THE EFFECTS OF DECENTRALIZATION ON MACROECONOMIC INSTABILITY: DOES POLITICAL AND INSTITUTIONAL ENVIRONMENT MATTER?

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Abstract

There is yet to be a consensus among economists as to the true benefits of decentralization both on the theoretical and empirical level. Nevertheless this has not stopped various countries from proceeding with the decentralizing of their economies. Indeed certain studies have shown that out of the 77 developing and transition countries with populations greater than 7 million, 63 have embarked on some form of fiscal decentralization (Helmsing, 1999; Ebel, 2000). The main objective of this paper is to shed more lights on the relationship between decentralization and macroeconomic stability. Even though there is a huge literature both theoretically and empirically on the impact of decentralization, not many of them seems to be interested on the question of the link between decentralization and macroeconomic stability. It is thus our hope trough this paper to fill this gap in the literature.

Keywords: Decentralization, macroeconomic stability, institutional and political environment

1. Introduction

The debates on the benefits of decentralization are far from being conclusive both on the theoretical and empirical level, but this has not stopped various countries from proceeding with the decentralizing of their economies. Indeed certain studies have shown that out of the 77 developing and transition countries with populations greater than 7 million, 63 have embarked on some form of fiscal decentralization (Helmsing, 1999; Ebel, 2000)[1].

In this paper, we will look at one issue about decentralization that we believe has been scantily analyzed in the literature namely the effects of decentralization on macroeconomic stability. Our main objective here is to try to shed more lights on the issue notably by looking at other dimensions of macroeconomic stability than what are usually used in precedent studies as well as by examining other factors that might accentuate or diminish the effects of decentralization on macroeconomic stability[2].

Even though there is no precise definition of macroeconomic instability, the concept is usually understood as a situation of a situation of economic malaise, where the economy does not seem to have settled in a steady position, and where, eventually, something needs to be done for putting it back on track (Azam 2000). Roughly speaking, everything that is going wrong in a country's macroeconomic condition such as high inflation, overvalued currency, unstable real exchange rate, balance of payment deficit, or fiscal deficit is often called macroeconomic instability. To put it differently, macroeconomic instability refers to phenomena that make the domestic

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[1] This trend towards decentralization can be seen according to several authors as a final stage of the dialectical movement of the development paradigm (Bardhan and Mokherjee 2005, Sharma 2004).Till mid 1980s, the paradigm was in favour of more economic role for the state which then gave rise to the extreme forms of centralization. The centralized decision making was seen as a way to rationalize scarce resources and depoliticize the masses while decentralization was viewed as likely to heighten cleavages, political radical ethnic and religious (Scheineder 2003). However in late 1980s and early 1990s, an obsession with curtailing the economic role of the state and reducing the size of the public sector, as these were seen as major causes for financial crisis in the developing countries have led to the emergence of the second phase. The public sector far from being regarded as engine of development came to be perceived as an obstacle to it. Then by mid 1990s, a renewed appreciation of the public sector's development role especially the subnational governments began to emerge.

[2]It is also interesting to note that the question of macroeconomic stability itself has been exiguously analyzed in the literature. As it is put by Satyanath and Subramaniam (2004),

> " *It is surprising that while so much of the recent literature has been devoted to, even obsessed with, explaining the cross-country variation in real variables—for example, in income..there has been much less of a concern with analyzing the cross-country variation in nominal or macroeconomic instability. This is despite the fact that the cross-country variation in nominal or macroeconomic instability is even more astounding than that in income*" (Satyanath and Subramaniam (2004): p. 2).

macroeconomic environment less predictable and it can take the form of volatility of key macroeconomic variables or of unsustainability in their behavior.

The paper starts by reviewing the theoretical and empirical studies that have been done so far on the effects of decentralization on macroeconomic instability. Based on this review, we will show that there is yet to be a consensus both at the theoretical and empirical level, among economists as far as the effects of decentralization on macroeconomic instability are concerned. Section 2 presents our econometric approach as well as our results. Finally section 3 concludes.

2. The Relationship between Macroeconomic Stability and Decentralization

It is noteworthy that there is a slight tendency to associate decentralization with less macroeconomic stability owing notably to the fact that decentralization is usually accompanied by an increase of autonomy level of the local governments. Ahmad et al (2005) held that macroeconomic stability for a country or supranational economic union depends on the overall aggregate exposure to risk—and a critical element of the latter is the borrowing of all the component jurisdictions in the relevant country or economic union. Decentralization means that local governments will be granted more power in determining the level of their expenses as well as their revenues. This in turn means that central government will have less power to control the behavior of the subnational governments. Adding to this is the coordination problem that will emerge among the subnational governments which usually have their own agendas to pursue. In a decentralized system, subnational governments respond to different constituencies. And herein lies the cause of policy divergence across level of governments (Riker 1987). According to Wibbels (2000) policy divergence is more likely to happen when it comes to economic reforms as voters usually hold the national and not subnational governments responsible for macroeconomic performance. Besides, international pressures also tend to focus on the performances of national governments. And since subnational governments are in a way insulated from the country's macroeconomic situation, their adjustment policies are subject to collective action problem. From the point of view of provincial politicians, the gains achieved via state-level economic reform cannot be contained within state boundaries because state economies are open. Furthermore, the impact of any one state's reform efforts is likely to be marginal in terms of the overall success of economic adjustment. As a result, the free rider problem becomes operational. Economic adjustment takes on the quality of public good requiring the individual states to cooperate, but it is more rational for individual provincial politicians to avoid the political costs associated with austerity. Under these circumstances, the coordination of national fiscal and monetary policies as adjustment tools is complicated, posing a challenge to national economic stability (Prud'homme 1995, Treisman 1999). In other words, economic adjustment policies within a

