Working Paper, No. 10, 2011

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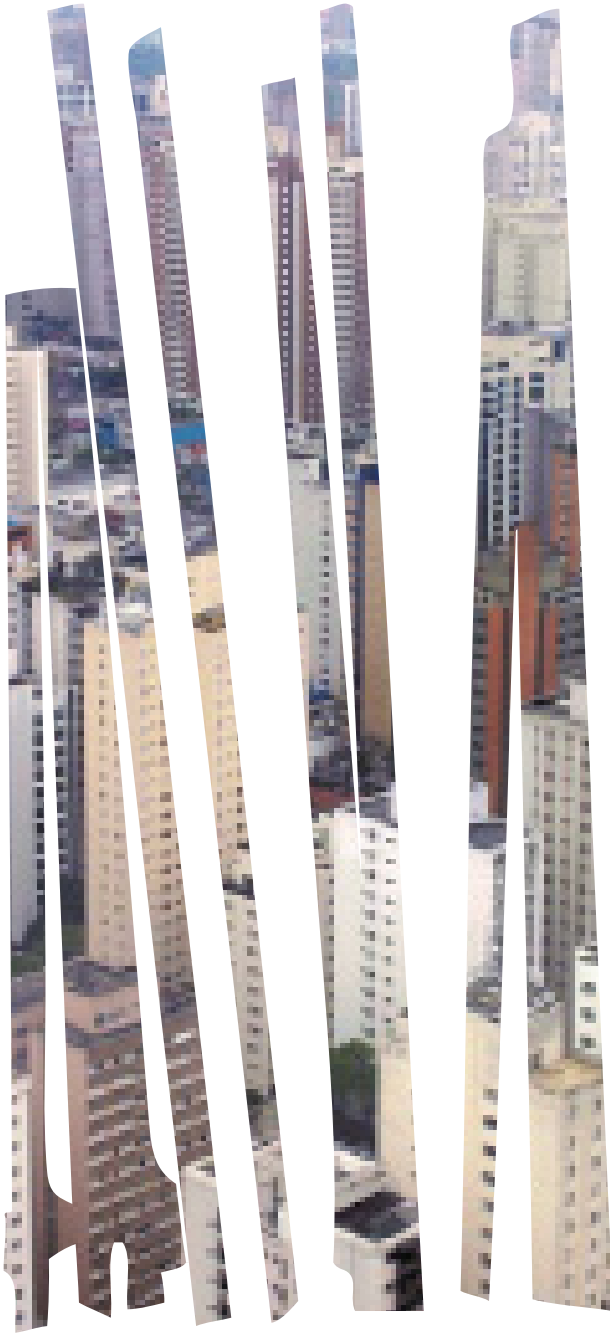
Jean Daudelin and Yiagadeesen Samy



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Jean Daudelin and Yiagadeesen Samy

Abstract

Using census data (for 1991 and 2000) for more than 5.000 municipalities, we examine the relationship between income per capita and inequality at the municipal level in Brazil. We uncover the existence of an “inverted-U” relationship in 1991 that flipped into a “straight-U” relationship in 2000, both of which are statistically significant. Such a flip has important implications, as it suggests that the current decline in inequality is likely to reverse as GDP per capita increases, with radically different prospects for the evolution of inequality in the country. Building on our case, and very tentatively, we submit that the flip may be due to the association of economic growth with industrialization. As long as the two are positively correlated, as was the case in Brazil and Latin America until late in the 20th Century, in OECD countries until the 1970s, and today in China and India, the standard Kuznets curve adequately describes the relationship between development and inequality. When that correlation is negative, however, i.e. when growth is accompanied by de-industrialization, as is the case in OECD countries since the 1980s and in Brazil since the 1990s, the curve “flips” and inequality declines at first, and then increases again after a tipping point has been reached.

Keywords: Inequality | Growth | Industrialization

Biographical Notes

Yiagadeesen Samy is Associate Professor of International Affairs at the Norman Paterson School of International Affairs, Carleton University. He holds a PhD in Economics, and his fields of specialization are international trade and development economics. He has published several articles in academic journals such as Applied Economics, the Journal of International Trade and Economic Development, the Canadian Foreign Policy Journal, Foreign Policy Analysis, and Conflict Management and Peace Science, and contributed chapters to several books. His book (co-authored with David Carment and Stewart Prest) on “Security, Development and the Fragile State: Bridging the Gap Between Theory and Policy” was published by Routledge in 2009. He is currently also working on state fragility; fiscal pacts and development outcomes; aid for trade; and emerging donors.

