

The impact of fiscal decentralization on growth, inflation and inequality in the Americas

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Abstract

This paper analyses the impact of fiscal decentralization on economic growth, inflation and Gini coefficients in 12 countries of the Americas. The findings suggest that the positive impact of this process has been more modest than anticipated, with revenue decentralization having a detrimental effect on economic growth and expenditure decentralization a positive one in developing nations of the Americas. Regarding the impact on income inequality, the results indicate that fiscal decentralization can play an important role in reducing this, particularly on the revenue side, but when decentralization is analysed in developing nations of the Americas only, fiscal decentralization is shown to accentuate rather than mitigate income inequality, which highlights the significant amount of work that is yet to be done before this process delivers on expectations. The findings for the impact of fiscal decentralization on price stability are inconclusive.

Keywords

Fiscal policy, tax administration, decentralization in government, economic growth, inflation, income distribution, price stabilization, measurement, North America, Latin America

JEL classification

E62, H70, O10, O50

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I. Introduction

For most countries in Latin America, the last three decades have been a period of significant devolution of government activities and functions to subnational government structures, particularly at the regional, municipal and local levels. More mature and entrenched democracies with institutions that are increasingly reflecting the demands of specific constituencies, a desire for greater representation of different subgroups and regions within societies, and the realization that there may be efficiency gains from transferring responsibilities to the areas and communities most directly affected by government interventions are among the reasons for this trend towards decentralization of government activities.

The main subject of this study is fiscal decentralization, which occurs when central governments transfer certain revenue and expenditure responsibilities to subnational levels of government. Economic research on this topic has for the most part concentrated on how fiscal decentralization impacts governance and economic growth, but more recent efforts have begun analysing the ways in which it affects poverty, income distribution and fundamental rights, including civil and political rights as well as economic freedom.

Although current research has extensively studied the impact of decentralization on growth, no clear-cut conclusions have emerged, particularly when the process of decentralization is analysed from the perspective of developing nations. The lack of conclusive evidence is even more evident when the impact of decentralization on other variables such as income distribution and economic stability is examined. This paper aims to help bridge some of the gaps in current research by analysing how fiscal decentralization has impacted economic growth, inflation and income inequality in a region of the world where the issue of decentralization has been at the forefront of structural reforms for several decades.

The rest of the paper is organized as follows. Section II presents a brief review of the literature on the relationship between fiscal decentralization, growth, economic stability and inequality. Section III introduces the theoretical arguments for the expected impact of decentralization on the principal variables of interest. Section IV presents the data and methodology and section V the analysis of the empirical results. Section VI summarizes the principal findings and analyses their policy implications.

II. Literature review

One of the main areas of economic research into fiscal decentralization deals with its effects on economic growth. Several studies have carried out cross-country and country-specific analyses of the issue, mostly but not exclusively in developed nations. A related theme is the way decentralization has affected economic stability, and there has also been significant research on this topic. The most recent areas of interest are the impacts on poverty, income inequality and fundamental human liberties. A brief review of some of the most important works on this array of topics is presented below.

Cross-country studies of the way fiscal decentralization impacts economic growth are many. Important early contributions include Davoodi and Zou (1998), who worked with data for 46 countries and found a negative correlation between fiscal decentralization and growth in developing nations, but none in developed economies. Martínez-Vázquez and McNab (2003) concluded that while fiscal decentralization might in fact have an impact on growth, the theoretical underpinnings for this relationship remained underdeveloped and hence no definite answer could be provided. Martínez-Vázquez and McNab (2006) found that when a negative correlation between decentralization and growth was established for developed countries, it could be offset by the positive impact of decentralization on macroeconomic stability. Thornton (2007) worked with data for 19 countries of the Organization for Economic Cooperation and Development (OECD) and found that when fiscal decentralization was measured only by the revenues over which subnational governments had full autonomy, its impact on economic growth was not statistically significant.

More recent works include Rodríguez-Pose and Ezcurra (2011), reviewing a set of 21 OECD countries and finding a significant negative association between fiscal decentralization and economic growth, despite the inclusion of several control variables and adjustments to account for differences in expenditure preferences by subnational governments. Amagoh and Amin (2012) concluded that while there might be benefits from fiscal decentralization, its impact on growth was constrained by a number of factors that depended on the contexts of the societies involved. Baskaran and Feld (2013) found, also for a set of OECD countries, that fiscal decentralization appeared to have a statistically insignificant negative effect on growth when proxied by standard indicators of the Government Finance Statistics (GFS) type, but a statistically significant negative impact when new indicators reflecting the degree of subnational tax autonomy were used. Gemmell, Kneller and Sanz (2013) found for a set of OECD countries that spending decentralization had tended to be associated with lower economic growth and revenue decentralization with higher growth. Blöchliger (2013) found a positive association between fiscal decentralization and GDP per capita in OECD countries, with revenue decentralization having a greater impact than spending decentralization. Representative works for individual countries include Xie, Zou and Davoodi (1999) for the United States, Yifu Lin and Liu (2000) for China and Rao (2000) for India.

On the issue of economic stability and the way fiscal decentralization affects it, representative works include Neyapti (2004), which takes a set of countries with varying levels of inflation and finds that revenue decentralization has a negative impact on inflation in higher-inflation countries if accompanied by both central bank independence and local accountability, while in lower-inflation countries the negative impact on inflation remains without the need for additional factors; Neyapti (2010), which analyses the topic of fiscal discipline and concludes that for a set of 16 countries expenditure and revenue decentralization reduces budget deficits; Rodden, Eskeland and Litvack (2003), which analyses the issue of how fiscal discipline is maintained when lower levels of government take responsibility from national authorities and examines how “hard” and “soft” budget constraints impact economic stability in countries with varying degrees of political and institutional development; and Jalil, Harun and Che Mat (2012), which focuses on price stability for 62 countries and finds that decentralization appears to lower the inflation rate to an extent that depends on the level of corruption in political institutions. Country-specific studies include Bodman and others (2009) for Australia, Iqbal and Nawaz (2010) for Pakistan and Okonkwo and Godslove (2015) for Nigeria.

Concerning fiscal decentralization, poverty and income distribution, significant contributions include Boex and others (2006), which in addition to providing a comprehensive survey of the literature on the topic offers a set of qualitative suggestions for conducting decentralization reforms from a pro-poor perspective; Sepúlveda and Martínez-Vázquez (2011), which takes a large dataset of countries and finds that fiscal decentralization appears to reduce poverty as long as the share of subnational expenditures is no greater than one third of total government expenditures, and also to reduce income inequality, but only if general government represents a significant share of the economy; Goerl and Seiferling (2014), which takes a large dataset of countries and finds that the decentralization of government expenditures can help achieve a more equal distribution of income if a number of conditions are met; and Sacchi and Salotti (2014), which looks at a set of OECD countries and finds that a higher degree of tax decentralization is associated with higher household income inequality. At the individual country level, a sample of works includes Moon (2003) for South Korea, Song (2013) for China and Cavusoglu and Dincer (2015) for the United States.

A recent area of research involves analysis of the impact of fiscal decentralization on what can be described as fundamental human rights, a term that encompasses both civil and political rights and economic freedom. Although this line of research is not new in other areas of the social sciences, as can be seen in the early contribution by Kaufman (1969) and a great many subsequent articles, such as Michels (2011) and Islam (2015), it has been little explored in economics. Notable exceptions include Weingast (2009) and Bojanic (2016).

III. The theoretical foundations for the relationship between fiscal decentralization, growth, inflation and income inequality

Analysis of current research on fiscal decentralization and its impact on a range of indicators leaves an impression of uncertainty about how decentralization will affect variables such as growth, economic stability and income inequality. However, the fact that empirical work has not provided a clear picture in its current state has not prevented economists from hypothesizing about the ways in which decentralization is expected to affect these very variables. The most recent theoretical work will be briefly summarized here and an attempt made to highlight the issues that are likely to play an important role in our understanding of how fiscal decentralization affects growth, price stability and income distribution in the Americas.