decentralized system have an important subnational component. As compared to a unitary system, these threats to macroeconomic performance are largely moot as local governments are merely the bureaucrats extensions of central governments. Absent the divergent incentives and political autonomy generated by the decentralization process, subnational officials in centralized countries are responsible to their national government and therefore have few motives to resist economic reforms.

On the other hand, under the logic of commitment problem, decentralization is associated with more price and macro stability. In the literature, high inflation is attributed to the inability of policymakers to commit credibly to monetary restraint which in turn is due to the fact that high inflation, regardless of its costs, is their dominant strategy (Barro and Gordon 1983, Kydland and Presscott 1977). These studies show that if markets expect low inflation, increasing the money supply will have positive real effects and if markets expect high inflation, it is still less costly in the short run to accommodate these expectations rather than to thwart them. Fiscal decentralization may make it more difficult for policymakers to renege on their commitment for price stability. The competition among lower levels of governments may reduce their incentives to renege on stable monetary policy (Qian and Rolland 1998). The credibility of the commitment to price stability can be established if the monetary authority adheres to a set of formal rules[3] or if there is a guarantee that it is independent from any pressures from all levels of government (Barro 1996[4], Shah 1994). And empirical studies show that central bank independence is correlated with lower inflation rates. Fiscal decentralization can also enhance the independence of central bank. For example over the period 1955 to 1988, the three countries which are considered as having the most independent central banks (Switzerland with the National Bank of Switzerland, Germany with the Bundesbank and the United States with the Federal Reserve Board), had average inflation rates of 4.4 percent compared to 7.8 percent for the three least independent banks (New Zealand until 1989, Spain and Italy). The inflation rate in the former countries is also showed to be of lower volatility. Shah (2005) argued that with decentralization the central bank will be more independent since a decentralized system would require a more clarified rules and regulations

[3] For example, in 1991 Argentina adopted the Convertibility Law that established parity in the value of the peso in terms of the US dollar Argentina's central bank has also strengthened the credibility of its commitment to price stability by enduring a severe contraction in the monetary base during the period December 1994 to March 1995 as speculative reactions to the Mexican crisis resulted in a decline in its foreign exchange reserves. In 1994 Brazil adopted the Real Plan to help achieve a measure of this level of credibility.

[4] Barro is very preoccupied with price stability that he regards an ideal central banker as one who is not necessarily a good macro economist but one whose commitment to price stability is unshakable. According to the author, "*The ideal central banker should always appear somber in public, never tell any jokes, and complain continually about the dangers of inflation*" (1996, p.58).

under which a central bank operates as well as its functions and its relationships with different level of governments. Huther and Shah (1996) find a weak but positive association between fiscal decentralization and central bank independence. In Brazil, when the government introduced a decentralized federal constitution in 1988, the independence of the central bank is significantly enhanced (Bomfim and Shah 1994, Shah 1991). Lohman (1998) argued that Germany's low inflation in the postwar can be partly attributed to the independence of the Bundesbank which was enhanced by the way it was embedded into the country's federal institutions. According to the author, a majority of the bank's council members were appointed by the Lander governments. Central and Land elections were staggered and the parties dominating the two governments often differed. The Landers were also represented in the Buderast which could veto changes to central bank legislation. All these factors serve as checks and balances on the attempts by the central government to inflate the economy in order to gain popularity during elections.

On the empirical grounds, there have been very few studies that analyze the effects of decentralization on macroeconomic stability and almost all of them used the inflation rate as their indicator for macroeconomic instability.

