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Fiscal Decentralization, Macrostability, and Growth

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Abstract

This paper examines how fiscal decentralization may influence economic growth. Previous research on this question has primarily focused on the potential direct relationship between decentralization and growth. In this paper, we also examine the potential indirect influence of decentralization on growth through its impact on macroeconomic stability. Using an international panel data set, we find that fiscal decentralization appears to reduce the rate of inflation in the sample countries and it does not appear to directly influence economic growth. Fiscal decentralization, however, appears to have an indirect, positive effect on growth through its positive influence on macroeconomic stability. The indirect effect of fiscal decentralization on economic growth via macroeconomic stability has not been previously identified in the literature.

Keywords: Fiscal Decentralization, Economic Growth, and Macroeconomic Stability

JEL Classification Numbers: E62, H77, O20, O40

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1. Introduction

Given the current drive among developing and transitional countries to decentralize expenditures and revenues to subnational governments, it is important to ask not only whether fiscal decentralization influences economic growth, but also **how** fiscal decentralization may influence economic growth. What evidence exists on the direct relationship between fiscal decentralization and economic growth is conflicting at best and lacks, for the most part, a convincing argument in either direction on the direct effect of fiscal decentralization. The same may be said for the theoretical development and empirical evidence on the relationship between fiscal decentralization and macroeconomic stability.

In this paper we examine the current state of knowledge in the economics literature on the relationship between fiscal decentralization and economic growth; investigate empirically the extent of such a relationship; and analyze whether fiscal decentralization also indirectly influences economic growth through its impact on macroeconomic stability. As decentralization moves to the forefront of policy options being considered by developing and transitional countries and often figures prominently among the prescriptions offered by international donor organizations, it becomes more important to understand better the relationship between decentralization, macroeconomic stability, and economic growth. If fiscal decentralization positively or negatively influences economic growth directly or indirectly (the latter through the macroeconomic stability channel), then policymakers need to be aware of these relationships when formulating and implementing decentralization policy.

The rest of the paper is organized as follows. First, we briefly review the literature on the relationship between fiscal decentralization, macroeconomic stability, and economic growth. Second, we develop an augmented neoclassical model of economic growth that incorporates both the potential indirect effect of fiscal decentralization on economic growth through macroeconomic stability and the potential direct effect of fiscal decentralization on economic growth. Third, using an international panel data set, we estimate the impact of fiscal decentralization on macroeconomic stability and economic growth. The last section summarizes and reviews the policy implications of our findings.

2. Review of the Literature

While the direct relationship between decentralization and growth is not one of the conventionally addressed issues in the theory of fiscal federalism, it has received a significant amount of attention in the empirical literature in recent years.¹ Whether or not a direct relationship exists between fiscal decentralization and economic growth, however, remains, an unanswered question.² The static proposition that fiscal decentralization enhances economic efficiency may have a corresponding effect in the dynamic setting of economic growth (Oates 1993). Of course, this linkage can be derailed if fiscal decentralization does not function effectively.³ Others have argued that decentralization may control the Leviathan, although the evidence on this hypothesis is also mixed.⁴ Some have argued that decentralization may also serve to preserve and promote the development of markets (Weingast 1995, Qian and Weingast 1997, Cao, Qian and Weingast 1999). A problem, however, is that these arguments for decentralization may be susceptible to the contention that subnational governments in developing and transitional economies lack sufficient capacity relative to the central government (Rodden and Rose-Ackerman 1997).

Nevertheless, most authors arguing for and against using fiscal decentralization as a policy option in developing and transitional economies have implicitly recognized the potential influence of fiscal decentralization on macroeconomic stability (Prud'homme 1995, McLure 1995, Sewell 1996, Fornasari, Webb, and Zou 2000, Tanzi 2000). The theory of design of fiscal decentralization suggests a number of potential tradeoffs between efficiency and other objectives such as a more equal distribution of resources across regions or macroeconomic stability. The classical view of this issue contends that

¹ Considerable attention has also been paid to the determinants of fiscal decentralization. For reviews of this literature, see, among others, Oates (1999), Panizza (1999), and Martinez-Vazquez and McNab (2003).

² See, for example, Xie, Zou, and Davoodi (1999), Zhang and Zou (1998), Lin and Liu (2000), and Thiessen (2003) for empirical analyses of the relationship between fiscal decentralization and economic growth.

³ Bahl and Linn (1992), Prud'homme (1995), Tanzi (1996), and Bahl (1999) have questioned whether or not voting mechanisms and mobility function well enough in developing economies to allow the realization of efficiency gains associated with decentralization.

⁴ Marlow (1988) argues that decentralization is negatively associated with government size; Anderson and Van den Berg (1998) fail to detect a statistically significant relationship between decentralization and government size; Stein (1999) argues that decentralization's may reduce or increase government size, dependent upon the extent of vertical imbalance; Jin and Zou (2002) and Rodden (2003) find that expenditure decentralization and smaller vertical imbalance control government size.

macroeconomic policy should solely be the responsibility of the central government and not at all the responsibility of subnational governments, more recently, a number of authors have argued that devolving at least some measure of macroeconomic policy to subnational governments can promote, not hinder, macroeconomic stability (Gramlich 1995, Shah 1999, Rodden and Wibbels 2002).

