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Brazil and China: Two Routes of Economic Development?

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Abstract

We look at two emerging economies, Brazil and China, and propose an evaluation of their recent development in terms of growth performance and the evolution of income inequality. Our analysis, therefore, is related to a recent vast growth literature but also to the much debated Kuznets-curve and theory. However, we claim that neither the growth approach nor Kuznets' capture recent relevant phenomena characterizing such countries' dynamics: namely, the presence of at least two distinct growth models. Cointegration analysis and empirical evidence seem to corroborate our interpretation. They also offer some further insights. We surmise that, while contributing to press for a re-examination (once again) of the issue of convergence in the light of the issue of income distribution, such findings have interpretative relevance and policy implications for other LDCs.

Keywords: Economic Growth; Income Inequality; Time Series Analysis.

JEL Classification: C23; D3; O11; O40.

1 Introduction

After a lengthy and on the whole probably inconclusive debate, research has started to look for supplementary variables to explain the all-pervasive evidence of *divergence* in per capita income, among developed countries as well as between them and LDCs (and more recently emerging economies). An extensive literature has blossomed on the causality relationship between inequality (however, measured) and economic performance, as measured by say, per capita (pc) GDP. Recently, this debate has merged with a debate on the so-called Middle Income Trap (in particular, in relation to some of the emerging economies).

Generally in a cross-country framework, we have seen the (re-) discovery of analyses positing the existence of a functional relation between growth and inequality. It is natural to think of the time honored Kuznets' curve (1955) with its associated dynamical hypothesis and prediction, a relation whose peculiarity is to describe a *causal* association that reverses at the (high or low) level of a country's development. In more recent years, a shared attitude has been, basically, rejection of the very existence (or of the "end", Palma (2011)) of a K-curve constructed from cross-country analysis. Hereafter, we take instead a time series approach to study the evolution of pc GDP (levels and growth rates) versus income inequality (through a Gini index) in the two economies, China and Brazil (a companion paper by Risso et al., (2013) examines México).

An econometric exercise shows that in both countries pc GDP and income inequality do stand in a co-integrated, long-term relationship. However, while VAR Granger causal relationships indicate that China's economic growth "predetermines" or "Grange-causes" income inequality (*perhaps, one could say á la Kuznets*); in Brazil the causal relationship seems to be reversed. Moreover, in China such relationship is positive (like in Risso and Carrera (2012)) while in Brazil it is negative. Then, for each country, we construct, analyze and compare the qualitative behavior of curves in a plane with (pc GDP, Gini index) on the coordinate axes, a *K-plane*. Obviously, such curves are not true Kuznets curves, due to their time series origins, though we may call them *Kuznets-like*.

We suggest a re-interpretation of the experiences of the two countries, where the key notions distinguishes between *two growth models*, a fast growth with income concentration, "investment" supported model (prevailing in China, at least till recently)

and a more moderate growth with income redistribution, “consumption” supported model (of Brazil), as well as the possibility of a model switch¹.

Section 2 briefly surveys relevant literature. Section 3 go through the steps of an econometric exercise to discuss empirical evidence for China and Brazil focusing on the existence of stable long-run relationships between inequality and growth of the type as implied by cointegration and Granger causality. The aim of Section 4 is to a sketch of some stylized facts of Brazil’s and China’s recent development in *a K-plane*, and to introduce the notion of growth models and model switch. Section 5 puts the two countries *vis-a-vis* one another and summarizes our results, while the last one (Section 6) outlines some conclusions.

2 The literature: a brief review

In recent years, considerable efforts have been spent on understanding the differential growth experience of the various countries, also in a hunt for the *perfect policy recipe* to success. Especially emerging economies, and some LDCs, have been scrutinized with the tools of growth (rather than development) theories. One key issue that has come up is whether a growth goal be achievable through redistributing or else letting wealth and income concentrate. It is still subject to debate.