Concerning the potential growth impact of fiscal decentralization, there is already a significant body of theoretical work on the subject (see, for instance, Oates, 1993; Brueckner, 2005; Martínez-Vázquez and McNab, 2006), and the answer seems to hinge on whether a central authority is best able to utilize fiscal policy to attain long-term growth, or whether a decentralized structure for administering public funds is more capable of delivering outcomes that will translate into growth. While most researchers seem to agree that a positive correlation between decentralization and growth should be expected, owing to better targeting of growth-enhancing infrastructure and greater incentives to save in decentralized regimes, the important qualifier is that the political and institutional context of the country where decentralization is taking place matters. The inference, then, is that although a positive correlation between fiscal decentralization and economic growth is expected, the state of development of an economy will determine whether the decentralization process is able to resolve into policies that generate growth over time.

As regards the impact of fiscal decentralization on inflation, Martínez-Vázquez and McNab (2006) and Treisman (2000), among others, have developed a theoretical framework for the ways in which decentralization is likely to affect price stability. Without hypothesizing about the specific direction in which price stability is likely to be affected by decentralization, their empirical work tends to show that in (mostly) developed economies there is an inverse correlation between inflation and fiscal decentralization, implying that lower inflation levels are more likely in those nations with more decentralized regimes, while the opposite seems to be true in less developed economies, where decentralization may actually generate higher inflation. From the perspective of countries in the Americas, an important consideration is that one of the principal reasons for the very high inflation rates they have experienced over time is unrestrained government expenditure, with a significant percentage of this occurring at lower levels of government. This draws attention to the very real concern that devolving this specific function to subnational levels of government may once again foster inflationary pressures.

Theoretical work on the way income distribution is affected by fiscal decentralization is not as developed as that for growth and economic stability. An important exception is Beramendi (2003), which offers a theoretical model for analysing how decentralization interacts with the politics of redistribution and inequality and argues that decentralization in itself does not necessarily lead to higher (or lower) levels of income inequality, but rather inequality is to a large extent a function of regions' internal social and political structures. Empirical studies are more numerous and include, among others, Durham (1999), Sepúlveda and Martínez-Vázquez (2011) and, more recently, Goerl and Seiferling (2014). From the perspective of this article, if growth is assumed to be a necessary but not sufficient condition for any increase in income equality, as argued by Kuznets (1995), then fiscal decentralization, to the extent that it is expected to have a positive impact on growth, should also eventually bring greater income equality.

Coupled with the theoretical and empirical findings just described, two important additional factors to consider regarding decentralization in developing nations of the Americas are the limited institutional

ability of subnational levels of government to collect their own revenues and the very real economic, political and cultural disparities that exist within and between countries.

An inability to collect their own revenues makes subnational governments dependent on central government transfers. This situation creates inefficiencies, as these transfers may not be automatic and may be tied to political calculations. The regional disparities within and between countries mean that decentralization in the developing part of the American hemisphere has taken place in very heterogeneous settings, and hence it should not be surprising that the degree of decentralization varies not only between countries but also between regions within each country. Issues of income inequality, the degree of urbanization, territorial imbalances and literacy rates are but a few of the factors that may affect how the process of decentralization is able to take hold in a particular setting. The point is that in the context of decentralization in this part of the world, regional disparities and the dependence of subnational governments on central government for tax collection are likely to play a significant role in the effectiveness and usefulness of fiscal decentralization.

IV. Data and methodology

One of the most significant challenges for a cross-country study of fiscal decentralization is properly measuring the extent of decentralization in several layers of government. A related issue when the study focuses on (mostly) developing nations is the difficulty of finding reliable and credible data. An optimal scenario would be one in which the dataset constructed was fully comparable across countries and truly reflected the autonomous decisions of subnational governments. As might be expected, constructing such a dataset is a formidable undertaking, not least because it requires knowledge of the degree of autonomy of subnational governments over revenue collection and expenditure decisions. It also calls for a thorough understanding of each nation's tax system, and particularly the structure of revenue-sharing between regions, the nature of grants and transfers between the central government and subnational levels of government, and the overall level of regional political autonomy. Given the difficulty of finding decentralization indicators that successfully identify all these, the standard practice in the economics literature has been to utilize data collected by the International Monetary Fund (IMF) and reported in its Government Finance Statistics Yearbook (GFSY)² as the primary source for revenue and expenditure data at national (general) and subnational levels of government. Although GFSY does not report the nature of government transfers or identify whether transfers and grants are under the control of the national or subnational levels, and indeed does not currently have disaggregated data for many developing nations, it is also the primary data source for the present study, albeit not the only one, since revenue decentralization data from OECD,³ the Economic Commission for Latin America and the Caribbean (ECLAC)⁴ and, when possible, the national institutes of statistics or comparable government institutions of each country have been used in addition to those of the GFSY.⁵

The standard measures of fiscal decentralization utilized in most decentralization studies are the ratio of total subnational government revenues to general government revenues and the ratio of total subnational government expenditures to general government expenditures. These two fiscal decentralization indicators are also used here. The GFSY, OECD, ECLAC and national data provide

² See [online] <http://www.imf.org/external/pubs/ft/gfs/manual/comp.htm>.

³ See [online] www.oecd.org/ctp/federalism/fiscal-decentralisation-database.htm.

⁴ See [online] <http://estadisticas.cepal.org/cepalstat/portada.html?idioma=english>.

⁵ Decentralization data for the Plurinational State of Bolivia are easily obtainable from the country's National Institute of Statistics (www.ine.gob.bo). Likewise, data on Argentina can be obtained from the Federal Tax Commission of Argentina (www.cfi.gov.ar) and from the Ministry of Treasury and Public Finance of Argentina (www.economia.gov.ar). For the rest of the developing countries of the Americas in this study, obtaining decentralization data from a national government entity was more challenging, so use was made of the data reported by one or more of GFSY, OECD and ECLAC.

information at the consolidated general government level and, for some countries, at the regional, state and local government levels. Revenues (expenditures) at subnational levels of government (regional, state and local) were added together to come up with a single figure for subnational government revenues (expenditures). Of the 23 countries in the Americas (excluding the Caribbean), data disaggregated between the general and subnational levels of government are available for 12 nations, and this study accordingly focuses on this subsample for which data are available.⁶ Yearly observations run from 1972 to 2015, although the dates of the data available for the 12 countries do not necessarily coincide. Depending on (i) whether the revenue or expenditure decentralization indicators are used as regressors, (ii) the specific methodology utilized in estimating a regression and (iii) the dependent variable of the model (per capita GDP growth, the inflation rate or the Gini coefficient), the number of observations ranges from a low of 91 to a high of 208. The end result is an unbalanced panel dataset with a maximum of 208 observations for 12 countries of the Americas running from 1972 to 2015. Although there are significant gaps in the dataset, it was decided that no averages or linear approximations should be used to fill in the gaps, with the actual dataset instead being allowed to speak for itself.

The three dependent variables utilized here are per capita GDP growth,⁷ the inflation rate and the Gini coefficient. The control variables for the set of regressions relating to fiscal decentralization and economic growth are the inflation rate (expressed as a percentage); gross domestic savings (percentage of GDP) as a proxy for capital formation; openness to international trade ((exports + imports)/GDP, expressed as a percentage); remittances (percentage of GDP); foreign direct investment (FDI) (percentage of GDP); unemployment rate (percentage); general government final consumption expenditures (percentage of GDP) as a proxy for the size of government; urban population (percentage); and a political and civil liberties ratio as a measure of political stability and basic rights.⁸ With the inflation rate as the dependent variable, control variables include GDP per capita in levels (at purchasing power parity, in logs), openness to international trade, general government final consumption expenditures, military expenditures (as a percentage of GDP), FDI and remittances. Finally, when the Gini coefficient is the dependent variable, the control variables are GDP per capita in levels and GDP per capita squared, to take account of what Kuznets (1955) hypothesizes about per capita income growth initially increasing inequality but eventually reducing it; urban population; openness to international trade; a political and civil liberties ratio to attempt to capture the extent to which basic human rights affect inequality; remittances; gross domestic savings; general government final consumption expenditures; the inflation rate; Internet users (per 100 people); and the unemployment rate.⁹

The particular specifications for each case conform to previous research on similar topics, but additional control variables have been included where deemed pertinent, namely remittances and a political and civil liberties ratio when economic growth is the dependent variable, remittances when it is the inflation rate, and a political and civil liberties ratio, Internet users and the unemployment rate when it is the Gini coefficient.