King and Ma (2001) examined the effects of centralization on inflation using data that covered 42 countries over the period of 1973-1994. However, they only found a significant positive correlation between centralization and inflation when they omitted from their sample "high-inflation" countries defined here as those who have an average inflation of more than 20%. They also found that the inclusion of centralization in their regression gives central bank independence the right sign (negatively correlated with inflation rate). The paper was later reinvestigated by Neyapti (2003 who argued that decentralization and central bank independence reinforce each other in determining the inflation rate since decentralising revenue collection by itself need not be efficient as local authorities have much more limited tax bases available to them as well as limited capacity to issue debt. Moreover, the author argued that local autonomy in collecting local revenues may be constrained for political considerations. Hence, he hypothesized that revenue decentralization leads to lower inflation provided that monetary discipline exists, and not necessarily otherwise. This is because, even if local accountability exists, the cost of inflationary monetary expansion resulting from individual actions of local governments is not fully internalised by local governments. He thus took both local accountability, as a fiscal disciplinary device and central bank independence, as a proxy for monetary discipline, into account to assess the relationship between RD and inflation. His empirical investigation demonstrates that, controlling for business cycles, openness and government size, revenue decentralization has significant negative effect on inflation only in low inflation countries. Moreover, the additional effect of the interaction between decentralization and central bank independence is significant in low inflation countries. These results are consistent with King

and Ma's observation of the significant effect of central bank independence. Neyapti observed, however, that decentralization has a significant negative effect on inflation also in higher inflation countries when coupled with both central bank independence and local accountability. More recently, Vazquez and McNab (2005) found that decentralization appears to promote price stability. Their results are consistent both in the full and sub-sample of developed, developing and transitional countries. This suggests according to the authors that their results are not dependant on the level of development.

However, Treisman (2000) found that fiscal decentralization have no significant correlation with inflation. The author used three indictors of decentralization namely whether the country is classified as federal according to Elazar (1987), the share of subnational spending of the total government spending and the share of subnational revenue of the total government revenue. The author found that none of these three variables have a noticeable effect on inflation with coefficients close to zero. The results were confirmed by Rodden and Wibbels (2002). The authors found that although there is a positively correlation between fiscal decentralization and inflation, the relation does not achieve statistical significance. Thornton (2007) examines the issue of revenue decentralization and inflation focusing on the share of the revenues of sub-national governments over which they have full autonomy. Results from panel least squares regressions of 19 OECD member countries for which data on the degree of revenue autonomy in 1995 was available suggest that, when measured in this way, the impact of revenue decentralization on inflation is not statistically significant. According to Thornton, these results suggest that countries that shift a large share of revenues to sub-national governments are able to pursue better policies at the national level and not a reflection of relatively more responsible fiscal policies at the level of sub-national governments. One possible explanation for this situation is that revenue sharing arrangements in such countries act to reduce competition for fiscal resources between sub-national governments.

Based on the literature review above, it is quite obvious to see that there are still lots to be done as far as the links between decentralization and macroeconomic stability are concerned. Not only that the studies have failed to acknowledge other aspects of macroeconomic stability, they seemed to ignore various other factors that could influence directly or indirectly the effects of decentralization on macroeconomic stability. One type of variables that we believe to be rather important is the ones that capture the existing institutional and political arrangements of the country in question such as the quality of the government, democracy, political stability or the level of corruption. As shown by our review of literature in the preceding section, these variables have been widely studied notably from the angle of the impact that decentralization may have on them. However there are yet any studies that try to examine the impact that these variables may have on the impact of decentralization on macroeconomic stability. It is not too farfetched to assume for example that the impact of a decentralization process on macroeconomic stability will in a way depend on the position of the country in question in the

governance index level. These institutional variables may be introduced into the framework either directly or indirectly through their interaction with other more traditional independent variables. Such interactions may have been widely covered in other studies of decentralization but they are yet to be introduced into the regressions between decentralization and macroeconomic stability.

3. Econometric Estimation

The hypothesis that we want to test here is whether decentralization will lead to more or less macroeconomic instability. Given the inconclusive debate on the theoretical grounds we do not have any a priori as to the sign of correlation between these two variables.

3.1. Data Description

In this section we describe the data and the measures we use for our econometric analysis. Our data covers 62 countries from the period of 1972 to 2001. The list of the countries that constitute our sample as well as the definition and sources of all data are given in the appendix.

This data set is structured as a panel with observations for each country consisting of five-year averages. Each country has six observations: 1972-1976, 1977-1981, 1982-1986, 1986-1991, 1992-1996, 1997-2001. The panel is, however, not balanced because some observations are missing for a number of countries. Table 1 summarizes the descriptive statistics of the variables.

3.1.1. Decentralization data

Data related to decentralization are mostly obtained from the Government Finance Statistics (GFS) which are collected and published by the International Monetary Fund. More precisely the following indicators will be used as our measure of decentralization

- the percentage of subnational governments expenditure of the total government expenditures
- the percentage of subnational governments revenues of the total government revenues.

The used of GFS data to measure the extent of decentralization have been widely criticized in the literature[5]. This has led to the use of other type of indicators as well as to the construction of new database by some authors. However compelling the use of these data may be, it will not serve our purpose here as they are only available for certain developed countries.

[5] see for example Ebel and Yilmaz (2000).

3.1.2. Data of Macroeconomic Stability

In this study we will use two variables as a measure of macroeconomic instability

- the inflation rate
- the change in the de facto market exchange rate (Reinhart and Rogoff 2004)[6].