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Content

1. Introduction

In his presidential address to the American Economic Association, Simon Kuznets (1955) suggested that income inequality first worsens and then improves as a country develops. Kuznets’ conjecture was based on limited time series data for a few developed countries and he admitted in his concluding remarks that “the paper is perhaps 5 per cent empirical information and 95 per cent speculation, some of it possibly tainted by wishful thinking” (1955: 26). In fact, Kuznets (1955) did not empirically verify his hypothesis but instead provided a numerical example to show how this process would unfold. And yet, over time, his conjecture came to be regarded as an “economic law” (Robinson 1976) or “stylized fact” (Acemoglu and Robinson 2002), and for those (especially in the developing world) who took this “inverted-U” proposition seriously, the policy implications were viewed as being extremely important.

In particular, for a country in the early stages of its economic development, increasing inequality is thus a necessary consequence of future growth as the benefits of growth are at first concentrated among the wealthiest segments of the population. Hence, if policy-makers rush to implement policies to deal with inequality, their economies may be trapped at a low level of development. As a result, a large number of theoretical and empirical papers have tried to establish whether there is in fact an “inverted-U” relationship between the level of development and income inequality[1]. As we argue further below, the vast empirical literature has produced very inconclusive results and been severely hampered by a lack of reliable data. Through Kuznets’ lens, growing inequality today in China, India, and South Africa, and in Brazil until the end of the 1980s, could be interpreted as a temporary predicament that time and growth will resolve, as these countries cross the curve’s tipping point. Similarly, the recent decline of inequality in much of Latin America (Lopez-Calva and Lustig 2010a) would imply that these countries have moved beyond that point. The problem, however, is that the exact shape of the Kuznets curve is contested. Studies of inequality in the United States and in OECD countries (Alderson and Nielsen 2002) have identified, contrary to Kuznets’ prediction, a “straight-U” shape curve, with inequality declining for a while and then picking up again.

In this paper, we use census data on income per capita and inequality at the municipal level in Brazil at two different points in time, 1991 and 2000, the latest census-years for which such data is available. This is a rich dataset that includes more than 5.000 municipalities spread across the twenty-six states and one federal district that make

[1] The Kuznets hypothesis has also been extended to other situations such as, for example, the relationship between per capita income and pollution intensity, the so-called environmental Kuznets curve.

up the country. In particular, we uncover the existence of an “inverted-U” relationship in 1991 that flipped into a “straight-U” relationship in 2000, both of which are statistically significant. Such a flip has important implications, as it suggests that the current decline in inequality is likely to reverse as GDP per capita increases, with radically different prospects for the evolution of inequality in the country. Indeed, if most municipalities are to the left of the turning point of a “straight-U” Kuznets curve, inequality is likely to increase in the future as incomes rise further, even if the relationship at the macro level over time in the case of Brazil seems to fit the standard Kuznets hypothesis.

From a theoretical standpoint, these results suggest that one should look for the joint determinants of the relationship between growth and inequality, which gives the curve its shape, instead of just looking at the determinants of inequality itself. Building on our case, and very tentatively, we submit that the flip may be due to the association of economic growth with industrialization. As long as the two are positively correlated, as was the case in Brazil and Latin America until late in the 20th Century, in OECD countries until the 1970s, and today in China and India, the standard Kuznets curve adequately describes the relationship between development and inequality. When that correlation is negative, however, i.e. when growth is accompanied by de-industrialization, as is the case in OECD countries since the 1980s and in Brazil since the 1990s, the curve “flips” and inequality declines at first, and then increases again after a tipping point has been reached.

The rest of the paper proceeds as follows. In the next section, we briefly review the theoretical and empirical literature on the Kuznets hypothesis. In section three, we present the data that will be used in our analysis. Section four presents the model tested and the results of our empirical analysis. In section five, we propose an explanation that points to industrialization as the main factor and its impact on return on education as its main channel. Section six concludes with policy implications and directions for future research.

2. Literature Review

In Kuznets’ (1955) classic paper on the relationship between economic growth and income inequality, the main mechanism behind the „inverted-U” hypothesis is the shift of population from traditional to modern activities. This is perhaps not surprising since development was often equated with industrialization at the time. Although several factors (economic, social and political) are also discussed as possible mechanisms, and due to a lack of data, Kuznets (1955) used a numerical illustration where population moved from the agricultural to the nonagricultural sector to demonstrate that this was

indeed the main driver of change in inequality. This kind of dual economy framework was equally present in W. Arthur Lewis’ (1954) famous two-sector model with a traditional agricultural sector and a modern industrial sector, and where (initial) growth in the modern industrial sector can generate the patterns of inequality described by Kuznets.

Subsequent theoretical explanations have all, to a certain extent, been related to the nature of structural change. For example, Sherman Robinson (1976) derives the “inverted-U” hypothesis from a very simple two-sector model, with different sectoral income distributions, and where the population of one of the sectors increases monotonically over time. By way of improvement over Robinson (1976), which includes only one measure of inequality (the variance of the logarithm of income), Sudhir Anand and Ravi Kanbur (1993) use a model of intersectoral population shifts to formalize the Kuznets process and they conclude that the existence of a turning point in the inequality-development relation is ambiguous. They also derive specific functional forms corresponding to six different inequality indices and specify the conditions under which each functional form yields a turning point.