Where the model specification is concerned, different regression methodologies were used to deal with information limitations and gaps within an unbalanced panel dataset, the likely correlation of observations within and across sections and the very wide variability of data for the countries in the sample. Specifically, generalized least squares (GLS) and instrumental variables regressions were estimated to

⁶ The 12 countries included in this study are Argentina, Brazil, Canada, Chile, Colombia, Costa Rica, El Salvador, Mexico, Paraguay, Peru, the Plurinational State of Bolivia and the United States.

⁷ Figures for per capita GDP growth are calculated in purchasing power parity.

⁸ The source for this combined ratio is Freedom House, which compiles separate indices of political rights and civil liberties and prepares qualitative assessments of the degree of liberty in each country. Here, the two indices and the qualitative assessments have been combined into a single index of political and civil liberties ranging from 0.18 (most free) to 1.00 (least free). See [online] http://freedomhouse.org/report-types/freedom-world#.VY_fw11RHcw.

⁹ Excepting political and civil liberties, the source for all variables is the World Bank. See [online] <http://data.worldbank.org/data-catalog/world-development-indicators>.

allow for cross-sectional and intrasectional heteroskedasticity and autocorrelation,¹⁰ as were GLS with fixed and random cross-sectional effects to allow, respectively, for omitted variable bias and for the impacts of time-invariant variables. Additionally, generalized method of moments (GMM) regressions were estimated to reflect the dynamic nature of the relationship between fiscal decentralization, growth, inflation and income inequality.¹¹

V. The results of the empirical analysis

As an introduction to the empirical analysis, table 1 reports summary statistics for the 12 countries of the Americas analysed in this study, including the time period covered by each decentralization indicator.

Table 1
The Americas (12 countries):^a decentralization indicators and summary statistics

| Country | Subnational government revenues as proportion of general government revenues (%) | | | | Subnational government expenditures as proportion of general government expenditures (%) | | | |
|----------------------------------|--|----------------------|----------------|---------------|--|----------------------|----------------|---------------|
| | Period | Average whole period | Highest (year) | Lowest (year) | Period | Average whole period | Highest (year) | Lowest (year) |
| Argentina | 1990, 2000, 2005, 2007-2015 | 37.35 | 45.59 (2015) | 21.17 (2005) | 1980-2013 | 42.52 | 51.51 (2006) | 24.05 (1982) |
| Bolivia (Plurinational State of) | 1985-2014 | 31.05 | 46.17 (2003) | 15.14 (1985) | 1986-2014 | 27.57 | 36.98 (1997) | 14.95 (1986) |
| Brazil | 2000-2014 | 54.01 | 62.47 (2014) | 49.19 (2005) | 2006-2012 | 52.34 | 54.73 (2008) | 50.76 (2009) |
| Canada | 1979-2014 | 72.59 | 78.10 (2010) | 69.35 (1989) | 2000-2014 | 73.30 | 77.59 (2014) | 68.19 (2000) |
| Chile | 1974-2014 | 8.56 | 14.06 (2002) | 2.75 (1974) | 2000-2001 | 13.35 | 13.50 (2000) | 13.20 (2001) |
| Colombia | 1990, 1998-2003, 2005, 2010, 2014 | 33.94 | 46.39 (1999) | 20.56 (2005) | 1998-2000 | 39.33 | 40.16 (2000) | 38.76 (1998) |
| Costa Rica | 2000-2014 | 5.01 | 6.95 (2007) | 3.19 (2000) | 2002-2007 | 3.98 | 6.35 (2005) | 3.08 (2002) |
| El Salvador | 2002-2010 | 7.61 | 10.11 (2009) | 4.54 (2002) | - | - | - | - |
| Mexico | 1972-2013 | 29.63 | 44.76 (2009) | 18.96 (1989) | 1990-2013 | 44.58 | 59.66 (1997) | 27.60 (1990) |
| Paraguay | 2005-2012 | 8.92 | 10.86 (2012) | 7.73 (2010) | 2005-2012 | 9.34 | 11.17 (2012) | 8.02 (2010) |
| Peru | 1995-2012 | 30.42 | 39.19 (2009) | 21.50 (1998) | 1995-2012 | 30.00 | 40.88 (2012) | 21.08 (1998) |
| United States | 1980-2014 | 56.13 | 60.77 (1992) | 51.48 (2013) | 1990-2014 | 51.50 | 59.85 (2000) | 46.27 (2011) |

Source: Prepared by the author on the basis of data from International Monetary Fund (IMF) [online] <http://data.imf.org/?sk=E86E9088-3830-4CA3-B240-1B0EC5E15221>; Organization for Economic Cooperation and Development (OECD) [online] www.oecd.org/ctp/federalism/fiscal-decentralisation-database.htm; Economic Commission for Latin America and the Caribbean (ECLAC) [online] <http://estadisticas.cepal.org/cepalstat/portada.html?idioma=english>; Federal Tax Commission of Argentina [online] www.cfi.gov.ar; Ministry of Treasury and Public Finance of Argentina [online] www.economia.gov.ar; and National Institute of Statistics of the Plurinational State of Bolivia [online] www.ine.gov.bo.

^a Argentina, Brazil, Canada, Chile, Colombia, Costa Rica, El Salvador, Mexico, Paraguay, Peru, the Plurinational State of Bolivia and the United States.

The summary statistics demonstrate that there is a great deal of variation between the countries of the Americas in their degree of fiscal decentralization. Of all the countries included in the analysis, Canada is the most decentralized, with both the revenue and expenditure indicators averaging well over 70%.¹² Costa Rica, El Salvador and Paraguay are at the other end of the spectrum, with average

¹⁰ With both the GLS and instrumental variables regressions, the Prais-Winsten panel-corrected standard error (PCSE) within estimator was estimated to correct for serial correlation (cross-sectional and between-period correlation).

¹¹ The GMM regressions were estimated using the PCSE method to take account of cross-sectional and between-period correlation.

¹² As defined in section IV, the revenue (expenditure) decentralization indicator is the ratio of subnational government revenues (expenditures) to general government revenues (expenditures).

decentralized revenues and expenditure alike in the single digits.¹³ Between these two extremes, the degree of fiscal decentralization in the rest of the countries is not homogeneous, with nations like Brazil and the United States showing significant degrees of decentralization (revenue and expenditure decentralization indicators at around the 50% level) that do not however approach that in Canada. In the remaining group of countries, Argentina and Colombia seem to tilt towards greater decentralization, with average revenue and expenditure percentile indicators in the high thirties or low forties, while Mexico, Peru and the Plurinational State of Bolivia fall somewhere in between, with both indicators averaging around 30%.¹⁴ Chile leans to a lower level of decentralization, with revenue decentralization in the high single digits and expenditure decentralization in the low teens. It is also noteworthy that while the raw data seem to suggest an increasing degree of decentralization for most countries as time passes, this is not true for all, as demonstrated by the United States, where both revenue and expenditure decentralization indicators seem to show a downward trend over time.

Regression results showing the impact of fiscal decentralization on GDP per capita, inflation and the Gini coefficient are reported in two sets, the first including all 12 countries and the second excluding Canada and the United States, the two nations with arguably the most developed and stable decentralization regimes in the hemisphere. Excluding these two nations has the benefit of showing the fiscal decentralization situation from the perspective of developing countries of the Americas only.

The impact of fiscal decentralization on growth is analysed first. Table 2 presents regression results when all 12 countries are included and the dependent variable is per capita GDP growth.

The five columns in table 2 report estimates for the five methodologies described in section IV. In the first, a GLS model reflecting cross-sectional and intrasectional heteroskedasticity and autocorrelation is presented. The second and third columns report GLS models with fixed and random cross-sectional effects. The fourth and fifth columns report estimates for when the variables are instrumented and when GMM is used. The instrumental variables and GMM specifications were estimated in consideration of both cross-sectional and intrasectional heteroskedasticity and autocorrelation. Additionally, each column contains two regression results: the first shows estimates for when the fiscal decentralization indicator is based on revenue and the second for when it is based on expenditure.

