Development Indicators (WDI), and William Easterly's web-site: <http://www.nyu.edu/fas/institute/dri/Easterly/>.

Table 6: Robustness 2: 3SLS Instrumental Variable Regression: Annual Data (1975-2000)

	(1)	(2)	(1)	(2)
	Budget 3	Default	Budget 3	Default
Default	0.159 (0.171)		0.006 (0.557)	
Left-Winged*Default			1.240 (2.050)	
Budget 3		-1.084*** (0.383)		-2.057* (1.100)
Fixed Regime*Budget 3				1.774 (1.845)
Trade Openness	0.065* (0.036)	-0.067 (0.082)	0.133 (0.152)	-0.200 (0.162)
Current Account	0.102 (0.111)	-0.478** (0.189)	0.723 (1.067)	-0.308 (0.263)
External Debt	-0.004 (0.073)	-0.102** (0.045)	0.042 (0.242)	-0.127** (0.054)
Population Growth	-1.459 (1.722)	11.129*** (3.205)	0.946 (8.654)	10.829*** (3.417)
Financial Depth	-0.013 (0.037)	0.110** (0.050)	-0.110 (0.207)	0.099* (0.053)
Capital Uncertainty	-0.014 (0.014)	0.055 (0.037)	0.013 (0.067)	0.059 (0.039)
Left-Winged	-0.000 (0.011)		-0.084 (0.156)	
Size	-0.556*** (0.138)		-0.397 (0.561)	
Development	0.624*** (0.129)		0.666* (0.375)	
Elderly Population	-12.188*** (3.183)		-18.433 (13.880)	
Young Population	0.606* (0.355)		2.095 (3.484)	
Public Debt	-0.354** (0.148)		-0.364 (0.444)	

Continued on next page

Table 6 – continued from previous page

	(1)	(2)	(1)	(2)
	Budget 3	Default	Budget 3	Default
Public Debt Square	0.258*** (0.074)		0.325 (0.270)	
Fractionalization	0.075*** (0.028)		0.038 (0.117)	
Majority Seats	0.022 (0.024)		-0.149 (0.308)	
Fixed Regime		0.037* (0.022)		0.096 (0.066)
Terms of Trade Uncertainty		-0.059 (0.040)		-0.062 (0.043)
Crisis Dummy		-0.086 (0.060)		-0.080 (0.069)
Observations	212	212	212	212
R-Square	0.66	0.68	0.78	0.65
Hansen - Sargan (p-value)		0.38	0.59	

Notes: The first two columns show the results of 3SLS estimation of system in (6), and the last two columns for the system in (7). *Budget 3* refers to primary structural budget balances as a fraction of potential output and as a robustness, it is calculated based on (Blanchard 1993). *Default* is the measurement for sovereign government default risk premium and country spread, the domestic real interest rate minus the risk-free world interest rate, is used as a proxy. Both country and year fixed effects are controlled in the estimations, yet the coefficient estimates are not shown due to space constraint. The data span 1975-2000 period and there are 20 countries in the full sample. Standard errors with small sample adjustments are in parenthesis. ***, ** and * denote significance at 1 percent, 5 percent and 10 percent, respectively. P-value shows the Hansen-Sargan overidentification statistic which is a test of the null hypothesis that the excluded instruments are valid instruments.

Data Sources: IMF's International Financial Statistics (IFS), International Country Risk Guide (ICRG), Beck, Demirgüç-Kunt & Levine (2000), World Development Indicators (WDI), and William Easterly's web-site: <http://www.nyu.edu/fas/institute/dri/Easterly/>.

Table 7: Descriptive Statistics of the Estimated Structural Budget Balance Ratios

Pairwise correlations				
	Actual Budget	Budget	Budget 2	Budget 3
Actual Budget	1.000			
Budget	0.975	1.000		
Budget 2	0.683	0.661	1.000	
Budget 3	0.972	0.966	0.623	1.000

Summary Statistics				
	Actual Budget	Budget	Budget 2	Budget 3
Mean	-0.0542	-0.0529	0.0000	-0.0523
Standard dev.	0.0524	0.0507	0.0357	0.0512
Min	-0.3258	-0.3002	-0.2195	-0.3258
Max	0.0462	0.0406	0.1107	0.0522

Notes: *Actual Budget* refers to the actual primary budget balances as a fraction of GDP. *Budget* refers to the primary structural budget balances as a fraction of potential output and it is the author's estimation based on OECD methodology. *Budget 2* refers to primary structural balances as a fraction of GDP and it is calculated as the residuals obtained from country by country regression of primary budget balances on a constant and output gap. *Budget 3* refers to primary structural balances as a fraction of GDP and as a robustness, it is calculated based on Blanchard (1993).

List of countries: Argentina, Bolivia, Cameroon, Chile, Colombia, Costa Rica, Dominican Republic, Egypt, Arab Rep., Iran, Islamic Rep., Malaysia, Mauritius, Mexico, Morocco, Panama, Paraguay, South Africa, Thailand, Tunisia, Uruguay, and Venezuela.