The dynamic process creates new resources as well as modifies their distribution. This was very clear to the theorists of economic development seeking its explanations and consequences in major structural changes. Ever since Kuznets and Lewis, theoretical constructs about the effects of performance onto income distribution have focused on several basic mechanisms. In a bold generalization from a limited cross country evidence, Kuznets (1955) maintained that an increase in inequality is inevitably associated with certain phases (“stages”) of the development process –that is– distributional inequality would increase as the economy progresses from an agrarian to an industrial structure, to decline only later on, the transition having been accomplished

¹ Since our analysis ends with 2009, it is worth to say a few words about the current situation. Brazil and China have been hit in varying degrees by the global economic downturn and have responded in distinct ways. Public reaction and perceptions of living standards do not appear to have been the same. Hereafter, we surmise inequality be part of the reason. However, country specific factors, such as trade relations and FDI (Rodriguez-Pose and Gill, 2006; Castilho et al., 2012; Rodriguez-Pose, 2012), play a role too, but will only tangentially be examined hereafter (Current research by Rodrik (2010) and Zhu (2012) are basic starting points for the case of China. Loayza and Fajnzylber (2005) and Adrogué et al. (2010) for Brazil.)

and the country entered the club of the developed ones². Kuznets' theory came to be discussed within the growth literature and, then, within the empirics of cross-country convergence.

As seen by this more recent literature, the issue became to be synthesized in a single central question: is growth that causes inequality, or else can income inequality be its engine? Thus, one has to inquire about the *direction* but also the *sign* of a unidirectional causality relation. In contrast to the development approach focusing on structural change, springing from the growth and convergence debate, the more recent contributions have been searching for a stable, unidirectional relation between those variables, generally through a cross country approach similar to Kuznets' own. Opposite, often-controversial results were produced.

We pick up two strands of such growth-related literature that interest our exercise³. The first one posits a relation *from* inequality *to* growth, but it has two variants as to the sign. One of them has theoretical ancestors in the British classics and goes all the way down to the Keynesian theory of Kaldor-Pasinetti: an income eschewed distribution favoring profit earners enhances growth because wealthier individuals have a higher propensity to save and invest. Thence, higher income concentration would lead to higher aggregate savings and thus to faster capital accumulation-driven growth⁴.

In more recent times, this unidirectional or causal relation is retained by e.g. Alesina and Rodrik (1994), Perotti (1994, 1996), Deininger and Squire (1998). Persson and Tabellini (1994), Li and Zou (1998), Forbes (2000), Arjona et al. (2001), to name a few. (Barro (2000), makes an attempt at classifying them.) However, these contributions do not share (with the classical variant), either the interpretation (other variables being brought in addition to inequality, e.g. democracy etc.) or the expected *sign*: a steadily decreasing relationship from inequality to growth replacing an increasing one⁵.

The second strand of literature we will refer to, inverts the roles of the variables. In the variant that will interest us, the idea of a decreasing function is retained: higher growth may yield lower inequality. In fact, resources generated by growth need not be

² Where a better distribution would be associated with further growth.

³ Shin (2012) offers an exhaustive review.

⁴ It may be worth to remember, that such conception crucially relies on the idea that it is capital accumulation that drives growth, an idea only partially shared by the neoclassical approach which adds to it technological progress as the productivity driver for the long run.

⁵ Banerjee and Duflo (2003) find an interesting result: when growth (or changes in growth) is regressed non-parametrically on changes in inequality, the relationship has a U-shape. Such idea will turn up later in this paper.

concentrated but can be used for redistribution, directly and/or indirectly. In dynamical terms, this analysis seems to posit the *existence of a downward-sloping path* (in **the** K plane) over a stretch of low incomes, at least for some developing countries⁶. There, a self feeding, virtuous mechanism would be at work: once initialized, growth feeds (positively) into income distribution and the latter further supports (through domestic market expansion, and households long term investment in human capital and the like) present and *future growth*, generating a path of sustained expansion. This would have been the mechanism behind the East Asian Miracle (EAM) (Stiglitz (1996)).

The nonlinearity implied by the above feedback mechanism, which does not appear in other growth interpretations, has a relation with the Kuznets' hypothesis.

Thus, our discussion leads us to consider the latter's framework. As noted earlier, the general attitude now seems to be of outright rejection of the very existence of one such a curve and the implied theory. Manifold justifications for the rejection have been given; still, references to it (and writings) periodically re-surface, showing the strong appeal of the idea.