As is evident from the results reported, the revenue-based fiscal decentralization indicator consistently shows a negative impact on economic growth. The coefficients for this variable in all specifications are negative, of approximately equal size, and statistically significant in all cases, excepting the GLS specification with fixed effects. On the expenditure side, the fiscal decentralization variable is mostly positive but only statistically significant when estimated with GMM, which is consistent with the assumptions made in section III, particularly the supposition that decentralized expenditures were more likely to be targeted at growth-enhancing investment projects.¹⁵ Taken as a whole, however, the empirical evidence does not conclusively support the hypothesis that decentralization is conducive to growth, particularly where revenue decentralization is concerned.

¹³ In El Salvador, the level of decentralization is only this low on the revenue side.

¹⁴ In Mexico, the degree of decentralization on the expenditure side is quite high, averaging around 45% for the 1990-2013 period. On the revenue side, the indicator averages only around 30%, but this may reflect the longer time period (1972-2013).

¹⁵ When the specification is instrumented, the expenditure decentralization variable is found to be negative and statistically significant at the 10% level, drawing attention to the weakness of the statistical evidence found in this study to support the expected positive impact of fiscal decentralization on economic growth.

Table 2
The Americas (12 countries):^a fiscal decentralization and GDP per capita

| | Generalized least squares to allow for cross-sectional and intrasectional heteroskedasticity and autocorrelation (no effects specification) | Generalized least squares with cross-sectional fixed effects and no weights | Generalized least squares with cross-sectional random effects and no weights | Instrumental variables to allow for cross-sectional and intrasectional heteroskedasticity and autocorrelation (no effects specification) | Generalized method of moments |
|---|---|---|--|--|-------------------------------|
| Revenue decentralization (%) | -0.057** (2.002) | -0.066 (0.057) | -0.056** (0.024) | -0.067*** (0.017) | -0.073** (0.037) |
| Expenditure decentralization (%) | 0.008 (0.019) | 0.120 (0.084) | 0.001 (0.031) | -0.045* (0.024) | 0.160*** (0.049) |
| Inflation rate (%) | 0.001 (0.001) | -0.005*** (0.001) | 0.001 (0.001) | -0.016 (0.012) | -0.006*** (0.006) |
| Gross domestic savings (% of GDP) | 0.295*** (0.043) | 0.304*** (0.092) | 0.247*** (0.069) | 0.257*** (0.052) | 0.526*** (0.064) |
| Openness to international trade (X + M)/GDP (%) | -0.061** (0.013) | -0.022 (0.049) | -0.051** (0.020) | -0.048*** (0.015) | -0.226*** (0.025) |
| Remittances (% of GDP) | 0.306*** (0.067) | -0.204 (0.359) | 0.285** (0.118) | 0.228*** (0.084) | 0.433* (0.258) |
| Foreign direct investment (% of GDP) | -0.055 (0.070) | -0.016 (0.143) | -0.080 (0.110) | -0.345*** (0.117) | 0.133 (0.088) |
| Unemployment rate (% of total labour force) | -0.203** (0.057) | -0.220*** (0.054) | -0.443*** (0.138) | -0.274*** (0.085) | -0.476*** (0.072) |
| General government final consumption expenditure (% of GDP) | 0.045 (0.062) | -0.266*** (0.073) | 0.073 (0.114) | 0.025 (0.075) | -0.858*** (0.175) |
| Urban population (% of total) | -0.067** (0.029) | -0.155 (0.129) | -0.042 (0.039) | -0.055* (0.044) | -0.043 (0.058) |
| Political and civil liberties ratio | -4.348** (1.300) | -2.979* (1.840) | -2.351 (1.839) | -5.218*** (2.484) | 7.834*** (2.935) |
| Observations | 208 | 208 | 208 | 187 | 175 |
| Adjusted R ² | 0.31 | 0.37 | 0.21 | 0.27 | 0.30 |

Source: Prepared by the author on the basis of data from International Monetary Fund (IMF) [online] <http://data.imf.org/?sk=E66E9088-3830-4CA3-B240-1B0E65E15221>; Organization for Economic Cooperation and Development (OECD) [online] www.oecd.org/ctp/federalism/fiscal-decentralisation-database.htm; Economic Commission for Latin America and the Caribbean (ECLAC) [online] <http://estadisticas.cepal.org/cepalstat/portada.html?idioma=english>; Federal Tax Commission of Argentina [online] www.cfi.gov.ar; Ministry of Treasury and Public Finance of Argentina [online] www.economia.gov.ar; National Institute of Statistics of the Plurinational State of Bolivia [online] www.ine.gov.bo; Freedom House [online] http://freedomhouse.org/report-types/freedom-world#_VY_WI1RFHow; and World Bank [online] <http://data.worldbank.org/data-catalog/world-development-indicators>.

Note: (*) = significant at 10%, (**) = significant at 5% and (***) = significant at 1%. The dependent variable is per capita GDP growth. All regressions include an intercept term (not shown in table). Generalized method of moments specifications include a one-period lagged dependent variable as regressor (not shown in table).

^a Argentina, Brazil, Canada, Chile, Colombia, Costa Rica, El Salvador, Mexico, Paraguay, Peru, the Plurinational State of Bolivia and the United States.

The behaviour of the control variables is also noteworthy. With most, the results conform to expectations about their likely impact on growth. For instance, savings have the expected positive impact on the dependent variable regardless of the specification used, while the unemployment rate shows the expected negative impact on growth. Openness to international trade is also shown not to be conducive to growth, which accords with a substantial segment of the economics literature that views the impact of trade with reservations.¹⁶ A similar result is obtained for FDI, as it is shown by the pairing of the instrumental variables and GMM estimates with both the revenue and expenditure indicators of fiscal decentralization to have a strongly negative and significant impact on growth, underlining concerns about the impact of foreign investment in this respect. The impact of remittances is mostly positive and significant, as would be expected, but this variable may have the opposite impact when analysed from a dynamic perspective. Higher inflation, bigger government (as measured by the general government final consumption expenditures variable) and greater urbanization also seem to lead to less growth. Finally, greater political and civil liberties seem to be conducive to higher growth, although the impact of this variable (the political and civil liberties ratio) may have a more nuanced impact in a dynamic setting.¹⁷

Table 3 presents regression results showing how fiscal decentralization impacts growth when Canada and the United States are excluded from the analysis. The specifications and statistical properties of each regression are the same as in table 2.

As with the full sample of countries, fiscal decentralization on the revenue side is consistently shown to have a detrimental impact on growth. The coefficients for this variable are mostly negative, and they are statistically significant when estimated using GLS (with no effects and with random effects) and instrumental variables. On the expenditure side, the coefficients for the decentralization indicator are positive in all cases and are statistically significant when estimated using GLS (with fixed effects) and GMM, demonstrating that expenditure decentralization does seem to play an important role in generating economic growth in developing nations of the Americas. This result is more conclusive than the one observed with the full sample of countries, revealing that for this set of developing countries in the Americas, decentralization on the expenditure side may indeed have the expected positive impact on growth.

With respect to the control variables, for the most part their behaviour resembles the situation with the full sample of countries. Savings and the unemployment rate are consistently shown to have the expected positive and negative impacts on growth, respectively, while openness to trade, FDI and bigger government show a similar negative impact on growth. Remittances also seem to have a positive impact on growth, but, as with the full sample of countries, the impact of this variable in a dynamic setting might be more nuanced. Inflation is also shown to be (mostly) a negative influence on growth while, by contrast with the cases of Canada and the United States included in the analysis, the degree of urbanization seems to play no role in growth. Finally, greater political and civil liberties seem to foster economic growth, although, once again, the impact of this variable in a dynamic framework seems to be more nuanced.

Tables 4 and 5 analyse the impact of fiscal decentralization on the inflation rate. The regression methodologies are the same as those utilized when growth was the dependent variable. Table 4 presents estimation results for all the countries included in the analysis.

¹⁶ A good survey of findings addressing some of the reservations about the impact of trade on growth is provided by Rodríguez and Rodrik (1999).

¹⁷ The ratio of political and civil liberties ranges from 0.18 (most free) to 1.00 (least free).