3.2. Econometric Specification

Using the data described above, we estimate the following model

$$MS_{it} = \beta_1 FD_{it} + \beta_2 Pol_{it} + \delta' Z_{it} + u_{it} \quad (1)$$

Where MS_{it} is the measure of macrostability represented here by the inflation rate and the evolution of the *de facto* exchange rate. Following Neyapti (2003), we use a linear transformation of the rate of inflation that scales it down to the range between zero and one. The formula used for the linear transformation is as follows:-

$$\text{Inf} = [\text{inflation rate}/1+\text{inflation rate}] \quad (2)$$

The transformation will allow us to control for the large variance in inflation across countries and over time. FD_{it} is the measure of fiscal decentralization, Pol_{it} denotes a measure of political institutions which will be represented by four variables: the level of political rights, the democracy level, the polity and the constraint on executive. The Z_{it} matrix comprises of several control regressor (M2 as a percentage of GDP, the index of central bank independence, the per capita GDP, the total population, the government size, the openness to international trade and the level of corruption). And finally u_{it} is the error term.

We start by testing for the presence of endogeneity problem in our estimation. In the case of our main independent variables, the results show that we fail to reject the exogeneity of the fiscal decentralization with respect to all

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[6] Following Satyanath and Subramaniam (2004), there are mainly two reasons why we decided to include the de facto exchange rate as our indicator of macroeconomic stability. First, price level especially in the developing countries is not what can be considered as a clear market-based measure. This is because for long periods of time in the post-war period, prices have been controlled and/or fixed and as such they do not really respond to underlying macroeconomic conditions. In many developing countries, even with a turn toward liberalization since the mid-to late 1980s, prices of nontradables, especially utilities, remain regulated, and hence may not convey all the information about underlying macroeconomic disequilibria. Second, any measure of nominal instability should reflect problems stemming from debt accumulation, rescheduling or accumulation of arrears, and other external pathologies which also reflect macroeconomic disequilibria. From this perspective, the market or parallel exchange rates is better suited to capturing these pathologies than prices.

our dependant variables. We also fail to reject the null hypothesis of exogeneity of several of our control variables namely the GDP per capita, the M2 and the openness variable.

We then examine whether a fixed or a random effect model is more appropriate for the estimation of equation 1[7]. The results of the tests seem to differ according to our dependant variable. When the rate of inflation is used as the dependant variable, the test is in favor of a random effect specification. Where else when we switch to the *de facto* exchange rate, the test is in favor of a fixed effect specification. Consequently, we use the random effect model in estimating our model when the dependant variable is the inflation rate and the fixed effect model when the change in *de facto* exchange rate is used as the dependant variable.

3.3. Results

3.3.1. Baseline Regressions

The results of our baseline estimations are presented in table 2 to table 5.

In table 2, the dependant variable is the inflation rate and fiscal decentralization is measured as the proportion of subnational expenditures to total expenditures. In column A (table 2), we estimate our regressions without controlling for corruption and political institutions. The results show that there is no significant relationship between inflation and decentralization. Inflation rate appears not to be influenced by decentralization.

In column B (table 2), we introduce in our regression a variable representing the level of corruption. It is quite striking to see that once we control for corruption, the rate of inflation becomes significantly correlated with the level of expenditure decentralization. The estimated coefficient for expenditure decentralization is found to be significant at the 1% level. The results suggest that in contrary to popular belief of a negative effect of decentralization on macroeconomic stability, an increase in expenditure decentralization, all else being equal, would lead to a decrease in the inflation rate. As for the level of corruption, it is also found to be highly correlated with the rate of inflation. An increase in the level of perceived corruption will lead to an increase in the level of inflation.

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[7] The null hypothesis of the Haussman (1978) test is that, assuming that both OLS and GLS are consistent, OLS is inefficient, the alternative being OLS is consistent but GLS is not. In other words, the Haussman statistic tests for the correlation between the individual effects and explanatory variables. Rejection of the null hypothesis thus leads to the rejection of random effects model, in favor of fixed effects (see Hsiao, 1986 or Baltagi, 1995)

These results are suggestive to the importance of taking into account institutional and political settings in assessing the impact of decentralization. In order to further verify this, we include in our regressions several other variables that are supposed to capture the institutional and political context of a country. The results are reported in column C to F (table 2). However, as we can see from table 2, none of these four variables appear to have a significant relationship with the rate of inflation. Nevertheless, the inclusion of these political variables does not alter the correlation between decentralization and inflation. The latter remains negatively correlated with decentralization.

As for other control variables, M2 are found to be significantly related to the rate of inflation. The latter is found to be positively related to M2. And once we control for political and institutional variables (column B to F, table 2), a negative and significant correlation is found between the rate of inflation and the GDP per capita. An increase in the level of GDP is thus associated with a decrease in the level of inflation. The results are similar to the one found in other studies (Neyapti 2003; Vazquez and McNab, 2005; Thornton, 2007).

In table 3, we replace our measure of fiscal decentralization with that of the proportion of subnational revenue of the total revenue. Our results are somehow similar to the ones found previously. However, in contrary to expenditure decentralization, revenue decentralization appears to be negatively correlated with the inflation rate even if we do not control for corruption or political institutions. Nevertheless when we introduce corruption and political instutions in our estimations, the statistical significance of the coefficient for decentralization has improved.