Thus, even though we do not address the issue of the existence of a proper Kuznets curve (being constructed from single country time series, our curves are *Kuznets'-like*), our approach and our country comparison will lead us to often refer to it as a sort of benchmark.

However, taking up the issue central to the growth-related literature, section 3 will first go through a cointegration (and causality) exercise to ascertain the existence of stable relationships between income inequality and growth, as well as its direction and sign. Results will be found that do not wholly fit into any of the growth interpretations.

3 An econometric exercise

The database used hereafter, for China as well as for Brazil, over the period 1980-2009, is:

1. GDP per capita (in 2005US\$ PPP) from Penn World table 8.1 (Feenstra et al., 2015).

⁶ A similar idea seems to be implied also by certain remarks of Barro (2000) and especially Shin (2012), where low-income countries are compared with high income ones (USA, France), both showing high-income concentration. This again seems to indicate the existence also of a kind of U curve.

2. Income inequality, measured by the Gini index. From the *Standardized World Income Inequality Database*, Version 4 by Frederick Solt (2009).

Although the relevant empirical literature provides insights on whether and how inequality may affect growth, it still suffers from the known limitations inherent to standard cross-country and panel regressions, because it relies on the implicit assumption of a common economic structure (Herzer and Vollmer, 2012). Nevertheless, using of the same source of data for the variables GDP per capita and Gini index allows us to be pretty sure that data are comparable between those two countries (Ivashchenko, 2003).

Our aim is to test whether there is a long-run relationship between economic growth and income inequality using cointegration techniques. Since it avoids and/or deals better with the typical problems (parameter heterogeneity, omitted variable bias and endogeneity) from which suffers the standard cross-country approach in the econometric analysis of economic growth.

As we look for results in terms of elasticity, we apply natural logarithms to the GDP per capita and Gini index series, named *lnGDP* and *lnGini*, respectively.

First, we establish the order of integration for both *lnGDP* and *lnGini* and show both series to be $I(1)$. Second, we find the optimum lag structure using Akaike Information Criteria (AIC). Third, we perform Hansen's procedure to test for the long run relationship with endogenous structural breaks. Fourth, we conduct the Toda-Yamamoto Granger causality test, to examine whether there is causal relationship between the two variables and its direction. Forth, we apply the Dynamic Ordinary Least Squares (DOLS) estimation methodology, a robust single equation approach that corrects for regressors endogeneity by the inclusion of leads and lags of the regressors' first differences. Fifth, we verify for the stationarity of the residuals of regressions in order to make sure our estimated models do not generate a spurious regression (Choi et. al., 2008).

3.1 Unit root tests and lag length selection

A preliminary step to investigate the link between income inequality and GDP is testing for the order of integration. The Phillips-Perron (PP) unit root tests differ from the Augmented Dickey Fuller (ADF) tests mainly in how they deal with serial correlation

and heteroskedasticity in the errors. In particular, where the ADF tests use a parametric autoregression to approximate the structure of the errors in the test regression, the PP tests ignore any serial correlation in the test regression. In sum, PP tests statistics can be viewed as DF statistics that have been made robust to serial correlation by using Newey-West (1987) heteroskedasticity and autocorrelation consistent covariance matrix estimator.

Table I. PP Unit Root Tests.

Variable (in Level)	Brazil				China			
	<i>lnGDP</i>		<i>lnGini</i>		<i>lnGDP</i>		<i>lnGini</i>	
	<i>Adj.t-stat</i>	<i>p-value</i>	<i>Adj.t-stat</i>	<i>p-value</i>	<i>Adj.t-stat</i>	<i>p-value</i>	<i>Adj.t-stat</i>	<i>p-value</i>
Trend & intercept	-1.65116	0.7468	-2.513603	0.3197	-1.530213	0.7953	-1.680601	0.734
Intercept	-0.822609	0.7976	-2.217562	0.2047	0.430599	0.9809	-0.745528	0.8194
None	1.613193	0.9709	-1.454428	0.1333	4.99283	1	1.247385	0.9421
Variable (1st difference)	<i>ΔlnGDP</i>		<i>ΔlnGini</i>		<i>ΔlnGDP</i>		<i>ΔlnGini</i>	
	<i>Adj.t-stat</i>	<i>p-value</i>	<i>Adj.t-stat</i>	<i>p-value</i>	<i>Adj.t-stat</i>	<i>p-value</i>	<i>Adj.t-stat</i>	<i>p-value</i>
Trend & intercept	-2.722096	0.2359	-7.666823	0.000*	-3.273441	0.091***	-2.785699	0.2136
Intercept	-2.838594	0.06***	-6.128736	0.000*	-3.301422	0.024**	-2.88077	0.060**
None	-2.94029	0.004*	-6.125438	0.000*	-1.751705	0.075***	-2.429833	0.017**