On the negative side, some have argued that the apparent disregard of some subnational governments for budget constraints in decentralized systems suggests that fiscal decentralization *per se* aggravates macroeconomic instability or at least presents another obstacle to resolving chronic fiscal imbalance (Rodden 2002 and Rodden, Eskeland and Litvack 2003). Where macroeconomic instability predated decentralization, for example, in Argentina and Brazil, decentralization has made the solutions more complicated in general but not impossible (Dillinger, Perry and Webb 2000). However, in many countries, the presence of a soft-budget constraint at the local level of government remains a threat to macroeconomic stability (Bahl 1999 and Stein 1999).

The empirical evidence on the relationship between fiscal decentralization and macroeconomic stability does not provide any definitive conclusion on the direction or significance of the relationship. Lagged inflation does not appear to significantly influence government size but it does appear that decentralization affects government size (Jin and Zou 2002). There also appears to be an almost 1-to-1 correspondence between increases in subnational deficits and central government expenditures and deficits in the subsequent period (Fornasari, Webb and Zou 2000). On the other hand, others have argued that no clear relationship appears to exist between decentralization and the level of inflation (Treisman 2000 and Rodden and Wibbels 2002). In summary, with the influence of fiscal decentralization on economic growth, whether decentralization significantly influences macroeconomic stability still is an unanswered question.

3. A Model of Decentralization, Macroeconomic Stability, and Growth

Our objectives in this section are first to account for the direct relationship between fiscal decentralization and economic growth; and second, to incorporate the potential influence of fiscal decentralization on macroeconomic stability into the aggregate production function; and therefore examine the indirect influence of decentralization on growth through its impact on macroeconomic stability. While the direct relationship between fiscal decentralization and economic growth has been previously examined in the literature, the indirect influence of fiscal decentralization on growth through macroeconomic stability has not been previously studied.

We develop an augmented neoclassical model of economic growth, which includes, among other variables, the accumulation of human and physical capital, to examine the role played by fiscal decentralization. We extend the model by assuming that the standard term for technological progress can be disaggregated into exogenous technical progress, the direct effect of fiscal decentralization on economic growth, and the effect of decentralization on macroeconomic stability. By augmenting the model, we can explicitly examine how decentralization may indirectly influence economic growth through its impact on macroeconomic stability. We note that the disaggregation of the exogenous technical progress term is consistent with the literature and adheres to the conditional convergence hypothesis (Barro 1991, Barro and Sala-i-Martin 1992, 1997).

We assume a Cobb-Douglas production function for the entire economy so that production at time t is given by (Mankiw, Romer and Weil 1992 and Islam 1995)

$$Y_t = V_t K_t^\alpha H_t^\beta G_t^\varphi L_t^\theta \quad [1]$$

where $\alpha, \beta, \varphi, \theta > 0$ and $\alpha + \beta + \varphi + \theta \geq 1$. Y_t is output, V_t the level of technology and other institutional factors, L_t is labor, and $K_t, H_t,$ and G_t are the stocks of private, human, and public capital at time t , respectively. We define V_t as the product of the level of technology and other institutional factors at time t or

$$V_t = A_t D_t P_t \quad [2]$$

where A_t is the level of technology, D_t the level of fiscal decentralization, and P_t measures inflation or the level of macroeconomic stability.⁵ Note that D_t is synonymous with the direct effect of fiscal decentralization on output. If fiscal decentralization indirectly influences output through its impact on inflation, *certius paribus*, then it will indirectly influence economic output through P_t . We note that disaggregating exogenous technological progress should not be interpreted as inflation or decentralization affecting economic growth through technological progress. If one expands the theoretical model, it becomes apparent that inflation, decentralization, and technological progress affect the physical inputs separately, that is, technological progress is not a composite function of decentralization.

We further assume that L and A grow exogenously at rates n and g ,⁶ respectively, and that the price level is a function of, among other things, fiscal decentralization or

$$P_t = g(D_t, X_t^1) \quad [3]$$

where X_t^1 is a vector of other exogenous variables explaining the behavior of macrostability over time, including the money supply. At this time, for theoretical simplicity, we assume that D_t is uncorrelated with X_t^1 .⁷

We assume that physical capital and human capital are subject to decreasing returns to scale. This implies that the economy, over the long-run, will tend to constant private capital-labor, human capital-labor, and public capital-labor ratios.⁸ Once steady state output is achieved, additional increases in per capita output can only be achieved through increases in capital productivity or increases in the level of decentralization

⁵ Decentralization is typically measured by the ratio of total subnational government expenditures (revenues) to total government expenditures (revenues) and this measure is bounded between zero and one.

⁶ Following Mankiw, Romer, and Weil (1992), we assume that the rate of depreciation is uniform across all types of reproducible capital for theoretical simplicity. See Lucas (1988) and Tondl (1999) for alternative approaches to the question of depreciation.