Table 3
The Americas (10 countries):^a fiscal decentralization and GDP per capita

| | Generalized least squares to allow for cross-sectional and intrasectional heteroskedasticity and autocorrelation (no effects specification) | Generalized least squares with cross-sectional fixed effects and no weights | Generalized least squares with cross-sectional random effects and no weights ^b | Instrumental variables to allow for cross-sectional and intrasectional heteroskedasticity and autocorrelation (no effects specification) | Generalized method of moments |
|---|---|---|---|--|-------------------------------|
| Revenue decentralization (%) | -0.074** (0.022) | -0.065 (0.065) | -0.082** (0.032) | -0.075* (0.046) | 0.006 (0.039) |
| Expenditure decentralization (%) | 0.026 (0.033) | 0.183* (0.100) | 0.010 (0.040) | 0.008 (0.040) | 0.262*** (0.022) |
| Inflation rate (%) | 0.001* (0.001) | -0.005** (0.001) | 0.001 (0.001) | -0.011 (0.012) | -0.008 (0.009) |
| Gross domestic savings (% of GDP) | 0.191*** (0.057) | 0.209* (0.118) | 0.174*** (0.061) | 0.154 (0.107) | 0.444*** (0.082) |
| Openness to international trade (X + M)/GDP (%) | -0.033 (0.021) | 0.003 (0.059) | -0.037* (0.030) | 0.008 (0.042) | -0.225** (0.036) |
| Remittances (% of GDP) | 0.218*** (0.078) | -0.062 (0.408) | 0.217* (0.124) | -0.449 (0.145) | -0.519** (0.228) |
| Foreign direct investment (% of GDP) | 0.056 (0.076) | 0.069 (0.162) | -0.514** (0.130) | -0.230 (0.185) | -0.810*** (0.084) |
| Unemployment rate (% of total labour force) | -0.208** (0.061) | -0.248* (0.133) | -0.301** (0.102) | -0.218** (0.103) | -0.414** (0.085) |
| General government final consumption expenditure (% of GDP) | 0.067 (0.073) | -0.234** (0.082) | 0.072 (0.121) | -0.142 (0.144) | -1.254** (0.185) |
| Urban population (% of total) | -0.003 (0.037) | -0.045 (0.166) | - | 0.005 (0.062) | 0.090 (0.094) |
| Political and civil liberties ratio | 1.127 (1.725) | -5.116** (2.686) | 1.639 (3.540) | -3.333 (2.352) | 8.810*** (1.199) |
| Observations | 163 | 123 | 163 | 144 | 134 |
| Adjusted R ² | 0.27 | 0.26 | 0.11 | 0.17 | 0.23 |

Source: Prepared by the author on the basis of data from International Monetary Fund (IMF) [online] <http://data.imf.org/?sk=E86E9088-3830-4CA3-B240-1B0EC5E15221>; Organization for Economic Cooperation and Development (OECD) [online] www.oecd.org/ctp/federalism/fiscal-decentralisation-database.htm; Economic Commission for Latin America and the Caribbean (ECLAC) [online] <http://estadisticas.cepal.org/cepalstat/portada.html?idioma=english>; Federal Tax Commission of Argentina [online] www.cft.gov.ar; Ministry of Treasury and Public Finance of Argentina [online] www.economia.gob.ar; National Institute of Statistics of the Plurinational State of Bolivia [online] www.ine.gov.bo; Freedom House [online] http://freedomhouse.org/report-types/freedom-world#_VY_WW1RHcw; and World Bank [online] <http://data.worldbank.org/data-catalog/world-development-indicators>.

Note: (*) = significant at 10%, (**) = significant at 5% and (***) = significant at 1%. The dependent variable is per capita GDP growth. All regressions include an intercept term (not shown in table). Generalized method of moments specifications include a one-period lagged dependent variable as regressor (not shown in table). Standard errors are given in parentheses.

^a Argentina, Brazil, Chile, Colombia, Costa Rica, El Salvador, Mexico, Paraguay, Peru and the Plurinational State of Bolivia.

^b Random effects estimation requires the number of cross-sections to be greater than the number of regressors. To fulfil this condition, the urban population and/or the general government final consumption expenditures variables were excluded from the specifications.

Table 4
The Americas (12 countries):^a fiscal decentralization and inflation

| | Generalized least squares to allow for cross-sectional and intrasectional heteroskedasticity and autocorrelation (no effects specification) | Generalized least squares with cross-sectional fixed effects and no weights | Generalized least squares with cross-sectional random effects and no weights | Instrumental variables to allow for cross-sectional and intrasectional heteroskedasticity and autocorrelation (no effects specification) | Generalized method of moments |
|---|---|---|--|--|-------------------------------|
| Revenue decentralization (%) | 0.178** (0.081) | 6.102*** (1.936) | 4.978*** (1.365) | -0.210** (0.025) | -0.319*** (0.061) |
| Expenditure decentralization (%) | 1.757*** (0.350) | -7.905 (5.417) | 6.004** (3.013) | 1.788*** (0.530) | -8.589** (1.370) |
| GDP per capita (at purchasing power parity, in logs) | -5.363** (0.878) | 128.446** (50.639) | -13.682 (26.921) | -2.063** (0.376) | -7.795*** (1.681) |
| Openness to international trade (X + M)/GDP (%) | -0.210** (0.045) | -6.754*** (1.889) | -1.897** (0.895) | -0.087** (0.013) | 0.131*** (0.049) |
| General government final consumption expenditure (% of GDP) | -2.710** (0.647) | -72.671*** (7.983) | -47.331** (6.068) | 0.659*** (0.096) | 0.368 (0.355) |
| Military expenditures (% of GDP) | -2.018** (0.749) | 103.508*** (29.548) | 19.987 (16.982) | -1.675** (0.222) | -2.147* (1.232) |
| Foreign direct investment (% of GDP) | -0.660** (0.179) | -7.410 (5.397) | -3.934 (4.630) | -0.727** (0.165) | -0.082 (0.173) |
| Remittances (% of GDP) | -0.880** (0.139) | 20.452* (11.920) | -1.041 (4.973) | -0.552** (0.073) | -0.479 (0.304) |
| Observations | 178 | 149 | 178 | 159 | 148 |
| Adjusted R ² | 0.20 | 0.13 | 0.23 | 0.57 | - |

Source: Prepared by the author on the basis of data from International Monetary Fund (IMF) [online] <http://data.imf.org/?sk=E86E9088-3830-4CA3-B240-1B0EC5E15221>; Organization for Economic Cooperation and Development (OECD) [online] www.oecd.org/ctp/federalism/fiscal-decentralisation-database.htm; Economic Commission for Latin America and the Caribbean (ECLAC) [online] <http://estadisticas.cepal.org/cepalstat/portada.html?idioma=english>; Federal Tax Commission of Argentina [online] www.cfi.gov.ar; Ministry of Treasury and Public Finance of Argentina [online] www.economia.gov.ar; National Institute of Statistics of the Plurinational State of Bolivia [online] www.ine.gov.bo; Freedom House [online] [http://www.ine.gov.bo](http://freedomhouse.org/report-types/freedom-world#_VY_MW1RHow); and World Bank [online] <http://data.worldbank.org/data-catalog/world-development-indicators>.

Note: (*) = significant at 10%, (**) = significant at 5% and (***) = significant at 1%. The dependent variable is the inflation rate. All regressions include an intercept term (not shown in table). Generalized method of moments specifications include a one-period lagged dependent variable as regressor (not shown in table). Standard errors are given in parentheses.

^a Argentina, Brazil, Canada, Chile, Colombia, Costa Rica, El Salvador, Mexico, Paraguay, Peru, the Plurinational State of Bolivia and the United States.

The results for the effects of fiscal decentralization variables on the inflation rate are inconclusive. When decentralization occurs on the revenue side, the GLS estimates for the decentralization indicator are positive and statistically significant, implying that greater decentralization fosters higher inflation. However, when the specification is instrumented and the relationship is analysed within a dynamic setting, the impact of revenue decentralization is reversed, meaning that it actually has a dampening impact on inflation. With the expenditure decentralization indicator, the results are slightly clearer: GLS and instrumental variables estimates show a positive and statistically significant correlation between expenditure decentralization and inflation, but the relationship is reversed with GMM estimation, implying that the impact of expenditure decentralization on inflation is not entirely clear. The lack of clarity in the results precludes any definite conclusions as to how fiscal decentralization impacts inflation, and hence it cannot be unambiguously stated that it either deters or induces inflation in the countries of the Americas.