Table 4 and 5 summarize the results found when we use the change in de facto exchange rate as our dependant variable. In table 4, the level of decentralization is represented by the proportion of subnational expenditure to total expenditure where else in table 5, we use the proportion of subnational revenue to total revenue as our measure of decentralization.

As shown by table 4, we do not find any significant correlation between expenditure decentralization and the change in de facto exchange rate. But in contrary to the results found previously with inflation rate as the dependant variable, there appears to be a significant correlation between the change in exchange rate and the political variables. All four variables representing the political and institutional setting are found to be negatively correlated with the exchange rate. An increase in political rights, democracy or the constraint on the executive leads to a more stable exchange rate. We also found the corruption level to be positively correlated the change in the exchange rate which signifies that an increase in the perceived level of corruption will lead to an increase in macro instability.

The results change when we use the share of subnational' revenue as our measure of decentralization. As reported in table 4, the change in the

exchange rate is found to be negatively influenced by the revenue decentralization. Note that again the correlation only become significant once we control for corruption and political variables (column B to F, table 5). As for the control variables, we found that all the political variables except for one (the political rights) to be significantly correlated with the change in the exchange rate. The results signify that a country that has a good governance track record will also have a stable exchange rate.

3.3.2. The Conditional Effects of Corruption and Political Institutions

In previous section we have shown that our measure of macroeconomic stability can be influenced by the level of perceived corruption or by political institutions. It is thus interesting to see if in addition to these direct effects, these same variables will also have an impact on the effect of decentralization on macroeconomic stability. It seems natural to argue that a positive effect of decentralization on macroeconomic stability will somehow be attenuated if the country is plagued with a serious problem of corruption. In contrary, a country which is free from corruption will be able to fully benefit from the effects of decentralization on macroeconomic stability. It can also be argued that a more stable political environment may accentuate the impact of decentralization on macroeconomic stability and vice versa.

In order to test for the assumptions of an indirect effect of corruption and political institutions on macroeconomic stability, we introduce in our equation the interaction term between these variables with our measure of decentralization. If the results show that the estimated parameters of the interaction term are positive then it may suggest that the corruption or political variables are having a positive impact on the effect of decentralization on macroeconomic stability.

We present the results for each indicator of macroeconomic stability in table 6. In column A (table 6), the dependant variable is the inflation rate while decentralization is measured by the proportion of subnational governments' expenditure to total government, expenditure. The results of the estimation show that decentralization has a negative impact on the level of inflation. But none of the coefficients estimates of the interaction term are statistically significant which signifies that the impact of expenditure decentralization on inflation is not influenced by corruption and political institutions. It is noteworthy that the level of perceived corruption continues to have a direct positive impact on the level of inflation.

4. Conclusion

The main objective of this chapter is to shed more lights on the relationship between decentralization and macroeconomic stability. Even though there is a huge literature both theoretically and empirically on the impact of decentralization, not many of them seems to be interested on the

question of the link between decentralization and macroeconomic stability. It is thus our hope to fill this gap in the literature.

Based on our literature review, it is quite obvious to see that there are still lots to be done as far as the links between decentralization and macroeconomic stability are concerned. It is also noteworthy that so far, the studies that have been done in this area seemed to ignore various other factors that could influence directly or indirectly the effects of decentralization on macroeconomic stability. One type of variables that we believe to be rather important is the ones that capture the existing institutional and political setting of the country in question. These variables have been widely studied notably from the angle of the impact that decentralization may have on them. However there are yet any studies that try to examine the impact that these variables may have on the impact of decentralization on macroeconomic stability. We have thus included in our study several indicators of political institutions as well as a variable representing the corruption level.

We have also used in our study other variables as a proxy for macroeconomic stability besides inflation rate. Price stability may be one of the main indicators of macroeconomic stability but it is far from being the only one given the wide spectrum which the term macroeconomic stability covers.

The empirical results provided in this study despite data inadequacies and methodological shortcoming point to the fact that there is a negative relationship between certain variable of macroeconomic stability and decentralization. In our baseline estimations, we found that decentralization appears to lead to a decrease in inflation rate and in the change of de facto exchange rate. However, we do not find any correlation between decentralization with the level of fiscal deficit. The results suggest that decentralization does not deteriorate nor ameliorate the fiscal balance of a country. Our results seem to run counter to a rapidly growing popular belief that decentralization is disastrous to macroeconomic stability. As far as our results are concerned, fiscal decentralization is manifestly not a recipe for disaster.

Our results also show that the impact of decentralization to be conditional on the level of perceived corruption and political institutions. It is found that the impact of decentralization on macroeconomic stability can be attenuated if corruption is high and the democracy is not being fully implemented.