⁷ If decentralization, macrostability, and output were endogenously related, then we would have to modify our analysis to incorporate the potential correlation between D and X^1 . The empirical evidence to date, however, does not appear to support the argument for an endogenous relationship between decentralization through inflation to economic growth. We examine this question in detail in the following sections.

⁸ The growth model specified in Equation 1 can be either a Solow-augmented neoclassical growth model with constant returns to scale for all production factors or an endogenous growth model with increasing returns to scale for all production factors. Also, if any combination of the capital inputs exhibits constant returns to scale then (1) would similarly be characterized as an endogenous growth model. Senhadji (1999) notes that a large part of the empirical growth literature supports the assumption of decreasing returns to capital.

(assuming that the overall effect of decentralization on economic growth is positive).⁹ Decentralization may thus affect output through two channels, a potential direct effect on output, and a series of potential indirect effects, one of which is macrostability.¹⁰

To determine the influence of fiscal decentralization on economic growth, we must first determine the steady state levels of the physical inputs in the production function. We assume that the same production function applies to all forms of reproducible capital and consumption so that one unit of capital can be costlessly transformed into one unit of consumption and vice versa. Assuming decreasing marginal returns to all forms of reproducible capital; that no combination of capital inputs exhibits constant marginal returns; expanding V_t , and taking the natural logarithm yields from (1) and (2) the steady state level of output per unit of labor or

$$\begin{aligned} \ln y_t^* = & \ln A_t + \ln D_t + \ln P_t + \frac{\alpha}{1-\alpha-\beta-\varphi} \ln i_k + \frac{\beta}{1-\alpha-\beta-\varphi} \ln i_h \\ & + \frac{\varphi}{1-\alpha-\beta-\varphi} \ln i_g - \frac{\alpha+\beta+\varphi}{1-\alpha-\beta-\varphi} \ln(n+g+\delta) \end{aligned} \quad [4]$$

Thus, the steady state output is dependent upon the accumulation of reproducible capital, the stock of technology, the direct effect of decentralization on output, and the indirect effect of decentralization through the macrostability channel.

We can calculate the speed of convergence to steady state per capita output using

$$\frac{d \ln y_t}{dt} = \lambda(\ln y_t^* - \ln y_t) \quad [5]$$

⁹ While changes in resource endowments (the discovery of new resources or new developments such as a cure for AIDS) may affect short-term capital-labor ratios, these changes would not necessarily affect the steady state capital-labor ratio unless these changes influence capital productivity.

¹⁰ Policies that lead to a permanent increase in the steady state capital-labor ratio cannot lead to long-run per capita growth, unless A is steadily increasing. Since the convergence to the new steady state may take years to occur, fiscal policy can still lead to higher output growth rates for a significant period of time, even though the neoclassical model might imply that these policies would affect only the level of output and not its long-run growth rate (Gerson 1998)

where $\lambda = (n + g + \delta)(1 - \alpha - \beta - \varphi)$. Defining y_0 as the initial level of per capita output, the evolution of per capita output over time is given by

$$\begin{aligned} \dot{y} = (1 - e^{-\lambda t}) & \left[\ln D_t + \ln P_t + \frac{\alpha}{1 - \alpha - \beta - \varphi} \ln i_k + \frac{\beta}{1 - \alpha - \beta - \varphi} \ln i_h \right. \\ & + \frac{\varphi}{1 - \alpha - \beta - \varphi} \ln i_g - \frac{\alpha + \beta + \varphi}{1 - \alpha - \beta - \varphi} \ln(n + g + \delta) - \ln y_0 \\ & \left. - e^{-\lambda t} \ln A(0) - e^{-\lambda t} \ln D(0) - e^{-\lambda t} P(0) \right] \end{aligned} \quad [6]$$

The advantage of this theoretical specification over the ones used in previous papers is that it allows for the explicit examination of the out-of-steady-state dynamics. In addition, our theoretical specification also makes explicit the difference between the bounded institutional factors in the production function and the physical inputs in the production function. The bounded institutional factors directly influence economic growth while the physical inputs are weighted by the ratio of their output share to labor's share of output. Finally, our theoretical specification explicitly captures the unobservable initial conditions in the theoretical model, providing support for our error components estimation approach below.

Two problems may arise with our derivation of the steady state production function and the equation for the convergence to the steady state output level. First, if countries have permanent differences in technology, then these differences would enter as part of the error term and be positively correlated with initial per capita output. Permanent variations in technology could bias the estimated coefficient on initial per capita output toward zero. However, the literature has yet to find convincing evidence to support the contention that countries have permanent differences in technology. Second, while countries may not have permanent variations in technology, they may have permanent variations in their institutional factors (colonial legacy, legal system, climate, geographical region) that would also enter as part of the error term. To control for these institutional factors, we will employ a two-way fixed error components model in our empirical estimations.