Regarding the control variables, per capita GDP growth is consistently associated with lower inflation, an unsurprising result in view of the findings of previous studies, such as Martínez-Vázquez and McNab (2006).¹⁸ Government expenditures and FDI mostly act to quell inflation, while the results for the rest of the variables (openness to international trade, military expenditures and remittances) are inconclusive.

Table 5 presents results for the effects of fiscal decentralization on the inflation rate when Canada and the United States are excluded from the analysis.

As is evident, the results largely confirm the findings presented in table 4. Both fiscal decentralization indicators show the same pattern of behaviour as is observed with the full sample of countries, whence the difficulty of drawing any definite conclusions. Under certain conditions, as reflected in the positive and statistically significant GLS estimates, revenue decentralization seems to foster inflation, while in others, as seen when the specification is instrumented and when it is estimated with GMM, the opposite is true. Likewise, expenditure decentralization seems to be more conducive to higher inflation with GLS and instrumental variables estimates, but in a dynamic setting the opposite is true. As was concluded for the full sample of countries, it cannot be unequivocally stated that fiscal decentralization deters or induces inflation in developing nations of the Americas.

The behaviour of the control variables is slightly better defined with this sample of countries. As expected, GDP per capita is for the most part associated with lower inflation, as are government expenditures and FDI, demonstrating that the size of government and net capital inflows play a positive role in preventing inflation.¹⁹ Military expenditures seem to be conducive to higher inflation, although when coupled with decentralization on the revenue side they may be a deterrent to it. Lastly, the impact of trade openness and remittances is indeterminate.

The last set of regressions is reported in tables 6 and 7. Table 6 presents results for the impact of fiscal decentralization on the Gini coefficient across the full sample of countries.

¹⁸ GLS with cross-sectional fixed effects reverses the overall trend and GDP per capita is shown to have a positive and significant impact on inflation. Since alternative GLS techniques, instrumental variables and GMM consistently generate negative and statistically significant coefficients for this variable, the result of GLS with fixed effects is taken to be an anomaly.

¹⁹ In a dynamic setting, FDI may be conducive to higher inflation, as evidenced in the GMM specification. Likewise, bigger government may also have a positive impact on inflation, as reflected in the instrumental variables estimate when decentralization occurs on the revenue side.

Table 5
The Americas (10 countries):^a fiscal decentralization and inflation

| | Generalized least squares to allow for cross-sectional and intrasectional heteroskedasticity and autocorrelation (no effects specification) | Generalized least squares with cross-sectional fixed effects and no weights | Generalized least squares with cross-sectional random effects and no weights | Instrumental variables to allow for cross-sectional and intrasectional heteroskedasticity and autocorrelation (no effects specification) | Generalized method of moments |
|---|---|---|--|--|-------------------------------|
| Revenue decentralization (%) | 0.840*** (0.301) | 6.706*** (2.275) | 5.968*** (1.663) | -0.231** (0.072) | -0.258*** (0.069) |
| Expenditure decentralization (%) | 1.816*** (0.447) | -7.900 (6.684) | 3.343 (4.643) | 3.575*** (1.308) | -6.783*** (1.536) |
| GDP per capita (at purchasing power parity, in logs) | 3.093 (3.413) | 148.802** (67.189) | 45.479 (37.732) | 12.006 (13.963) | -100.882** (34.722) |
| Openness to international trade (X + M)/GDP (%) | -0.537** (0.130) | 0.028 (0.173) | -3.000*** (0.939) | 0.599 (0.391) | 3.961*** (0.956) |
| General government final consumption expenditure (% of GDP) | -0.804** (2.085) | -75.553*** (9.086) | -56.733*** (7.563) | 0.573* (0.303) | 0.330 (0.387) |
| Military expenditures (% of GDP) | 11.085** (5.421) | 37.026*** (11.515) | 85.790*** (28.124) | 87.810** (33.873) | 234.145*** (73.216) |
| Foreign direct investment (% of GDP) | -2.173** (0.632) | -6.474*** (1.468) | -9.297* (5.585) | -0.873*** (0.308) | -0.044 (0.171) |
| Remittances (% of GDP) | -0.332 (0.386) | -4.219* (13.477) | 2.615 (4.768) | -0.588** (0.104) | -1.151*** (0.304) |
| Observations | 141 | 141 | 141 | 124 | 115 |
| Adjusted R ² | 0.17 | 0.07 | 0.28 | 0.25 | - |

Source: Prepared by the author on the basis of data from International Monetary Fund (IMF) [online] <http://data.imf.org/?sk=E86E9088-3830-4CA3-B240-1B0E5E15221>; Organization for Economic Cooperation and Development (OECD) [online] www.oecd.org/ctp/federalism/fiscal-decentralisation-database.htm; Economic Commission for Latin America and the Caribbean (ECLAC) [online] <http://estadisticas.cepal.org/cepalstat/portada.html?idioma=english>; Federal Tax Commission of Argentina [online] www.cfi.gov.ar; Ministry of Treasury and Public Finance of Argentina [online] www.economia.gob.ar; National Institute of Statistics of the Plurinational State of Bolivia [online] www.inec.gov.bo; Freedom House [online] http://freedomhouse.org/report-types/freedom-world#_VY_IWI1RHow; and World Bank [online] <http://data.worldbank.org/data-catalog/world-development-indicators>.

Note: (*) = significant at 10%, (**) = significant at 5% and (***) = significant at 1%. The dependent variable is the inflation rate. All regressions include an intercept term (not shown in table). Generalized method of moments specifications include a one-period lagged dependent variable as regressor (not shown in table). Standard errors are given in parentheses.

^a Argentina, Brazil, Chile, Colombia, Costa Rica, El Salvador, Mexico, Paraguay, Peru and the Plurinational State of Bolivia.

Table 6
The Americas (12 countries):^a fiscal decentralization and income distribution

| | Generalized least squares to allow for cross-sectional and intrasectional heteroskedasticity and autocorrelation (no effects specification) | Generalized least squares with cross-sectional fixed effects and no weights | Generalized least squares with cross-sectional random effects and no weights ^b | Instrumental variables to allow for cross-sectional and intrasectional heteroskedasticity and autocorrelation (no effects specification) | Generalized method of moments |
|--|---|---|---|--|-------------------------------|
| Revenue decentralization (%) | -0.049** (0.014) | 0.012 (0.053) | -0.058** (0.022) | -0.027 (0.029) | -0.022 (0.049) |
| Expenditure decentralization (%) | -0.004 (0.027) | 0.108 (0.068) | -0.016 (0.028) | -0.007 (0.052) | 0.008 (0.040) |
| GDP per capita (at purchasing power parity, in logs) | -1.684 (6.841) | -102.864** (23.568) | 5.712 (10.665) | -0.489 (11.766) | -26.533* (15.422) |
| GDP per capita squared (at purchasing power parity, in logs) | -0.319 (0.369) | 5.051*** (1.247) | -0.704 (0.572) | -2.300*** (0.673) | 1.366* (0.801) |
| Urban population (% of total) | 0.232*** (0.036) | 0.452** (0.185) | 0.164*** (0.046) | 0.444*** (0.086) | 0.099 (0.107) |
| Openness to international trade (X + M)/GDP (%) | 0.023* (0.014) | 0.024 (0.049) | -0.030 (0.081) | 0.095*** (0.035) | 0.053** (0.022) |
| Political and civil liberties ratio | 3.332*** (1.536) | -0.917 (3.848) | -1.4835** (2.329) | 9.609*** (3.251) | 1.866 (2.160) |
| Remittances (% of GDP) | -0.403** (0.074) | -0.111 (0.310) | -0.335** (0.100) | -0.804*** (0.116) | -0.470** (0.195) |
| Gross domestic savings (% of GDP) | -0.131** (0.045) | -0.338*** (0.085) | -0.046 (0.053) | -0.333*** (0.084) | -0.108* (0.085) |
| General government final consumption expenditure (% of GDP) | 0.422*** (0.067) | 0.168 (0.089) | 0.429** (0.120) | 0.214** (0.111) | 0.076 (0.184) |
| Inflation rate (%) | -0.077** (0.024) | -0.080 (0.050) | -0.133** (0.038) | -0.337*** (0.097) | -0.070** (0.018) |
| Internet users (per 100 people) | -0.012 (0.016) | 0.049* (0.027) | -0.045 (0.055) | 0.029 (0.022) | -0.037* (0.021) |
| Unemployment rate (% of total labour force) | 0.155*** (0.058) | 0.164** (0.079) | 0.231** (0.105) | 0.098 (0.095) | -0.046 (0.144) |
| Observations | 171 | 139 | 171 | 154 | 142 |
| Adjusted R ² | 0.81 | 0.84 | 0.61 | 0.78 | 0.85 |