Several studies in the 1990s have used dynamic general equilibrium models that emphasize the relationship between capital market imperfections and inequality during the process of economic development in order to provide further insights in the Kuznets process, or lack thereof. In Greenwood and Jovanovic (1990), financial markets are almost non-existent in the early stages of development and as the economy grows, initially only the rich benefit from joining them because of high fixed costs. Savings rates and income inequality both increase when the economy attains the intermediate stage of the growth cycle. As the economy matures further, people with less wealth also join the financial network and inequality declines while growth increases.

Contrary to Greenwood and Jovanovic (1990), the models in Abhijit Banerjee and Andrew Newman (1993) and, Oded Galor and Joseph Zeira (1993) suggest that there is a negative and linear relationship between financial development and income inequality. In Banerjee and Newman (1993), due to imperfect financial markets only rich individuals can invest in high-return projects thus becoming richer, while the poor who have no access to credit markets remain poor. In Galor and Zeira (1993), agents can make an indivisible investment in human capital in order to move from the unskilled to the skilled sector. However, capital market imperfections mean that only those with an inheritance that is larger than the investment, or who can borrow, can make the investment. As a result, inequality will persist in each case, implying that the development of financial markets can reduce inequality by reducing capital market imperfections and increasing opportunities for the poor to borrow and invest.

In a more recent treatment of the subject, Raghuram Rajan and Luigi Zingales (2003) argue that when institutions are weak only the rich may benefit from financial development. As the financial sector develops, the rich and well connected are more likely to continue having access to credit because of collateral and a better ability to repay. Such a trend would be even stronger if the rich are able to prevent new firms from getting access to credit, and thus entering the market. As a result, one should expect to see a positive relationship between financial development and income inequality.

Just as in the case of theoretical models and conjectures, empirical studies testing the “inverted-U” hypothesis have produced mixed results. Although Kuznets (1955) was primarily concerned with how income inequality changes over time as countries develop, and posited this relationship based on historical data for a few industrialized countries - Germany, the UK and the US - [2], lack of time series data meant that early empirical studies (for example Paukert 1973, Ahluwalia 1976 Anand and Kanbur 1993) used cross-country regressions to examine the Kuznets hypothesis. Felix Paukert examined the before-tax incomes of 56 countries (40 of which were developing) and their inequality measured by the Gini coefficient and finds evidence in support of the “inverted-U” hypothesis. Montek S. Ahluwalia (1976) examined a sample of 60 countries (40 developing, 14 developed and 6 socialist) using the income shares of five different percentile groups (the top 20 percent, the next 40 percent, the lowest 60 percent, the lowest 40 percent and the lowest 20 percent) as the dependent variables in order to have a better control over the entire income distribution. He finds evidence in favor of the “inverted-U” hypothesis and the goodness of fit of his estimated models is improved when additional explanatory variables besides per capita income are introduced in the estimated equations. In the Anand and Kanbur (1993) study discussed earlier, the authors find that the functional form that one chooses to test for the “inverted-U” hypothesis is important in determining whether the “inverted-U” hypothesis is significant or not, in addition to impacting on where the turning point is. Several other studies (for example Jha 1996, Eusufzai 1997 and Barro 2000) have also confirmed the hypothesis.

However, there are also several empirical studies that have reported evidence against the Kuznets hypothesis. Gustav Papanek and Oldrich Kyn (1986) use cross-section and time-series data for 86 countries and report that the empirical support for the Kuznets curve is not strong and may be weakening over time. With the advent of panel data on income inequality, such as the now famous Deininger-Squire (1996) dataset, some studies have also been able to address the temporal dimension of the problem

[2] The paper also contains a brief discussion of what the situation looks like in three developing countries (India, Ceylon and Puerto Rico) right after the Second World War, namely that the distribution of income in these countries is more unequal than in the developed countries. In another study, Kuznets (1963) used a larger sample of eighteen developed and developing countries to further support his argument.

more systematically. For example, Klaus Deininger and Lyn Squire (1998) do not find a significant relationship between income inequality and the level of development when country effects are included in their estimates. Andreas Savvides and Thanasis Stengos (2000), again using the Deininger-Squire (1996) dataset, adopt a threshold regression model that endogenously determines regime splits (rather than imposing country classifications a priori) and find evidence in favor of an “uninverted-U” relationship. Hongyi Li, Lyn Squire and Heng-fu Zou (1998) find that inequality is relatively stable within countries and varies significantly among countries; in other words, the Kuznets relationship seems to work better in cross-sectional than time series analysis.