4. Empirical Estimation: The Impact of Fiscal Decentralization

We now turn to the task of determining whether empirical support exists for the hypotheses of the direct and indirect effects of fiscal decentralization on economic growth. As in the case of several more recent studies of the relationship between fiscal decentralization and economic growth, we employ a panel data set of developed and developing countries. We first discuss the data sources and methodology before presenting the results of our empirical investigations.

4.1 *The Measurement of Fiscal Decentralization*

The most serious difficulty we face in the cross-country study of fiscal decentralization is how to properly measure the extent of decentralization. Ideally, we would be able to construct a panel data set of measures of fiscal decentralization that effectively quantified the activities of subnational governments resulting from autonomous or independent decisions of subnational governments. This would require classifying those revenues and expenditures that are under the effective control of the central government as central government activities, regardless of the level of government at which these revenues or expenditures occurred. Likewise, activities that were under the control of subnational governments, even if they were funded by the central government, would be classified as subnational government activities. Constructing such a panel data set would require information on: (i) the nature of grants and transfers received by subnational governments (for example, lump-sum versus conditional); (ii) the structure of the tax system to determine whether and how revenues were shared; (iii) the discretion of subnational governments to levy and collect taxes and to change their bases and rates; (iv) the discretion granted to subnational governments to spend resources to meet the needs of their constituents; and (v) the overall level of political autonomy of subnational governments.

Unfortunately, we cannot readily address these issues with the available data. As with many other empirical studies of fiscal decentralization, we employ the International Monetary Fund's Government Finance Statistics Annual Yearbook (GFS) as the primary data source for revenues and expenditures of national and subnational governments. While the GFS system reports information on grants and transfers between the various

levels of government, it does not contain information on whether the grants and transfers are under the control of the central or recipient level of government or if the grants are conditional, block, or lump-sum. The GFS system also does not report information on the nature of transfers. Cross-sectional and time-series data on the number and size of subnational governments is sketchy at best for developed countries and virtually non-existent for developing and transitional countries, except in those cases where technical assistance providers have conducted surveys of subnational governments.

It is this lack of information that has led to the use of a measure of fiscal decentralization that is typically constructed as a ratio of subnational government expenditures (revenues) to general government expenditures (revenues). We are, as Oates (1972) concluded, left with the standard, albeit imperfect, measures of fiscal decentralization based on revenue and expenditure data. We, as many of the other studies that have preceded us, thus define fiscal decentralization in one dimension, that is, as the share of subnational government revenues to general government revenues or the share of subnational government expenditures to general government expenditures.¹¹

In our analysis, specifically, we use GFS data at the consolidated central government, regional and state government, and local government levels. For those countries that do not report consolidated central government data, we substitute data on the budgetary central government.¹² Of the 180-plus potential countries in the GFS data set, we selected those countries that reported revenues and expenditures for at least the central government and at least one level of subnational government.¹³ This selection process resulted in an unbalanced base panel data set of 982 observations for 52 developed and developing countries with observations ranging from 1972 to 1997.

¹¹ See Ebel and Yilmaz (2002) for a discussion of the pitfalls associated with the conventional measurement of fiscal decentralization. The OECD dataset suggested by Ebel and Yilmaz, however, includes only data for six countries on a period of only three years (1997-1999). While some studies of fiscal decentralization have attempted to construct measures of decentralization net of grants and transfers and net of certain types of expenditures, we do not construct such measures, as we are not able to ascertain, with any degree of certainty, whether these techniques reduce or enhance the bias already present in our measures of fiscal decentralization.

¹² This is consistent with previous examinations of fiscal decentralization in the literature.

¹³ We did not include those countries that stopped reporting revenue and expenditure information prior to 1990 and those countries whose reported data were mathematically inconsistent. We did include countries that reported zero or minimal expenditures or revenues for at least one subnational level of government.

We then calculated two measures of fiscal decentralization: (1) the ratio of total subnational government revenues to general government revenues and (2) the ratio of total subnational government expenditures to general government expenditures. These two measures are the standard measures of fiscal decentralization that have been widely used in the previous studies of determinants and outcomes of fiscal decentralization.¹⁴ When we combine the data extracted from the GFS with the data extracted from the other data sources, the size of the data set is reduced from 1,000 observations to 610 observations due to missing observations in the socio-economic data sets. We note again that the panel data set is unbalanced; we do not create linear approximations of the missing data points; nor do we construct averages over periods of time to balance the data set.¹⁵

Our approach is to examine the potential impact of decentralization in the full sample of countries using a two-way fixed effects model.¹⁶ We then split the sample into sub-samples of developing and developing and transitional countries to investigate whether the influence of decentralization is dependent upon the level of development. These estimations allow us to test the hypotheses presented in the theoretical model.

4.2 Fiscal Decentralization and Macroeconomic Stability

We hypothesize that the inflation rate is determined by the rate of economic growth, the growth of the money supply, and, among things, fiscal decentralization. We specify the base two-way fixed effects error components estimator for inflation as:

$$P_{it} = \beta_1 D_{it} + \beta_2 M_{it} + \beta_3 y_{it} + \delta' Z_{it} + u_{it} \quad [7]$$

¹⁴ While some studies of fiscal decentralization have attempted to construct measures of decentralization net of grants and transfers and net of certain types of expenditures, we do not construct such measures, as we are not able to ascertain, with any degree of certainty, whether these techniques reduce or enhance the bias already present in our measures of fiscal decentralization. See, for example, Woller and Phillips (1998) and Lin and Liu (2000).