Table 1. Descriptive Statistics

	Observations	Mean	Standard Deviation	Min	Max
Inflation	287	0.8568	0.2316	-0.5252	3.5660
Exchange rate	276	39.1493	181.3336	-45.4418	911.893
Exp. Decentralization	261	26.2867	17.0294	1.4547	75.7473
Rev. Decentralization	252	19.0472	15.3016	0.6279	76.4074
GDP	287	9927.86	9234.279	137.5408	41559.24
M2	210	61.5306	212.347	1.5304	1852.052
Population	312	6.55e+07	1.85e+08	164949.6	1.25e+09
Openness	287	68.1632	42.4824	8.6815	258.4703
C. Bank Independence	131	0.4680	0.1930	0.17	0.89
Corruption	186	6.0889	2.4440	0.2	9.8099
Democracy	265	5.3524	7.6298	-52.8	10
Executive Constraints	265	4.2709	6.6405	-52.4	7
Polity	265	3.5426	9.4227	-56.8	10
Political Rights	303	2.6712	2.0270	-1.8	7
Government size	277	57353.82	123153.3	0	862603.4

Table 2. Expenditure decentralization and inflation rate

	A	B	C	D	E	F
Decentralization	-0.0020 (0.0021)	-0.0057*** (0.0021)	-0.0070*** (0.0022)	-0.0063** (0.0031)	-0.0063** (0.0031)	-0.0064** (0.0031)
Central bank independence	-0.0352 (0.1356)	-0.1171 (0.1355)	-0.2026 (0.1432)	-0.0621 (0.1929)	-0.0510 (0.1945)	-0.0657 (0.1925)
M2	0.0723*** (0.0203)	0.0802*** (0.0221)	0.0699*** (0.0225)	0.1030*** (0.0252)	0.1039*** (0.0249)	0.1023*** (0.0254)
GDP	-0.0089 (0.0270)	-0.1123*** (0.0397)	-0.1089*** (0.0382)	-0.1872*** (0.0554)	-0.1933*** (0.0562)	-0.1838*** (0.0550)
Openness	-0.0007 (0.0007)	-0.0004 (0.0008)	-0.0001 (0.0007)	-0.0000 (0.0010)	-0.0000 (0.0010)	-0.0000 (0.0010)
Population	-0.0020 (0.0198)	0.0197 (0.0206)	0.0303 (0.0214)	0.0342 (0.0305)	0.0352 (0.0311)	0.0333 (0.0303)
Corruption		-0.0777*** (0.0233)	-0.0675*** (0.0231)	-0.1312*** (0.0317)	- 0.1352***	-0.1291*** (0.0318)
Political Rights			-.035347 (0.0261)			
Democracy				0.0016 (0.0029)		
Polity					0.0014 (0.0025)	
Executive Contraints						0.0016 (0.0032)
Constant	0.8448* (0.4979)	1.0559** (0.5099)	1.0690** (0.4923)	1.0359 (0.7398)	1.0460 (0.7479)	1.0413 (0.7334)
R2	0.3801	0.5046	0.5942	0.3278	0.3269	0.3291
No of obs	294	294	294	294	294	294
No of countries	49	49	49	49	49	49

Notes: standard error in parentheses; significant at 10% level*, significant at 5% level**, significant at 1% level***.

Table 3. Revenue decentralization and inflation rate

	A	B	C	D	E	F
Decentralization (revenue)	-0.0045*	-0.0069***	-0.0081***	-0.0088**	-0.0089**	-0.0088**
	(0.0026)	(0.0026)	(0.0025)	(0.0039)	(0.0039)	(0.0038)
Central bank independence	-0.0516	-0.0749	-0.1491	-0.0741	-0.0673	-0.076
	(0.1358)	(0.1380)	(0.1401)	(0.1926)	(0.1937)	(0.1925)
M2	0.0681***	0.0892***	0.0777***	0.1058***	0.1061***	0.1054***
	(0.0201)	(0.0219)	(0.0222)	(0.0242)	(0.0241)	(0.0245)
GDP	0.0059	-0.0924**	-0.0772*	-0.1631***	-0.1688***	-0.1594***
	(0.0279)	(0.0426)	(0.0396)	(0.0578)	(0.0586)	(0.0574)
Openness	-0.0008	-0.0002	0.0001	0.0000	0.0000	0.0000
	(0.0007)	(0.0008)	(0.0008)	(0.0010)	(0.0010)	(0.0010)
Population	0.0058	0.0262	0.0342	0.0452	0.0464	0.0438
	(0.0198)	(0.0224)	(0.0222)	(0.0317)	(0.0321)	(0.0314)
Corruption		-0.0725***	-0.0551**	-0.1272***	-0.1312***	-0.1246***
		(0.0228)	(0.0228)	(0.0301)	(0.0305)	(0.0300)
Political Rights			-0.0314			
			(0.0259)			
Democracy				0.0019		
				(0.0028)		
Polity					0.0016	
					(0.0024)	
Executive Contraints						0.0019
						(0.0031)
Constant	0.6502	0.7234	0.6994	0.6565	0.6673	0.6670
	(0.5093)	(0.5656)	(0.5269)	(0.7854)	(0.7909)	(0.7793)
R2 between	0.4031	0.4945	0.5833	0.3374	0.3404	0.3364
No of obs	294	294	294	294	294	294
	49	49	49	49	49	49

Notes: standard error in parentheses; significant at 10% level*, significant at 5% level**, significant at 1% level***.