3. The Brazilian Case

3.1 Motivation

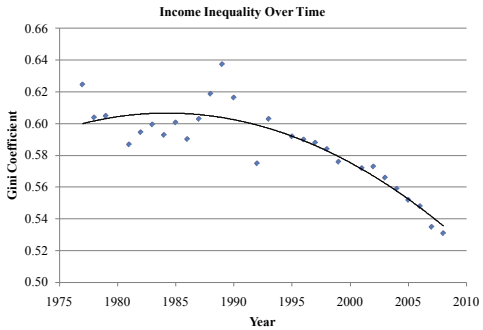
Looking at a particular case (Brazil) is in our view superior to large sample analyses of the kind described above because it is precisely what Kuznets (1955, 1963) had in mind. Our analysis is thus closer in spirit to studies such as Rati Ram (1991) and Peter H. Lindert (2000), which examined how inequality changed over time in developed countries. Methodologically, the early empirical studies that adopted a pure cross-sectional approach are limited because countries with different income levels and structural characteristics are being used in order to understand what is primarily a dynamic phenomenon for a particular country. For instance, when one considers a cross-section of countries, without doing any sophisticated empirical analysis but just eyeballing the data, it is often the case that Latin American countries (including Brazil), which are middle-income countries, have the highest levels of inequality. Thus, it is quite possible that Kuznets’ “inverted U” may be due to factors that have nothing to do with his description of the process of economic development. In fact, as Gary S. Fields and George H. Jakubson (1994) have found, the “inverted-U” tends to disappear once Latin American countries are controlled for.

Panel regressions and country specific analyses are obviously better because one can control for time-invariant characteristics through fixed effects in the case of the former, and track the movement of inequality over time in the case of the latter. In the current case, since we are examining data for a single country, many factors and policies (both domestic and international), such as inflation or tariff reductions, are going to affect these regions equally, and we have fewer worries about high levels of heterogeneity in our sample than would be the case in a cross-section of countries.

Second, our dataset, which is based on census data for more than 5.000 municipalities in 1991 and 2000, allows us to examine intra-country inequality and how it has moved over a period of ten years. In particular, we are able to track the movement of municipalities along the Kuznets curve and to provide important evidence for policymakers on where to focus their attention, something which data at the country-level cannot do. This is important because it is difficult a priori to know whether the municipalities in Brazil are on the left or right side of the Kuznets curve (independent of whether the latter is inverted or not). Third, comparing inequality across countries is problematic when collection methods and definitions used are different. For example, it is not uncommon to have different measures of inequality (such as measures based on consumption spending or those based on income) in the same dataset. The World Income Inequality Dataset (WIID) from the World Institute for Development Economics Research (WIDER) for instance, often provides very different Gini coefficients for the same country, so that it is difficult to know which one to choose.

Consider what has happened in Brazil. As Figure 1(a) below shows, income inequality at the national level has indeed followed an „inverted-U” pattern over the years 1977-2008, with a decline in inequality since the late 1980s[3]. Our own calculations show that the turning point took place at around $3,111 per capita (in constant 2.000 dollars), and that 67% of the variation in the Gini coefficient is explained by income per capita, and income per capita squared. However, Figure 1 and the information that we are able to extract from it do not tell us anything about within-country inequality, which we examine below using census data at the municipal level for 1991 and 2000[4]. Note also that the “inverted-U” relationship is less pronounced but still significant when income per capita and inequality are considered in Figure 1(b).

Figure 1(a)

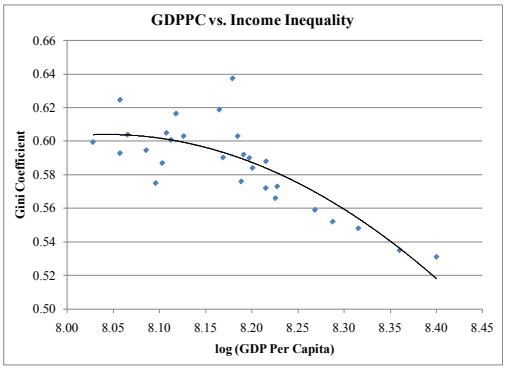


Source: Instituto Brasileiro de Geografia e Estatística (IBGE), accessed via http://www.ipeadata.gov.br/

[3] Unless otherwise mentioned, all the inequality data used in this paper is from the *Instituto Brasileiro de Geografia e Estatistica* or IBGE.

[4] Income inequality data for these two years are missing in Figure 1, precisely because the data for these years were collected at the municipal level.

Figure 1(b)



Source: Instituto Brasileiro de Geografia e Estatística (IBGE), accessed via http://www.ipeadata.gov.br/

Interestingly, both Ferreira et al. (2006), and Camila Matins-Bekat and Kishore G. Kulkarni (2009), confirm the presence of the „inverted-U” hypothesis at the national level for Brazil, even if they do not formally test for it. Ferreira et al. (2006) go one step further by highlighting some of the factors that could be responsible for the trends in national inequality observed in Brazil over the period 1981-2004, namely changes in returns to education, wide fluctuations in the rates of inflation, convergence between rural and urban areas, social assistance transfers to the poor, and changes in racial inequality. However, the importance and significance of these factors is not formally determined in the paper. More recently, Ricardo Barros et al. (2009b: 8, Figure 2.1), whose results mimic those of Figure 1 above, find through a more systematic analysis that much of the recent decline in inequality can be traced to non-labor income, particularly public transfers as well as labor market segmentation.