¹⁵ A linear approximation, which may merely reflect the time-wise average of the series around the missing data points, is likely to obscure the variability in the series that may arise, in part, due to the influence of fiscal decentralization. Linear approximation may also introduce bias into the series depending upon which observations are used to create the approximations for the missing data points. It is entirely possible that the observations may reflect a period in time in which the structure of the economy is significantly different from other periods in time (during an oil or policy shock, for example).

¹⁶ See Baltagi (2001) for a discussion of the two-way fixed effects error component estimator.

where P is the annual change in the consumer price index, D is the measure of fiscal decentralization discussed above, M is the measure of M2 as a percentage of GDP, y is GDP per capita, and the Z matrix includes several additional control regressors, including openness to international trade, tax revenues as a percentage of GDP, Gross Domestic Investment as percentage of GDP, and population.¹⁷ All variables are expressed in logs. We reject the null hypothesis of no serial correlation at the 1% significance level using a modified Durbin-Watson test for serial correlation.¹⁸ Respecifying the model in first differences, we fail to reject the null hypothesis of no serial correlation.

Testing for the presence of endogeneity of fiscal decentralization in (7)¹⁹, we fail to reject the null hypothesis of exogeneity for fiscal decentralization with respect to the inflation rate.²⁰ We do, however, reject the null hypothesis at the 1% level of significance for M2 as a percentage of GDP and for per capita GDP. Based on this result, we instrument for the first difference of M2 as a percentage of GDP with the two-period lagged level of M2 as a percentage of GDP. We also instrument for the first difference of per capita GDP with the two-period lagged level of per capita GDP.²¹ While we recognize that the tests for endogeneity with unbalanced panel data may be of relatively low power, our failure to reject to null hypothesis of exogeneity for decentralization is consistent with the rest of the decentralization literature.

We then examine whether the random effects GLS estimator or fixed effects Within estimator is more appropriate for the estimation of (7). While we would prefer to use the random effects estimator to avoid the loss of degrees of freedom associated with the use of the Within estimator, we reject the null hypothesis that the regressors and

¹⁷ We would prefer to examine the potential impact of fiscal decentralization on macroeconomic stability as proxied by the misery index (inflation rate plus unemployment rate). Unfortunately, we lack sufficient data on unemployment across countries and time to construct a misery index variable.

¹⁸ When specified in levels, the modified Durbin-Watson test statistic for unbalanced panel data is 0.157 while the Breusch-Godfrey test statistic is 563.25, both rejecting the null hypothesis of no serial correlation at the 1% level. When respecified in first differences, the modified Durbin-Watson test statistic is 1.898 while the Breusch-Godfrey test statistic is 70.27. We fail to reject the null hypothesis with any significant degree of confidence.

¹⁹ See, among others, Hausman (1978), Hausman and Taylor (1981), and Wooldridge (2002) for a discussion of testing for endogeneity in the presence of an unbalanced panel data set.

²⁰ We also fail to reject the null hypothesis of exogeneity for openness to international trade, tax revenues as a percentage of GDP, population growth, and Gross Domestic Savings as a percentage of GDP. The test statistics are available upon request.

²¹ We instrument for the endogenous regressors using the two-period lagged level of the regressor in question. See Baltagi (2001) for a discussion of these instrumental variables approach with panel data.

effects are uncorrelated. As this result suggests that the random effects estimator is inconsistent, we use the fixed effects estimator for the estimation of the relationship between fiscal decentralization and inflation. Finally, we examine whether the fixed effects are jointly significant, that is, whether the time and country specific effects are significant. Using these results, we specify the estimable form of Equation (7) as a two-way fixed effects model.

From this paper's perspective, the most important result of the full sample estimations is the negative and statistically significant relationship between revenue decentralization and the rate of inflation. The estimated coefficient for revenue decentralization is statistically significant at the 1 percent level (Table 1). A 1 percent increase in revenue decentralization appears to induce, for the countries in the sample, an approximate 0.3 percent decrease in the growth of the consumer price index. The estimated coefficient for revenue decentralization also appears to be robust to the inclusion of other regressors, including total population, defense expenditures, and urbanization. Note, however, that the estimated coefficient for expenditure decentralization is not statistically significant. Thus it appears that while the decentralization of expenditures does not affect inflation, countries with a more decentralized system of revenue assignments tend to experience more stable macroeconomic environments. Perhaps the ability of subnational governments to mobilize their own revenues puts less strain on the central government budget and ultimately on inflation.