Table 4. Expenditure decentralization and the evolution of de facto exchange rate

	A	B	C	D	E	F
Decentralization	-4.3896 (8.7642)	-5.4639 (7.4580)	-4.5458 (7.3581)	-4.0866 (8.2396)	-4.0088 (8.3050)	-4.2114 (8.1695)
Central bank independence	-320.1278* (181.7464)	-82.4292 (155.4286)	-153.564 (158.6333)	-48.1482 (175.8041)	-68.2504 (175.9168)	-55.7596 (173.4557)
GDP	425.0333 (309.8086)	-73.5253 (273.5133)	51.58256 (279.1417)	147.6586 (307.0179)	137.0141 (309.3995)	151.496 (304.4822)
Openness	2.3885 (2.2989)	1.9571 (1.9611)	1.1111 (1.9937)	3.4489 (2.5511)	3.6040 (2.5636)	3.8155 (2.5049)
Population	-627.474*** (602.6703)	-720.3054 (522.493)	-871.9449* (521.8835)	-024.416*** (718.4538)	-002.233*** (724.0051)	-067.743*** (712.7683)
Corruption		107.2778** (41.5535)	94.4075** (41.5905)	119.1196*** (43.4249)	110.983** (43.8042)	120.5346*** (43.0789)
Political Rights			-59.3462* (35.175)			
Democracy				-8.3304** (3.2265)		
Polity					-6.4910** (2.6570)	
Executive Contraints						-9.7141*** (3.5631)
Constant	23666.11*** (8631.381)	12315.64 (7530.858)	13998.29** (7476.502)	32373.91*** (10702.26)	32120.06*** (10784.7)	33047.08*** (10618.11)
R2 between	0.1878	0.1799	0.2202	0.4276	0.4187	0.4371
No of obs	276	276	276	276	276	276
No of countries	46	46	46	46	46	46

Notes: standard error in parentheses; significant at 10% level*, significant at 5% level**, significant at 1% level***.

Table 5. Revenue decentralization and the evolution of de facto exchange rate

	A	B	C	D	E	F
Decentralization	-9.7200 (13.0922)	-25.7843** (10.9762)	-24.0558** (10.8893)	-20.7653* (11.1413)	-21.4201* (11.1844)	-20.6911* (11.0463)
Central bank independence	-315.3133* (185.7305)	-6.4293 (151.7471)	-73.5152 (155.719)	37.6622 (172.1618)	23.7094 (172.2516)	29.3783 (169.8886)
GDP	414.8378 (315.5776)	-189.3043 (267.1283)	-70.8313 (274.1862)	38.3509 (300.7482)	23.6484 (302.2846)	43.0457 (298.2383)
Openness	2.3704 (2.3503)	2.1032 (1.8812)	1.3332 (1.9201)	2.9431 (2.4685)	3.0563 (2.4760)	3.2949 (2.4249)
Population	-625.703*** (595.0631)	-520.7443 (500.08)	-662.1788 (501.7002)	-1731.666** (692.9722)	-1695.556** (696.4932)	-1777.595** (687.6295)
Corruption		- 118.9088*** (39.7962)	- 107.0394*** (39.9967)	- 126.8186*** (40.8949)	- 119.5352*** (41.1541)	-127.962*** (40.5592)
Political Rights			-53.4037 (33.9079)			
Democracy				-7.9454** (3.1086)		
Polity					-6.2747** (2.5495)	
Executive Contraints						-9.2826*** (3.4329)
Constant	23880.72*** (8530.941)	10259.94 (7153.348)	11800.21 (7128.032)	28697.24*** (10250.72)	28254.98*** (10303.05)	29405.74*** (10171.87)
R2 between	0.1923	0.2463	0.2788	0.4711	0.4655	0.4800
No of obs	276	276	276	276	276	276
No of countries	46	46	46	46	46	46

Notes: standard error in parentheses; significant at 10% level*, significant at 5% level**, significant at 1% level***.