3.2 Evidence from Municipal Data

The data used in the remainder of this paper comes from IBGE, the Brazilian Institute of Geography and Statistics (see also footnote 3 for the Portuguese name), which carries out a national census every ten years. More precisely, the data comes from the last two censuses that were held, namely in 1991 and 2000; results from the 2010 census should be available in the coming months. Our sample covers more than 5.000 municipalities across all the twenty-six states and one federal district which make up the country. Table 1 below presents some basic statistics for the main variables that we will use in our empirical analysis.

Table 1: Summary Statistics

Variables	Mean	Median	Std. Dev.	Min	Max
Gini 1991	0.53	0.52	0.06	0.35	0.79
Gini 2000	0.56	0.56	0.06	0.36	0.82
GDPPC 1991	123	107	73	25	583
GDPPC 2000	171	159	96	28	955
Urbanization rate (%) 1991	53.12	51.66	23.26	2.16	100
Urbanization rate (%) 2000	58.83	59.33	23.33	0.00	100
School enrolment (%) 1991	55.52	56.23	10.43	9.80	90.94
School enrolment (%) 2000	77.97	78.40	6.71	44.50	107.69
Revenue from gov’t transfers (%) 1991	9.87	9.52	3.87	0.36	31.20
Revenue from gov’t transfers (%) 2000	17.12	16.63	5.49	1.57	36.11

Note: We have 5.507 observations for all of the above variables; the only exception is the urbanization rate in 1991, for which we have 4.491 observations.
Source: Instituto Brasileiro de Geografia e Estatística (IBGE), accessed via http://www.ipeadata.gov.br/

Data for income per capita (GDPPC) in the above table is in monthly 2.000 *Reais* and mean income per capita has increased by almost 40% over a ten-year period. Only 5% of the municipalities saw a decline in monthly income per capita over that period. Income inequality has also increased slightly over that period. In fact, only about 27% of the municipalities witnessed a decline in inequality, while about two-thirds saw an increase, with the rest (about 7%) seeing no change. It is worth pointing out that the average increase in inequality from 1991 to 2000 cannot be directly compared with numbers used in Figure 1 (keeping in mind that the latter does not in fact contain information for 1991 and 2000) as they are aggregated differently. Besides, it is not surprising that the Gini coefficients reported at the national level for Brazil tend to be higher than what we see at the municipal level because the country is large and economically diverse so that income disparities tend to be accentuated when looking

at the macro level. However, as we have argued above, there are benefits to be gained by examining municipal level data.

In addition to data on income inequality and income per capita, we also have data on the rate of urbanization, school enrolment (which is a combination of primary, secondary and post-secondary enrolment), and the percentage of revenue to municipalities from government transfers. As can be seen in the above table, all of these variables have increased on average between the census years. We will include them in the empirical analysis to verify whether, in addition to per capita income, they can account for some of the changes in inequality.

4. Model and Results

The Kuznets hypothesis, described above and illustrated in Figure 1, posits that there exists a quadratic relationship between income inequality and per capita income (the level of development) such that inequality first increases as income per capita increases in the early stages of development, and then declines after reaching a peak. The model that we will estimate can thus be expressed as follows:

$$ineq_i = \beta_0 + \beta_1 \ln Y_i + \beta_2 (\ln Y)_i^2 + \varepsilon_i \qquad (1)$$

where *ineq* refers to a measure of inequality (which in our case is the Gini coefficient), *ln Y* refers to the natural logarithm of per capita income to proxy for the level of economic development, *i* refers to municipalities, and e_i is the normal disturbance term with the usual properties. Assuming we have a cross-section sample of municipalities that is reasonably diverse and that the Kuznets relationship is fully captured by the data, we expect $ß_1 > 0$ and $ß_2 < 0$. As discussed above, we will also extend the model with additional explanatory variables (urbanization rate, rate of school enrolment, and government transfers), which are commonly highlighted as the mechanisms behind the process outlined by Kuznets generally, as well as specifically in the case of Brazil. Table 2 presents the results when equation 1 is estimated.