Turning to the sub-sample estimations, we again find that revenue decentralization appears to negatively influence the rate of inflation for the sub-samples of developed and developing and transitional countries.²² For the sub-sample of developed countries, the estimated coefficient for revenue decentralization is statistically significant at the 10 percent level and suggests that a 1 percent increase in the level of revenue decentralization induces a 0.4 percent decrease in the inflation rate for the developed countries in the sample (Table 1). For the sub-sample of developing and transitional countries, the estimated coefficient for revenue decentralization is also

²² We fail to reject the null hypothesis that the time-specific effects are jointly equal to zero but are able to reject the null hypothesis for the country-specific effects and thus present the results for the one-way fixed country effects IV Within estimator in Table 4.

statistically significant at the 10 percent level and appears to suggest that a 1 percent increase in the level of decentralization induces a 0.13 percent decrease in the rate of inflation. The estimated coefficient for expenditure decentralization is not statistically significant in either the developed or the developing country sub-samples.

The results of our analysis, even in light of the necessary cautionary notes, are quite striking. Revenue decentralization appears to promote, and not hinder, as has been often previously suggested by some in the literature, price stability among the sample countries. That this result is consistent, although at the lower order of magnitude, for the sub-sample of developing countries, suggests that our findings are not dependent upon the level of development.

Our empirical results support the previous arguments in the literature that fiscal decentralization may enhance price stability and contradict the *a priori* arguments of those who caution that decentralization, at a minimum, presents an obstacle to achieving macroeconomic stability (Prud'homme 1995). With respect to the empirical literature, our findings contradict the previous findings that decentralization either "locks in" (Treisman 2000) the current rate of inflation or has no statistically discernable effect (Rodden and Wibbels 2002). We find that revenue decentralization may, in fact, lower the rate of inflation.

4.3 Decentralization, Macrostability, and Economic Growth

We now turn to the question of the effect of fiscal decentralization on economic growth, that is, whether the static proposition that fiscal decentralization is efficiency enhancing has a corresponding proposition in the dynamic setting of economic growth. The theoretical model suggests that a direct relationship between decentralization and economic growth is possible, yet the question remains whether the relationship can be empirically substantiated in a fully specified model that controls, among other things, for the indirect effect of fiscal decentralization on economic growth. We now examine whether fiscal decentralization directly affects economic growth and also whether there is an indirect impact on economic growth through the inflation channel.

Drawing on the neoclassical economic growth literature, we specify the base estimation equation for growth in per capita GDP as:

$$y_{it} = \beta_1 D_{it} + \beta_2 K_{it} + \beta_3 H_{it} + \beta_4 G_{it} + \beta_5 P_{it} + \delta' Z_{it} + u_{it} \quad [8]$$

where D and P are as previously discussed; K is private capital as proxied by gross domestic private fixed investment; H is human capital as proxied by infant mortality; and G is public capital as proxied by gross domestic public investment. We would prefer to measure human capital using schooling data; however, panel data on education levels are currently not of sufficient quantity to include in the panel data set. The use of infant mortality as a measure of human capital, however, is consistent with the economic growth literature. The Z matrix contains a number of control regressors, including openness to international trade, population, democratic governance, tax revenues as a percentage of GDP, and defense expenditures as a percentage of GDP. All variables are expressed in logs. We reject the null hypothesis of no serial correlation at the 1 percent significance level.²³ Re-specifying the model in first differences, we fail to reject the null hypothesis of no serial correlation.

Following the methodology presented in the previous subsection, we first test for the endogeneity of the regressors.²⁴ We fail to reject the null hypothesis of exogeneity for fiscal decentralization with respect to growth in per capita GDP, a result that supports the previous findings in the literature. We do, however, reject the null hypothesis of exogeneity for the inflation rate and gross domestic fixed private and public investment per capita. We again reject the null hypothesis that the regressors and effects are uncorrelated, suggesting that the fixed effects estimator is more appropriate for the task of estimating (8). As before, we instrument for these endogenous regressors with the two-period lagged level of the regressor in question.

The empirical results are presented in Table 2. Among the most important empirical findings of this paper is the failure to detect, for the full sample of countries, a statistically significant direct relationship between fiscal decentralization and growth in per capita GDP. While the estimated coefficient for expenditure decentralization is

²³ When specified in levels, the modified Durbin-Watson test statistic for unbalanced panel data is 0.164 while the Breusch-Godfrey test statistic is 563.35, both rejecting the null hypothesis of no serial correlation at the 1% level. When respecified in first differences, the modified Durbin-Watson test statistic is 1.74 while the Breusch-Godfrey test statistic is 69.55. We fail to reject the null hypothesis with any significant degree of confidence.

²⁴ The test statistics are available upon request.

positive, it does not approach any meaningful level of significance. The estimated coefficient for revenue decentralization is negative but insignificant. The inclusion of the control regressors, to include total population, defense expenditures as a percentage of GDP, openness to international trade, and democratic governance, does not improve the significance of either of the estimated coefficients for fiscal decentralization. We also examined whether a non-monotonic relationship exists between decentralization and growth by including the square of decentralization as an additional variable. The estimated coefficients for the squared decentralization terms were also insignificant. Our findings appear to support those of in the literature who have failed to detect a statistically significant direct relationship between decentralization and economic growth.