Table 6. Conditional effects of corruption and political institutions

	Inflation		Exchange Rate		Deficit	
	A	B	C	D	E	F
Decentralization (Expenditure)	-0.0143** (0.0067)		-28.1047* (16.3055)		-44.0657 (279.3191)	
Decentralization (Revenue)		-0.0243*** (0.0087)		-71.6409*** (16.4708)		-164.9142 (255.2185)
Central bank independence	-0.0352 (0.1980)	-0.1276 (0.1946)	15.0023 (179.4495)	53.1091 (150.7807)		
M2	0.1020*** (0.0250)	0.0983*** (0.0237)				
GDP	-0.2104*** (0.0578)	-0.1629*** (0.0581)	52.8490 (310.2108)	134.0658 (263.8617)	1148.653 (1815.006)	546.6188 (1156.83)
					-0.0713*** (0.0091)	-0.0303*** (0.0084)
Openness	-0.0001 (0.0010)	-0.0002 (0.0010)	1.5416 (2.7584)	1.0767 (2.1968)	-17.4974 (41.2849)	-2.6873 (29.2362)
Population	0.0324 (0.0320)	0.0372 (0.0323)	-1330.076 (819.1426)	-1223.538* (619.8374)	-1742.2 (1191.689)	-1225.501 (779.5313)
Corruption	-0.0889* (0.0465)	-0.0581 (0.0475)	-13.007 (88.3527)	-67.2743 (61.9366)	-127.8501 (1286.163)	-603.8841 (791.484)
Democracy	0.0019 (0.0068)		-10.0423 (8.2475)	-7.7416 (5.8179)	-1.5947 (369.4532)	347.5146 (241.9974)
Corruption*Dec	-0.0014 (0.0009)	-0.0025** (0.0012)	-4.5369* (2.6540)	-9.0087*** (2.3411)	17.0136 (39.0174)	34.8798 (31.8542)
Demo*Dec	-0.0000 (0.0001)	-0.0000 (0.0001)	0.0578 (0.2014)	0.0497 (0.1761)	3.1053 (9.1577)	-5.6113 (7.7528)
Constant	1.4690* (0.8220)	1.2440 (0.8373)	22156.94* (12155.74)	20311.32** (9208.011)	17321.16 (26545.97)	15623.28 (17641.03)
R2 between	0.3490	0.3948	0. 4696	0.6223	0.8045	0.4550
No of obs	294	294	276	276	294	294
	49	49	46	46	49	49

Notes: standard error in parentheses; significant at 10% level*, significant at 5% level**, significant at 1% level***.

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Appendix 1. Countries included in the sample

Argentina
Australia
Austria
Bahrain
Belarus
Belgium
Bolivia
Brazil
Bulgaria
Canada
Chile
China
Costa Rica
Croatia
Czech Republic
Denmark
Dominican Republic
Estonia
Finland
France
Georgia
Germany
Hungary
Iceland
India
Indonesia
Iran
Ireland
Israel
Italy
Latvia
Lithuania
Luxembourg
Malaysia
Mauritius
Mexico
Moldova
Mongolia
Netherlands
Netherlands Antilles
New Zealand
Norway
Panama
Paraguay
Peru
Poland
Portugal
Romania
Russian Federation
Senegal
Slovak Republic
Slovenia
South Africa
Spain
Sweden
Switzerland
Thailand
United Kingdom
United States
Uruguay
Zimbabwe

Appendix 2. Description of the variables

Variable	Definition	Source
Expenditure decentralization	Share of expenditures of all subnational governments in total expenditures of consolidated central budget measured in percents.	*Government Finance Statistics, IMF*
Revenue decentralization	Share of revenues of all subnational governments in total revenues of consolidated central budget measured in percents.	*Government Finance Statistics, IMF*
Inflation rate	CPI index.	*World Development Indicators, World Bank*
Exchange rate	The change in the nominal parallel market exchanger	*Reinhart and Rogoff (2004)*
GDP per capita	Gross domestic product percapita (USD 2000)	*World Development Indicators, World Bank*
Population Total	population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship-except for refugees not permanently settled in the country of asylum, who are generally considered part of the population of their country of origin	*World Development Indicators, World Bank*
M2	M2 as a percentage of GDP	*World Development Indicators, World Bank*
Government Size	Total government expenditure as a percentage of GDP.	*Government Finance Statistics, IMF and World Development Indicators, World Bank*
Openess	Sum of trade (imports and exports) as a percentage of GDP.	*World Development Indicators, World Bank*
Corruption indices	Scale from 0 to 10, with higher values corresponding to better governance outcomes	*Transparency International*
Democracy	The general openness of political institutions. The 11-point Democracy scale is constructed additively. Scale from 0 to 10 (0 = low; 10 = high)	*Polity IV data det*
Polity	Combined Polity Score, computed by subtracting AUTOC from DEMOC. Scale form -10 to 10 (-10 = high autocracy; 10 = high democracy)	*Polity IV data det*
Constraint on Executive	Operational (de facto) independence of chief executive. Scale 0 to 10.	*Polity IV data det*
Political Rights	Political rights is defined as the rights that enable people to participate freely in the political process, including the right to vote freely for distinct alternatives in legitimate elections, compete for public office, join political parties and organizations, and elect representatives who have a decisive impact on public policies and are accountable to the	*Freedom House*

	electorate. Scale 1 to 7 (1 = highest degree of freedom and 7= the least amount of freedom).	
Central Bank independence	The index assesses the fulfillment of 16 criteria of political and economic independence using a continuous scale from zero to one, with higher values also indicating higher CBI. The overall index is based on a weighted average of the individual criteria.	*Cukierman et al. (1992)*