Table 2: Estimation Results Using Municipal-Level Data

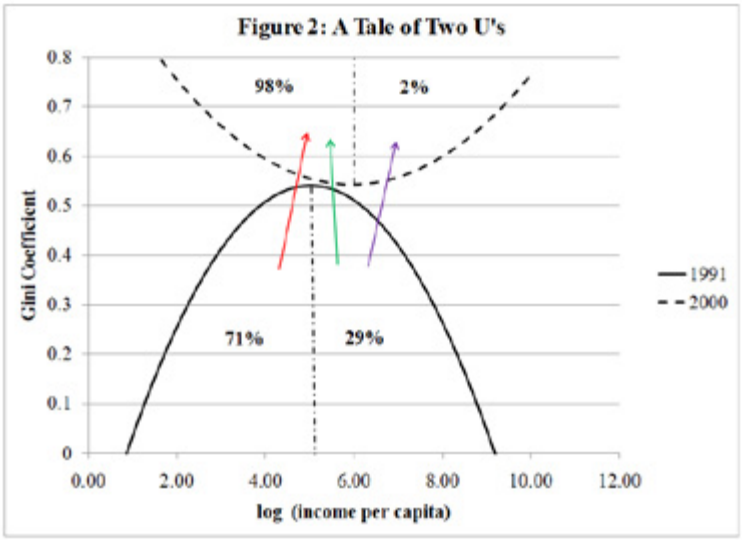
Explanatory Variables	(1)	(2)	(3)	(4)	(5)	(6)
Year	**1991**	**2000**	**1991**	**2000**	**1991**	**2000**
Constant	0.537** (0.001)	0.556** (0.001)	0.520** (0.001)	0.562** (0.001)	0.536** (0.001)	0.557** (0.001)
ln Y	0.024** (0.001)	-0.026** (0.001)	0.028** (0.001)	-0.035** (0.001)	0.027** (0.002)	-0.025** (0.000)
(ln Y)²	-0.031** (0.002)	0.014** (0.002)	-0.030** (0.001)	0.013** (0.001)	-0.030** (0.003)	0.012** (0.003)
urban	-	-	-0.001** (0.000)	0.001 (1.250)	-	-
school	-	-	0.001** (0.000)	0.001 (1.758)	-	-
transfers	-	-	0.001** (0.000)	-0.002** (0.001)	-	-
Adjusted R^2	0.099	0.079	0.087	0.094	0.112	0.075
N	5507	5507	4491	5507	3716	4138
F-Stat	302.734	236.849	86.785	115.03	235.33	168.52
(p-value)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Turning Point:						
Before	3915 (71%)	5371 (98%)	-	-	-	-
After	1592 (29%)	136 (2%)	-	-	-	-

Note: Figures in parentheses are robust standard errors. *(**) indicate 5(1) percent level of significance.
Source: Instituto Brasileiro de Geografia e Estatística (IBGE), accessed via http://www.ipeadata.gov.br/

Looking at column 1 above, the results for 1991 clearly support the Kuznets hypothesis of an “inverted-U” relationship. The coefficients on *ln Y* and *(ln Y)²* are positive and negative respectively, and both are statistically significant at the 1% level. Note that in order to avoid the problem of multicollinearity, the demeaned values of *ln Y* and *(ln Y)²* are used in the regressions. The turning point in income per capita occurred at around 153 monthly *Reais*, which is higher than the mean and median income (see Table 1 above). As shown in the bottom part of Table 2,71% of the municipalities were on the rising portion of the Kuznets curve while the remainder was on the declining portion. In column 2, ten years later, in 2000, the relationship has changed and we find clear evidence supporting the existence of a “straight-U” relationship between the level of development and income inequality. The coefficients on *ln Y* and *(ln Y)²* are negative and positive respectively, and both are statistically significant at the 1% level. The turning point in 2000 occurred at 387 monthly *Reais*, which is again above the mean and median income for that year (see Table 1). Furthermore, 98% of the municipalities were located on the declining portion of the “straight-U” Kuznets curve and the remainder on the increasing portion.

For illustrative purposes, and using the estimated coefficients from Table 2, Figure 2 shows what has happened between 1991 and 2000. Municipalities that used to be to the left of the turning point in 1991 on an increasing path of inequality have now all moved to the left of the turning point in 2000. Municipalities that used to be the right of the turning point in 1991 have mostly (92%) moved to the left of the turning point in 2000, thus staying on a path of declining inequality. Only a few (8%) municipalities that were on a declining path of inequality in 1991 have seen their situation reverse over time. These were municipalities with mostly already high incomes in 1991.

Figure 2



Source: Instituto Brasileiro de Geografia e Estatística (IBGE), accessed via http://www.ipeadata.gov.br/

In columns 3 and 4, we extend the model with additional variables related to the urbanization rate (urban), the school enrolment rate (school) and the percentage of revenue coming from government transfers (transfers). Contrary to Kuznets’ prediction, urbanization led to a decline in inequality in 1991; however, it was not significant in 2000. The increase in school enrolment, which could serve as a proxy for increasing returns to education, led to an increase in inequality in 1991 and was no longer significant in 2000. Finally, transfers from the government had a negative impact only in 2000, but a positive one in 1991, an indication that they were possibly poorly targeted in that earlier period. Estimating the same equation for the two periods as a growth equation, we find that the increase in urbanization led to a decrease in inequality, that the increase in school enrolment led to an increase in inequality, and that the change in government transfers led to an increase in inequality (even if significant only at the 6% level).