While we fail to observe evidence of a direct relationship between decentralization and growth, we find empirical support for an indirect relationship between decentralization and growth through the inflation channel. As noted in the previous section, revenue decentralization appears to reduce the rate of inflation in the sample countries. The results in this section verify that a negative relationship exists between inflation and economic growth. Thus, an increase in revenue decentralization, all else being equal, would appear to reduce the rate of inflation over time and, in turn, indirectly enhance economic growth. We believe that this first evidence on the indirect influence of decentralization on growth is intriguing as it supports the contention that decentralization has an indirect effect on economic growth through its impact on inflation.

For the sub-sample of developed countries, we fail to reject the null hypothesis that the country-specific effects are jointly equal to zero and thus use the one-way IV Within estimator. From the results in Table 2, we note that there appears to be a negative and statistically significant relationship between fiscal decentralization and growth in per capita GDP. The estimated coefficients for expenditure and revenue decentralization are statistically significant at the 1 percent level. While the estimated coefficients for revenue decentralization appear to be robust to the inclusion of the control regressors (total population, defense expenditures, M2 as a percentage of GDP), the estimated coefficients for expenditure decentralization appear to be fragile. For the developed countries sub-sample, increases in revenue decentralization lead directly to lower

economic growth. On the other hand, the indirect effect of decentralization on growth through its impact on inflation is not present for the sub-sample of developed countries.

For the sub-sample of developing and transitional countries, we are able to reject the null hypothesis that the country and time-specific effects are singularly and jointly equal to zero and therefore use the two-way IV Within estimator. As with the full sample estimations, we fail to detect a statistically significant direct relationship between fiscal decentralization and growth in per capita GDP. The estimated coefficients for expenditure and revenue decentralization (Table 2) are positive and negative, respectively, but insignificant. As with the full sample of countries, we note that inflation appears to significantly and negatively influence growth in per capita GDP and that decentralization appears to negatively influence the rate of inflation. This result would appear to suggest that decentralization, for the developing countries in the sample, indirectly affects economic growth through the inflation channel. Unlike some of the arguments in the literature, fiscal decentralization does not appear to present an obstacle to achieving price stability in the sample developing and transitional countries.

5. Summary and Conclusions

In this paper we have examined the linkages between fiscal decentralization, inflation, and economic growth and have found support for the hypothesis that decentralization, at a minimum, does not present a threat to price stability in a large sample of developed and developing countries. Our findings suggest that fiscal decentralization *per se* does not create conditions that undermine efforts to achieve price stability. While it is quite clear that poorly designed or implemented fiscal decentralization policies may create incentives for subnational governments to overborrow relative to their debt-servicing capacity and potentially lead to macroeconomic instability, it appears that, by allowing governments at different levels to mobilize their own revenues, decentralization ultimately leads to more stable prices. The mechanism by which this takes place is not well established and it should be investigated in the future. However, an appealing conjecture is that by mobilizing their own tax revenues, local governments put less pressure on the central government budgeting, thus

lowering the chances for larger central government deficits and ultimately increases in the money supply and inflation.

The other significant finding of this paper is that there does not appear to exist a direct role for fiscal decentralization in economic growth. However, fiscal decentralization appears to have a positive indirect effect on economic growth through its beneficial impact on price stability.

From the perspective of future research, refining the measures of fiscal decentralization and macroeconomic stability to include measures of unemployment and other dimensions should be the next step of future work. A more complete understanding of the contemporaneous and time-wise causality flows between decentralization, its influences, and economic growth, should also be considered avenues for future research.

Table 1. Fiscal Decentralization and Inflation²⁵

	Full Sample	Full Sample	Developed Countries	Developed Countries	Developing Countries	Developing Countries
Expenditure	-0.1623		-0.1623		-0.1041	
Decentralization	(0.1025)		(0.1025)		(0.0965)	
Revenue		-0.2566**		-0.4142 ⁺		-0.1386 ⁺
Decentralization		(0.1089)		(0.2637)		(0.0808)
M2 (% of GDP)	1.3128	1.2501	1.3758	1.2586	-0.2122	-0.2346
	(1.0947)	(1.0878)	(1.2925)	(1.2386)	(0.9248)	(0.9330)
GDP Per Capita	-2.8441**	-2.9351**	-1.4094	-1.3045	-1.0517	-1.1320
	(1.4569)	(1.4601)	(1.4115)	(1.3419)	(1.4537)	(1.4675)
Openness to	0.0338	-0.0299	0.3400*	0.3358*	0.4337*	0.4281*
International Trade	(0.2986)	(0.2957)	(0.1750)	(0.1664)	(0.2668)	(0.2663)
Tax Revenues (% of	-0.0188	-0.0605	0.1386	-0.0167	-0.0538	-0.1021
GDP)	(0.1655)	(0.1701)	(0.1400)	(0.1597)	(0.2102)	(0.2070)
Gross Domestic	0.0642*	0.0665*	0.0973*	0.0869**	0.0980**	0.1002**
Savings (% of GDP)	(0.0306)	(0.0287)	(0.0417)	(0.0365)	(0.0310)	(0.0288)
Degrees of Freedom	388	388	188	188	218	218
R ²	0.25	0.26	0.13	0.17	0.17	0.17

²⁵ **, *, and + signify the 1%, 5%, and 10% level of significance, respective. White heteroscedastically consistent standard errors are reported in the parentheses. All variables measured in first differences of logs.