Source: Prepared by the author on the basis of data from International Monetary Fund (IMF) [online] <http://data.imf.org/?sk=E86E9088-3830-4CA3-B240-1B0EC5E15221>; Organization for Economic Cooperation and Development (OECD) [online] www.oecd.org/ctp/federalism/fiscal-decentralisation-database.htm; Economic Commission for Latin America and the Caribbean (ECLAC) [online] <http://estadisticas.cepal.org/cepalstat/portada.html?idioma=english>; Federal Tax Commission of Argentina [online] www.cfi.gov.ar; Ministry of Treasury and Public Finance of Argentina [online] www.economia.gov.ar; National Institute of Statistics of the Plurinational State of Bolivia [online] www.ine.gov.bo; Freedom House [online] http://freedomhouse.org/report-types/freedom-world#_VY_IW1RHcw; and World Bank [online] <http://data.worldbank.org/data-catalog/world-development-indicators>.

Note: (*) = significant at 10%, (**) = significant at 5% and (***) = significant at 1%. The dependent variable is the Gini coefficient, which ranges from 0 (complete equality) to 100 (complete inequality). The political and civil liberties ratio ranges from 0.18 (most free) to 1.00 (least free). All regressions include an intercept term (not shown in table). Generalized method of moments specifications include a one-period lagged dependent variable as regressor (not shown in table). Standard errors are given in parentheses.

^a Argentina, Brazil, Canada, Chile, Colombia, Costa Rica, El Salvador, Mexico, Paraguay, Peru, the Plurinational State of Bolivia and the United States.
^b Random effects estimation requires the number of cross-sections to be greater than the number of regressors. To fulfil this condition, the openness to international trade and/or inflation rate variables were excluded from these specifications.

The impact of fiscal decentralization on the Gini coefficient varies depending on whether decentralization occurs on the revenue or expenditure side. There is substantial evidence that decentralization on the revenue side plays a positive role in creating conditions for greater equality, as evinced by the negative, statistically significant and approximately same-sized coefficients obtained for the revenue decentralization indicator using GLS specifications with no effects and with random effects. The impact of expenditure decentralization, on the other hand, seems to be non-existent, as the coefficients estimated for this variable are in all cases close to zero and statistically insignificant. The general conclusion, therefore, is that revenue decentralization seems to play the expected positive role in generating conditions for greater income equality, whereas decentralization on the expenditure side seems to be ineffective in addressing inequality concerns.

The behaviour of the control variables is also noteworthy. GDP per capita in levels and GDP per capita squared do not seem to follow a clear pattern of behaviour, and hence it is not possible to reach any definite conclusions about the way these variables impact income inequality. The uniform behaviour pattern of the GDP variable suggests, however, that the Kuznets hypothesis, implying greater inequality in early stages of development but less inequality in more advanced stages, may not apply here. There is convincing evidence that greater urbanization, openness to international trade, larger government and higher unemployment worsen income inequality, as reflected in the consistently positive and statistically significant coefficients for these variables. These results fall neatly into line with findings elsewhere (see, for instance, Rodríguez and Rodrik, 1999; Lee, 2005; Martínez, Ayala and Ruiz-Huerta, 2001) that urbanization, open markets, an increasingly active government and higher unemployment are the principal drivers of greater income inequality. Savings and remittances, on the other hand, seem to be conducive to greater income equality, reflected in consistently negative and statistically significant coefficients, a result that is equally unsurprising given the importance of deferred consumption and alternative sources of income as instruments for repressing income inequality. Inflation also seems to assuage inequality, as reflected in negative and statistically significant estimates for this variable with different techniques. This result is consistent with findings elsewhere (e.g. Monnin, 2014) that monetary policies aimed at controlling inflation have operated to the detriment of people in the middle and lower income brackets and have therefore increased income inequality. The argument is that whenever wages accelerate and central banks tighten monetary policy, unemployment rises, implying a worsening of income inequality. The counter-argument, then, is that higher inflation may reduce income inequality by allowing higher wage growth. Lastly, the political and civil liberties and Internet users ratios do not follow any discernible pattern, so that it is not possible to draw any conclusions about their impact on income inequality.

Table 7 reports regression estimates for the impact of fiscal decentralization on the Gini coefficient in countries of the Americas, excluding Canada and the United States.

The impact of fiscal decentralization on the Gini coefficient is clearer with this subset of countries in the Americas. Both decentralization indicators are consistently positive, of similar size and, in several cases, statistically significant, implying that decentralization may actually contribute to greater inequality in developing nations of the Americas. Although this implication seems to be stronger when decentralization occurs on the expenditure side, the general conclusion in both cases seems to be that fiscal decentralization has not delivered on its promise of contributing to greater income equality in these countries, and this, as Brosio and Jiménez (2013) rightly point out, highlights the need to strengthen coordination mechanisms and arrangements between all levels of government to ensure more efficiency and better delivery of outcomes in the decentralization structures of these countries.

Table 7
The Americas (10 countries):^a fiscal decentralization and income distribution

| | GLS to allow for cross-sectional and intrasectional heteroskedasticity and autocorrelation (no effects specification) | Generalized least squares with cross-sectional fixed effects and no weights | Generalized least squares with cross-sectional random effects and no weights ^b | Instrumental variables to allow for cross-sectional and intrasectional heteroskedasticity and autocorrelation (no effects specification) | Generalized method of moments |
|--|---|---|---|--|-------------------------------|
| Revenue decentralization (%) | 0.037** (0.017) | 0.006 (0.058) | 0.030 (0.021) | 0.056 (0.042) | -0.005 (0.059) |
| Expenditure decentralization (%) | 0.081*** (0.030) | 0.048 (0.090) | 0.131*** (0.034) | 0.170*** (0.056) | -0.051 (0.032) |
| GDP per capita (at purchasing power parity, in logs) | -90.537* (9.492) | -29.114 (36.551) | -88.140** (19.528) | -53.609** (17.102) | 1.465 (24.175) |
| GDP per capita squared (at purchasing power parity, in logs) | 5.059*** (0.531) | 1.436 (1.903) | 4.874*** (1.106) | 2.922*** (0.968) | 0.165 (1.263) |
| Urban population (% of total) | -0.077 (0.059) | 0.223 (0.246) | -0.073* (0.043) | 0.114 (0.116) | -0.068 (0.102) |
| Openness to international trade (X + M)/GDP (%) | 0.003 (0.019) | -0.048* (0.028) | -0.036 (0.093) | 0.048 (0.052) | 0.044 (0.037) |
| Political and civil liberties ratio | -5.682** (1.712) | -8.775*** (4.133) | -13.183** (4.472) | -9.956*** (2.407) | -5.104* (2.940) |
| Remittances (% of GDP) | -0.057 (0.081) | -0.166 (0.342) | -0.523 (0.473) | -0.303** (0.127) | -0.723** (0.244) |
| Gross domestic savings (% of GDP) | 0.174*** (0.002) | 0.210** (0.086) | 0.090 (0.178) | 0.044 (0.122) | -0.126** (0.057) |
| General government final consumption expenditure (% of GDP) | 0.589*** (0.064) | 0.367*** (0.093) | 0.209 (0.249) | 0.549*** (0.108) | 0.626*** (0.237) |
| Inflation rate (%) | -0.127** (0.027) | -0.022 (0.028) | -0.076 (0.058) | -0.402*** (0.087) | -0.059** (0.026) |
| Internet users (per 100 people) | -0.193** (0.011) | -0.086*** (0.028) | -0.112 (0.080) | -0.193*** (0.025) | -0.129*** (0.045) |
| Unemployment rate (% of total labour force) | 0.416*** (0.083) | 0.491*** (0.249) | 0.601** (0.229) | 0.630*** (0.119) | 0.917*** (0.119) |
| Observations | 141 | 109 | 149 | 126 | 100 |
| Adjusted R ² | 0.89 | 0.76 | 0.67 | 0.55 | 0.79 |