Note: Δ means 1st difference of the variable. Phillips-Perron test (PP): null hypothesis is unit root. * Null hypothesis rejected at 1%. ** Null hypothesis rejected at 5%. *** Null hypothesis rejected at 10%.

Source: Own elaboration.

Results of the PP unit root test in levels and differences of the two variables indicate that *ln pc GDP* and *ln of the Gini index* are non-stationary in their respective levels (Table I). After first differencing, however, the null hypothesis of a unit root in the PP tests is rejected for both and we can conclude that two variables are integrated of order one, I(1).

3.2 Testing for cointegration.

As a third step, we test for cointegration. The Johansen methodology can estimate more

than one cointegrating vector and simultaneously estimates the short-run and long-run cointegrating relationships, offering a more intuitive interpretation since the coefficients can be naturally classified as short-run or long-run effects. However, in our bivariate model Johansen approach is not longer needed. When testing for cointegration one must bear in mind that the traditional tests (AEG, Phillips-Ouliaris (PO), Johansen, etc.) are not the most adequate if there occurred breaks in the cointegration vector, since they fail to reject the null hypothesis of no cointegration less often than they should, inducing to conclude that a long run equilibrium relationship does not exist. To overcome this difficulty, Hansen test is performed using the **Lc** statistic when testing the null of cointegration against the alternative of no cointegration. However, this test detects cointegration relationships subjected to regime shifts as well as invariant cointegration vectors (Vasco et al., 2003). Since the alternative hypothesis of a random walk in the intercept is identical to *no cointegration*, the test Lc statistic is a test of the null of cointegration against the alternative of no cointegration.

Table II. Cointegration Test - Hansen Parameter Instability

Brazil

Series: lnGDP - lnGINI. Null hypothesis: Series are cointegrated				
Lc statistic	Stochastic Trends (m)	Deterministic Trends (k)	Excluded Trends (p2)	Prob.*
0.09644	1	0	0	>0.2

China

Series: lnGDP - lnGINI. Null hypothesis: Series are cointegrated				
Lc statistic	Stochastic Trends (m)	Deterministic Trends (k)	Excluded Trends (p2)	Prob.*
0.02699	1	0	0	>0.2

*Hansen (1992) $Lc(m_2=1, k=0)$ p-values, where $m_2=m-p_2$ is the number of stochastic trends in the asymptotic distribution.

Source: Own Elaboration.

We obtain that the null hypothesis (of cointegration) cannot be rejected as the Lc statistic is significant at 20 percent (Table II). Moreover, parameters are stable, i.e. we find no evidence of unstable relationship between the variables for either country, Brazil and China.

3.3 Testing for causality

Cointegration, by itself, implies causality in at least one direction. However, since the variables are integrated, the application of the standard Granger causality test is invalid. In this case, Toda and Yamamoto's (1995) alternative procedure estimates a VAR model (the equations of the VAR can also be estimated separately) with $(k+d_{max})$ lags, where k is the standard optimal number of lags and d_{max} is the maximal order of integration that occurs in the process. Once the VAR has been estimated, we test whether the coefficients of the first k lags of the dependent variable was simultaneously null.

In our dataset, the PP test for unit root shows that both $\ln GDP$ and $\ln Gini$ are I(1) for both countries, so $d_{max}=1$. The Akaike Information criteria (AIC), selects as optimal lag length of a VAR for China 5, while for Brazil it is 7.

Table III shows the results for both countries, Brazil and China, respectively.