Table 2. Fiscal Decentralization and Economic Growth²⁶

	Full Sample	Full Sample	Developed Countries	Developed Countries	Developing Countries	Developing Countries
Expenditure Decentralization	0.0660 (0.0506)		-0.2736** (0.1305)		0.0635 (0.0481)	
Revenue Decentralization		-0.0469 (0.0532)		-0.3141** (0.1159)		-0.0510 (0.0533)
Infant Mortality	-0.1527* (0.0771)	-0.1531* (0.0773)	0.0208 (0.0770)	0.0224 (0.0739)	-0.4324** (0.1775)	-0.4273** (0.1767)
Inflation (Annual % Change in CPI)	-0.0798* (0.0396)	-0.0802* (0.0392)	0.0130 (0.0842)	0.0199 (0.0930)	-0.0989+ (0.526)	-0.0974+ (0.0523)
Gross Domestic Private Investment (% of GDP)	0.6212** (0.1113)	0.6253** (0.1152)	0.5950** (0.1492)	0.5767** (0.1483)	0.6784** (0.1404)	0.6851** (0.1453)
Gross Domestic Public Investment (% of GDP)	0.2434** (0.1039)	0.2454** (0.1045)	0.4133** (0.1339)	0.4068** (0.1322)	0.1612 (0.1245)	0.1608 (0.1249)
Democratic Governance	0.0109** (0.0039)	0.0107** (0.0039)	-0.0353 (0.0612)	-0.0027 (0.0840)	0.0117** (0.0041)	0.0114** (0.0040)
Degrees of Freedom	438	438	218	218	208	208
R ²	0.43	0.43	0.66	0.67	0.40	0.40

²⁶ **, *, and + signify the 1%, 5%, and 10% level of significance, respective. White heteroscedastically consistent standard errors are reported in the parentheses. All variables measured in first differences of logs.

Variable Appendix

Variable	Definition and Source
Revenue Decentralization	Ratio of total subnational government revenues, including grants and transfers, to the sum of government revenues at the subnational and central government level Government Finance Statistics (2002)
Expenditure Decentralization	Ratio of total subnational government expenditures, including grants and transfers, to the sum of government expenditures at the subnational and central government level Government Finance Statistics (2002)
Infant Mortality per 1,000 Live Births	World Development Indicators (2002)
Gross Domestic Private Fixed Investment Per Capita	World Development Indicators (2002)
Gross Domestic Public Fixed Investment Per Capital	World Development Indicators (2002)
Inflation	World Development Indicators (2002)
Democratic Governance	The composite democratic governance index ranges from 0 (complete absence of civil liberties and political rights) to 1 (full political rights and respect and protection of civil liberties). Freedom House (2002)
Gross Domestic Product Per Capita	World Development Indicators (2002)
Urbanization	World Development Indicators (2002)
General government tax revenues as percentage of GDP	Government Finance Statistics (2002) and World Development Indicators (2002)
M2	World Development Indicators (2002)
Total population	World Development Indicators (2002)

Sample Appendix

Country	Observation Period	Country	Observation Period
Argentina	1987-1997	Australia	1972-1996
Austria	1975-1989	Azerbaijan	1994-1997
Belgium	1978-1988	Bolivia	1986-1997
Brazil	1981-1994	Bulgaria	1988-1997
Canada	1974-1995	Chile	1975-1988, 1992-1997
Costa Rica	1977-1980, 1982-1985 1987-1995	Croatia	1994-1996
Denmark	1975-1989	Dominican Republic	1977, 1980, 1982, 1987, 1990, 1992, 1996
Estonia	1992-1996	Fiji	1980-1992
Finland	1972-1989	France	1975-1989
Hungary	1982-1989	Indonesia	1981-1993
India	1975-1996	Ireland	1972-1989
Israel	1974-1989	Kenya	1977-1984, 1986-1994
Latvia	1994-1997	Lithuania	1993-1996
Malaysia	1974-1979, 1981-1997	Mauritius	1975-1985, 1987-1997
Mexico	1977-1997	Netherlands	1975-1997
Norway	1972-1991	Panama	1985-1994
Peru	1990-1995	Philippines	1980-1992
Paraguay	1974-1980, 1984-1993	Poland	1994-1997
Romania	1991-1997	South Africa	1977, 1980, 1982, 1993, 1995-1997
Spain	1975-1989	Sweden	1975-1996
Switzerland	1975-1984	Thailand	1977, 1980, 1982, 1987, 1990 -1997
United Kingdom	1973-1995	United States	1972-1997
Zimbabwe	1977, 1980, 1982-1991		

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