Source: Prepared by the author on the basis of data from International Monetary Fund (IMF) [online] <http://data.imf.org/?sk=E86E9088-3830-4CA3-B240-1B0E05E15221>; Organization for Economic Cooperation and Development (OECD) [online] www.oecd.org/ctp/federalism/fiscal-decentralisation-database.htm; Economic Commission for Latin America and the Caribbean (ECLAC) [online] <http://estadisticas.cepal.org/cepalstat/portada.html?idioma=english>; Federal Tax Commission of Argentina [online] www.cft.gov.ar; Ministry of Treasury and Public Finance of Argentina [online] www.economia.gov.ar; National Institute of Statistics of the Plurinational State of Bolivia [online] www.inec.gov.bo; Freedom House [online] http://freedomhouse.org/report-types/freedom-world#_VY_WI1R1R1c; and World Bank [online] <http://data.worldbank.org/data-catalog/world-development-indicators>.

Note: (*) = significant at 10%, (**) = significant at 5% and (***) = significant at 1%. The dependent variable is the Gini coefficient, which ranges from 0 (complete equality) to 100 (complete inequality). The political and civil liberties ratio ranges from 0.18 (most free) to 1.00 (least free). All regressions include an intercept term (not shown in table). Generalized method of moments specifications include a one-period lagged dependent variable as regressor (not shown in table). Standard errors are given in parentheses.

^a Argentina, Brazil, Chile, Colombia, Costa Rica, El Salvador, Mexico, Peru and the Plurinational State of Bolivia.

^b Random effects estimation requires the number of cross-sections to be greater than the number of regressors. To fulfil this condition, the international trade openness, remittances, inflation and, for expenditure decentralization, general government final consumption expenditure were excluded from these specifications.

With respect to the behaviour of the control variables, GDP per capita seems to contribute initially to greater income equality and eventually to a yet further increase, reflected in consistently positive and statistically significant coefficients for GDP per capita squared, a development that clearly goes against Kuznets's prediction. Greater urbanization, remittances and Internet access are all important factors contributing to greater income equality, as reflected in consistently negative and statistically significant coefficients, and this highlights the importance of urban settings, diaspora involvement and access to the World Wide Web as key determinants in lowering income inequality in developing countries. Larger government and higher unemployment, on the other hand, seem to be conducive to greater income inequality, as reflected in consistently positive and statistically significant coefficients, demonstrating that the quality rather than the size of government determines its productivity and highlighting the well-researched fact that unemployment always tends to make matters worse. As with the full sample of countries, and for similar reasons, inflation also seems to have a dampening impact on inequality, while savings may contribute to greater inequality, perhaps because in developing nations of the Americas only a minority are able to save while the majority are simply unable to postpone current consumption. A curious result is the apparent effect of political and civil liberties on income inequality in these countries. The consistently negative and statistically significant coefficients for the political and civil liberties ratio seem to imply that the fewer political and civil liberties there are, the greater the equality of income. This result may reflect the perception in many developing countries of the Americas that strong governments are often needed to pass necessary legislation that may be unpopular at first but that will in time bring benefits, such as greater income equality. Finally, there is some indication that economic openness assuages income inequality.

VI. Conclusions and policy implications

This article analyses the impact of fiscal decentralization on economic growth, inflation and income inequality in a sample of countries in the Americas. Given that most of these countries have undergone a period of gradual decentralization of economic functions to regional levels of government over past years, the results presented here seem timely and relevant.

The main findings are as follows. With respect to the impact of fiscal decentralization on economic growth when all countries are included in the analysis, the revenue-based decentralization indicator consistently shows a negative impact on growth. On the expenditure side, the evidence is inconclusive, and hence it cannot be determined whether decentralization has had a positive or negative impact on growth. When the same analysis is done without Canada and the United States, decentralization on the revenue side is consistently shown to exert a negative influence on growth, confirming the results obtained with the full sample of countries, but the expenditure decentralization indicator seems to show a positive effect on growth, demonstrating that decentralization on the expenditure side is more conducive to growth in developing countries of the Americas. The behaviour of the control variables is similar regardless of the sample of countries being analysed. National saving, for instance, is consistently shown to contribute to growth, while higher unemployment, bigger government and greater openness to trade cause it to diminish. The impact of the remaining control variables is not as clear, and hence their combined effect on growth is indeterminate.

With respect to the impact of fiscal decentralization on inflation, the results are indeterminate, regardless of the sample of countries being analysed and of whether decentralization occurs on the revenue or expenditure side. In all cases, there is no discernible pattern of behaviour allowing unequivocal conclusions to be drawn about the ways in which decentralization impacts price stability. The behaviour of the control variables in both sets of regressions is similar, with the impact of these variables being slightly better defined in the sample of countries that excludes Canada and the United States. A noteworthy

result is that while government expenditures in both samples of countries generally seem to have a dampening influence on inflation, military expenditures seem to be more inflationary in the sample of developing countries of the Americas, highlighting the need to manage this type of expenditure with care. The impact of the remaining control variables is inconclusive.

Regarding the impact of fiscal decentralization on the Gini coefficient, finally, and considering the full sample of countries, the results indicate that decentralization on the revenue side has the expected positive impact in reducing income inequality, as reflected in consistently negative and statistically significant coefficients for GLS estimates (GLS specifications estimated with no effects and with random effects) that point to the importance of fiscal decentralization and its potential benefits in reducing income disparities. On the expenditure side, however, there is no evidence that decentralization has played any role in mitigating income inequalities.

The impact of fiscal decentralization on the dependent variable is somewhat clearer when Canada and the United States are excluded, regardless of whether decentralization occurs on the revenue or expenditure side. Fiscal decentralization indicators are generally positive and in some cases statistically significant (GLS specifications with no effects and with random effects and instrumental variables with no effects), demonstrating that fiscal decentralization has not played its expected role in reducing income inequality in developing nations of the Americas.

With respect to the behaviour of the control variables, the results are mixed. The impact of GDP per capita (in levels or squared values) is unclear when the full sample of countries is observed, but in developing countries of the Americas taken by themselves it seems to decrease income disparities initially but eventually worsen them. Greater urbanization seems, for the most part, to reduce income inequality in developing countries of the Americas, but the opposite seems to be true when Canada and the United States are included in the sample. In all cases, remittances and inflation decrease income inequality and unemployment and bigger government worsens it. Openness to trade seems to increase inequalities for the full sample of countries, but there are indications that it may mitigate it when developing countries alone are taken. Savings seem to decrease inequality in the full sample of countries and to worsen it when Canada and the United States are excluded. Internet access decreases inequality in developing countries of the Americas, but its impact on the full sample of countries is unclear. Finally, weaker political and civil rights seem to be more conducive to growth in developing countries of the Americas only, while the impact on the full sample of countries is indeterminate.

The most important policy implication of the findings presented here is that fiscal decentralization has so far fallen short of expectations in terms of its impact on growth, price stability and income distribution. Although there are some indications that decentralization can positively affect growth, particularly when it occurs on the expenditure side, the assumption was that it was going to be a powerful catalyst for this. Likewise, it was postulated that fiscal decentralization would act as a deterrent to fiscal mismanagement and hence would counteract inflationary pressures, but evidence for this has not yet materialized. Finally, it was presumed that this process would lead to greater income equality, and although there is evidence that this has started to happen (when the full sample of countries is considered and decentralization occurs on the revenue side), it also suggests that much work remains to be done before this goal is accomplished. The principal recommendation, particularly from the perspective of developing nations of the Americas, is that the institutional capacity of subnational levels of government should be strengthened, as should mechanisms for coordination between the different levels of government. With greater institutional capacity and improved coordination between all layers of government, perhaps the positive outcomes anticipated for this process will begin to be realized.

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