Finally in columns 5 and 6, we re-estimated the basic equations in columns 1 and 2, by controlling for the size of municipalities, since one could argue that those with smaller

populations could have a more than proportionate impact on inequality. We started with an arbitrary cut-off by removing those municipalities with a population of 5.000 or less (results shown in columns 5 and 6). The significance of the Kuznets relationship did not change as a result. The results did not change when the sample was further restricted to municipalities with a population of 10.000 or more (results not shown here).

5. Analysis

Current scholarly discussions of inequality focus on its determinants and to a lesser extent on its consequences for growth performance, not on the relationship between income levels and inequality. This was also Kuznets’ original research program: he wanted to know what factors explained the peculiar evolution of inequality, without assuming that it was linked systematically to levels of development.

Kuznets describes a process in which at first, people move from poor but more equal rural areas to richer but more unequal urban ones, driving average inequality up in the process (1955: 6-7). For Kuznets, industrialization is inherent to economic development: “[a]n invariable accompaniment of growth in developed countries is the shift away from agriculture, a process usually referred to as industrialization and urbanization.” (1955: 7). Over time, this process slows down and, combined with increased income of the lower groups within the non-agricultural sector (Kuznets 1955: 17, 18), the inequality trend is reversed.

More recent studies of inequality in developing countries have emphasized the impact of trade liberalization, with the Stolper-Samuelson theorem as a foundation (Krueger 1983, Bhagwati and Srinivasan 2002). From that “orthodox” perspective, trade liberalization should lead to an increase in the income of the abundant factor, which, in developing countries, is unskilled labour, inducing a reduction of income inequality. Trade liberalization for these countries, in other words, should be pro-poor. This view has been strongly challenged by a major research program (Harrison 2007), whose empirical analyses show inequality to increase along with openness to trade in developing countries (Milanovic and Squire 2007).

As mentioned above, detailed case studies of Latin American countries, however, have shown inequality decline since the turn of this century (Lopez-Calva and Lustig 2010a). Following a decade of trade liberalization, this development is consistent with the orthodox view. These studies, however, do not consider the impact of trade liberalization as a major explanatory variable, and trace lower inequality to declining returns to education and significant government transfers to the poor (Lopez-Calva

and Lustig 2010a, Barros et al. 2009a). Lower inequality caused by declining returns to education is consistent with Stolper-Samuelson if the relatively abundant factor is unskilled labour and, from that perspective, trade liberalization may have had a role in the evolution documented by Luis F. Lopez Calva , Nora Lustig and their colleagues (2010a,b) .

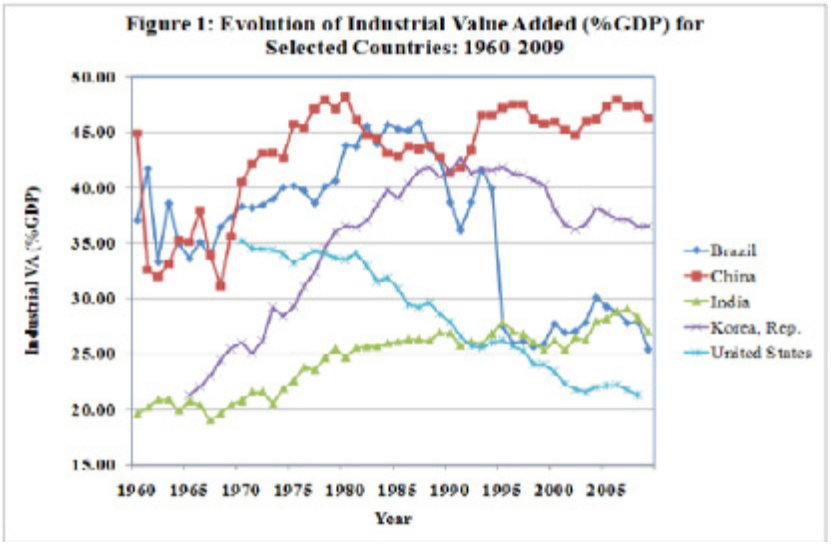
The orthodox view is consistent with currently growing inequality in wealthy countries—where returns to education are high—and declining inequality in Latin America (where returns to education are declining), but not with growing inequality in China and India where unskilled labour is relatively abundant and thus where returns on education should also be low and declining as the weight of trade in these economies increases. What could explain this discrepancy?

