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Economic growth and income distribution in Mexico: A cointegration exercise

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ABSTRACT

The empirical evidence on the relationship between income inequality and economic growth is widely recognized and, now, there are rich databases for carry on panel-data type of analyses. However, time series studies for specific countries may be more attractive and yield revealing results. For this reason, we study hereafter the long-run relationship between economic growth and income inequality in the case of Mexico. To this end, a time series of data for the Gini coefficients from Solt (2011) is used over the period 1968–2010, within a cointegration exercise. Being related to a single country, our results are suffering less from problems of heterogeneity, endogeneity, and measurement errors, which are commonly encountered in cross-country growth regressions. We first investigate (and confirm) that the two series of per capita GDP and Gini index are cointegrated. Five different methodologies are implemented in our analysis, so that the robustness of cointegration results is guaranteed. We consistently also find that the relationship between those variables is negative. Moreover, results show the per capita GDP to be weakly exogenous. According to tests for Granger causality, unidirectional causality runs from per capita GDP to the Gini index.

1. Introduction

1.1. The literature and the justification for a single-country regression model

The relationship between growth and inequality has been extensively debated in the literature, older and more recent, in a variety of ways (one can check the introduction by Gobbin and Rayp (2008), and read a good recent survey in Shin (2012)). Still, no final undisputed conclusions have been reached on a number of issues.

In classical models, economic growth depends mainly on the rate at which nations accumulate productive resources, and is linked to the aggregate savings rate. In such vision, distributional considerations matter for growth only if households' propensity to save varies with income and/or wealth. If the rich save at a higher rate (a view proposed by e.g. Nicholas Kaldor), distributionally unequal societies would be able to build up their productive capacity (and speed up their growth) faster than *more equal* ones. Inequality would foster growth because output growth requires capital accumulation and, for example, new industries typically require larger investments. Thus, a higher concentration of income/wealth supports a higher capital accumulation rate and, in the example, would stimulate growth through the development of more capital-intensive industries. (More recently, Forbes (2000) and Arjona et al. (2001) seem to return to this view, though via distinct arguments.)

On the other hand, in a well-known article, Kuznets (1955) found the famous inverted U pattern between per capita income and inequality on the basis of a cross-country analysis. According to the author's original interpretation, the foremost driving force would be the structural change occurring as labor shifted from a poor and less productive traditional sector to a more productive and differentiated modern one. Arguments supporting a positive and a negative relationship (the two arms of the U-Shape relationship) have both been offered. (Bénabou (1996) and Aghion et al. (1999) provide excellent surveys of various contributions to this debate.)

Frank (2009) has investigated the long-run relationship between (a measure of) inequality and growth performance in the United States, to conclude that there is a significant positive relationship between them. Using panel data for twelve developed economies, Andrews et al. (2011) find that, since 1960, higher inequality would be associated with higher growth. On the other hand, Davis' (2007) model generates a relationship between growth and income inequality that is negative across countries and positive within countries over time. Recently, in Shin's

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(2012) stochastic optimal growth model made up of heterogeneous agents, a positive and a negative relationship turn up to be both possible, depending on the stage of development of the economy.

Other contributions (Alesina and Rodrik, 1994; Perotti, 1994, 1996; Persson and Tabellini, 1994) have argued that a higher inequality at the beginning of a long-term period is linked to poorer growth performance, relationship being therefore negative. This view too has been challenged: while a negative relationship seems to hold for developing countries, there appears to be no clear relation at all for richer ones. Herzer and Vollmer (forthcoming) summarize all previous empirical literature in a long run analysis of 46 countries over the period 1970–1995, and a negative relationship appears to emerge.

However, despite the wealth of accumulated evidence, most empirical literature relies on standard cross-country and panel regressions and thus suffers from the limitations of such an approach. The same Herzer and Vollmer (forthcoming) summarize a number of criticisms of such models, in particular pointing out that a cross-country analysis implicitly assumes a common economic structure. The homogeneous panel estimators being used produce inconsistent and potentially misleading estimates of the average parameter values of models when slope coefficients differ across cross-section units (see Pesaran and Smith (1995)).*

Cointegration analysis applied to a single country does not suffer from such criticisms. Gobbin and Rayp (2008) apply Johansen's cointegration methodology to the analysis of the income inequality and economic growth relationship in Belgium, the US and Finland. Finding in each case quite different results, leads them to conclude that: "A country-specific estimation approach is needed since 'one-size-fits-all' does not apply in the field of growth empirics." (*ibidem*, p. 892).

Accordingly, our paper focuses on the experience of a single country, Mexico, so that we do not encounter data comparability problems (see e.g. Knowles (2005)), while avoiding the other problems in cross section and panel data studies. It tackles the issue of the inequality-growth nexus by using a bivariate cointegrated vector autoregressive (VAR) approach, so that none of the common problems arise of parameter heterogeneity, omitted variable bias and endogeneity.

1.2. The Mexican economy: a short overview

Hereafter, we consider Mexico, an economy with alternating performance that can be briefly sketched out as follows. The country grew at an average annual rate of over 6.5% between 1960 and 1980, resulting in significant improvements in per capita GDP and living standards. Between 1980 and 1987, however, average real GDP growth dropped to less than 1% and productivity growth fell to negative figures. The economic reforms of the latter part of the 1980s helped the country to recover from the 1982 debt crisis, with GDP growth rate averaging 3.8% between 1990 and 1994 (Faal, 2005). In 1995, soon after the Tequila crisis of the previous year, GDP levels declined by 6.2% but the economy still managed to grow at 5%–6% in the ensuing three years, to drop again from 6.2% in 2000 down to −0.2% in 2001. However, improved economic conditions in the United States after 2001 helped to recover soon. Mexico's GDP grew at a 3% average annual rate between 2001 and 2007, but it slowed down to 1.5% in 2008 and then contracted at a sharp −6.5% in 2009. E.g., 2006 Mexican GDP growth rate was 4.8% but one year later it had decreased to 3.3%.† The unemployment rate went from 3.7% in 2006 up to 5.5% in 2009. Labor productivity growth remained low throughout: its average annual growth rate was a modest 1% between 2001 and 2007, in 2008 it fell by 2.1%. Per capita GDP, which in 2008 was 31% relative to the United States, is the lowest in the OECD (see OECD Report on the Mexican economy, 2010).

Mexico is also a country of great contrasts, where levels of poverty and deficits in the social indicators are higher than one might expect at its level of development. The issue of (the levels and evolution of) poverty and inequality is closely related with the shortcomings of certain external shocks and with the process of structural reform initiated in the eighties. In particular, there are two components of the latter that may have very significantly affected economic and social differentiation. One of them is the trade liberalization which began in the mid-eighties and culminated with the signing of the NAFTA treaty, then launched in 1994. The other is the land reform bill that authorizes the privatization of *ejidos* (i.e. areas of communal land of which community members individually possess and farm parcels‡).

Thus, income inequality in Mexico rose sharply between 1984 and 1994 with the Gini coefficient going from 49.1 up to 54.9 (Bouillon et al., 1999) and, the Lorenz curves showing no crossings, such increase is unambiguous (Lustig and Szekely, 1997). Bouillon et al. (1999) attempt to identify which factors lie behind this rise. Results of their exercise show that the widening gap in the "returns" to education explains about fifty percent of the observed increase, while the "returns" to regional location account to around 24%, in the South alone for a 15%.§

To compare with our exercise hereafter, it is worth recalling the Ortega-Díaz (2006) analysis relying on dynamic panel data analysis, with both urban personal income for grouped data and household income from national surveys. They find that inequality and growth are positively related. However, with a periodization, two relationships emerge: 1) a negative influence of inequality on growth during a period of restrictive trade policies, and 2) a positive relationship with trade openness. Compared to Ortega-Diaz, our paper uses a different methodology, cointegration. With this approach, we come up with a robust result about the existence of a cointegrating relationship between inequality and economic growth.

Henceforth, we look at such long-run relationship over the 1968–2010 history of Mexico. Economic growth is measured by per capita GDP and inequality by the Gini coefficient (also known as the Gini index or Gini ratio). Solt (2011) has recently provided annually-based time series of Gini coefficients for several countries. Therefore, no one has the 30-odd observations needed to carry out our type of analysis.

Section 2 of the paper describes the database and the specification of the model. Then, Section 3 presents our empirical results for the cointegrating equations with various approaches, while Section 4 reports a test for Granger causality. Section 5 concludes.

2. Data and model specification

2.1. Data set

Annual per capita GDP is, of course, gross domestic product divided by midyear population (data are in constant 2000 U.S. dollars), where GDP is calculated without deductions for depreciation of fabricated

* Moreover, still according to the authors, the approach suffers of

i) an endogeneity problem and the use of instrumental variables may lead to spurious results;

ii) Cross country and panel studies use the growth rate of income as dependent variable: however, this tends to be roughly constant over time, while inequality indicators show large and persistent movements over time. The empirical implication is that there cannot be a long-run relationship between the growth rate of income and the index of inequality over time;

iii) In order to eliminate business cycle effects, cross-country analysis uses time-averaged data but this can induce a spurious contemporaneous correlation between them (see Ericsson et al., 2001). Moreover, Banerjee and Duflo (2003) maintain that cross-country data is deficient due to differences in cultural structure, technology level, and financial institutions. As regard to measurement errors, they are largely related to the variable measuring income distribution inequality while being less or not at all applicable to other variables (Barro, 2000).

† EIU, Country Reports: Mexico, various years.

‡ More details in Lustig and Szekely (1997).

§ They use a micro-simulation decomposition methodology and a reduced-form household income regression model.