Going back to Kuznets and building on the case of Brazil, we propose that the key to these anomalies may lie in the weight of industrialization in the growth matrix of a country and its implications for returns on education. In Kuznets’ model, internal dynamics matter because industrialization is the linkage between growth and increasing inequality. If industrialization were to induce increasing returns to relatively basic levels of education, the standard Kuznets model would hold, helping make sense of increasing inequality in the early phases of development in Europe and North-America, as well as the current dynamics of rapidly growing and industrializing Asia. In particular, increasing returns to education induces an increase in inequality, just as declining returns induces a decrease in inequality, as noted by Lopez-Calva and Lustig (2010), an explanation which is consistent with the “orthodox” Stolper-Samuelson model, where trade liberalization increases the value of unskilled labor in poorer countries. De-industrialization, by contrast, would lower returns to basic levels of education, “flipping” the curve into a “straight-U”. In such cases, it would lead first to a decline in inequality, as skilled and semi-skilled labour is devalued, as is currently the case in Latin America, and then to an increase in inequality, as returns on high education kick in at higher levels of revenue.

The link with openness would lie in its implications for industrialization: where the relation between growth and industrialization holds firm, so does the standard relationship between growth and inequality; where it breaks down, Kuznets’ hypothesis is reversed. Since World War II and until the end of the 1980s in Brazil, the relative weight of industrial production had been increasing regularly. Beginning in the 1990s, however, the tendency has reversed. The change is strongest in the industrial sector, where value added (as a percentage of GDP), which had gone from 37% to more than 45% in the mid-1980s, has declined since to reach 25% in 2009 (see Figure 3 below). The apex of industrialization is reached in the mid-1980s and has been declining since then.

Brazil’s liberalization shock, which came at the very beginning of the 1990s, is clearly a factor here. Over the same period, industrial value added as a proportion of GDP was increasing in China, India and South Korea, and declining in the United States and in most OECD countries (see Figure 3 below). In the industrializing group, inequality has been rising among poorer countries, consistent with the Kuznets hypothesis. In the de-industrializing group, poorer though middle-income countries such as Brazil, Mexico, and Argentina saw inequality decline, (Lopez-Calva and Lustig 2010a), while richer ones, such as the United States, saw it increase, with both results consistent with a reverse Kuznets curve. This is the reason we think that the fate of industrialization is the best explanation for “flipping” the Kuznets curve in Brazil.

Figure 3



Source: Constructed using data from WDR 2011 database, accessed via http://wdr2011.worldbank.org/sites/default/files/Light_Master_dataset-Version.zip

6. Conclusion

Inequality has important implications for development. William Easterly (2007) has shown recently that highly unequal countries have significantly poorer growth performance than equal ones. From a poverty reduction perspective, the distribution of income has immediate consequences: in Brazil, between 2001 and 2007, the per capita income of the poorest decile has grown three times faster than the national average, and five times faster than the richest decile (Barros et al. 2009a: 4). The shape of the Kuznets curve and where one is located on it matter.

This paper, using municipal-level data from Brazil, brings an interesting twist to the Kuznets curve discussion. It suggests that such a curve does indeed exist, but that its shape is not given but instead can change over time. Very tentatively, we propose

that such changes could be traced to the relative weight of industrialization in a country’s growth matrix. In the classic model proposed by Kuznets, the association of industrialization with growth was taken for granted and the „reverse-U“ shape of the curve considered universal. Recent growth patterns in the richest economies, but also in middle-income Latin American countries, however, show that the two are not necessarily correlated. Growth in fact can be accompanied by de-industrialization, reversing in such cases the standard Kuznets curve into a “straight-U”. The possibility of such a flip enables one to make sense of growing inequality in poorer but industrializing economies and in rich ones going through processes of de-industrialization, and also of declining inequality in poorer de-industrializing countries such as Brazil.

The implications of those results are intriguing. First, they reinforce the growing skepticism towards the role of industrialization in economic development, as Brazil sees its most successful period of pro-poor growth go hand in hand with its de-industrialization. Perhaps there is indeed no resource curse (Lederman and Maloney 2008), and an economy can both grow quickly and reduce poverty while the relative weight of its resource and tertiary sectors increase rapidly. Second, the role of social policy in the current evolution of inequality and poverty in Brazil—the famous *Bolsa Familia* program, in particular—may have been exaggerated by both the Brazilian government and social policy specialists, as much of the change could be traced to changes in the structure of the economy itself. Third, the most critical impact of these social policies may lie less in today’s decline of inequality than in the forthcoming management of structural pressures pushing for its increase, once Brazil and other Latin American countries move beyond the tipping point of the “straight-U” curve and becomes again more unequal.

Now, as repeatedly pointed out above, while the flip we identify is robust, our explanation for it is extremely tentative and, to put it in proper perspective, the reservations Kuznets introduced in his own piece and quoted in the introduction are probably warranted: “… so long as [this paper] is recognized as a collection of hunches calling for further investigation, little harm and much good may result.” (Kuznets, 1955).

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