Table III. Toda&Yamamoto -Granger Causality Test

Brazil			
Dependent variable: $\ln GDP$			
	Chi-sq	df	Prob.
<i>$\ln GINI$</i>	32.0497	7	0.0000*
Dependent variable: $\ln Gini$			
	Chi-sq	df	Prob.
<i>$\ln GDP$</i>	8.6951	7	0.2753
China			
Dependent variable: $\ln GDP$			
	Chi-sq	df	Prob.
<i>$\ln GINI$</i>	2.07793	5	0.8383

Dependent variable: *LnGini*

	Chi-sq	df	Prob.
<i>lnGDP</i>	10.9123	5	0.0531***

Notes: df means degree of freedom. * Rejection of the null hypothesis at 1%. ** Rejection of the null hypothesis at 5%. ***Rejection of the null hypothesis at 10%.

Source: Own elaboration.

Results show that economic growth (*lnGDP*) is causing income inequality (*lnGini*) in China, , while in Brazil income inequality (*lnGini*) is causing economic growth (*lnGDP*), in the sense of Granger. Let's get the signs of each causation.

3.4 Cointegrating equation

With cointegrated variables, standard OLS-type procedures produce consistent estimates. Because of the unidirectionality of the effects we opt to use a Dynamic Ordinary Least Squares (DOLS) procedure (Stock and Watson (1993)), i.e. a single equation regression estimation which includes leads and lags of the differentiated independent variable so as to make its stochastic error term independent of all past observation (serial correlation) and eliminate the bias of potential endogeneity .

We therefore estimate two distinct equations. Brazil's equation is:

$$lnGDP_t = \beta_0 + \beta_1 trend + \beta_2 trend^2 + \beta_3 lnGini_t + \sum_{i=0}^7 \varphi_i \Delta lnGini_t + \varepsilon_t$$

and China's

$$lnGini_t = \beta_0 + \beta_1 lnGDP_t + \sum_{i=0}^5 \varphi_i \Delta lnGDP_t + \varepsilon_t$$

Brazil's equation includes, in addition to the standard covariates, a linear and a quadratic trend, as a long-term movement of *lnGDP* was detected that *lnGini* and $\Delta lnGini$ have not been accounted for, which is moreover nonlinear, and this nonlinearity is by the quadratic term. The inclusion of a trend is a simplified way to capture the

effect of an omitted variable bias, a reasonable assumption in this equation, since economic growth does not depend exclusively on variations of income inequality. Such an effect was not detected for China, and therefore a standard DOLS model was estimated.

On the other hand, despite the presence of unilateral causality direction implying that the exclusion of leads in the dynamic OLS regression produces better estimators in terms of mean squared error (Hayakawa and Kurozumi, 2008), for China we included two leads to guarantee stationarity of residuals.

Table IV. Dynamic Least Squares (DOLS).

Brazil				
Dependent variable: <i>lnGDP</i>				
Cointegrating equation deterministics: Intercept, TREND, TREND ²				
Fixed leads and lags specification (lead=0, lag=7)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
lnGini	-13.34172	1.41728	-9.41	0.000
Intercept	59.00851	5.450209	10.83	0.000
TREND	.2863449	.0207356	13.81	0.000
TREND ²	-.0076621	.0006278	-12.20	0.000
<i>R</i> ² -adjusted	0.9883			
China				
Dependent Variable: <i>lnGini</i>				
Cointegrating equation deterministics: Intercept				
Fixed leads and lags specification (lead=2, lag=5)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
lnGDP	0.5426794	0.2363498	2.3	0.039
Intercept	-.5325115	1.675147	-0.32	0.756
<i>R</i> ² -adjusted	0.8130			

Source: Own elaboration.

Results for Brazil indicate the existence of a negative long-run relationship between lnGDP and its lnGini. A 1 per cent increase in Gini index would cause a 13.3 per cent decrease in the Brazilian GDP per capita.

As already mentioned, the coefficients for the variable trend and trend2 are, respectively, positive and negative, indicating that once the Gini index (and its differentiated lags) have been accounted for, there is still a trend for GDP. The marginal effect of the variable trend is indeed positive until 1997, and negative thereafter⁷, which indicates that on average, GDP grows more with time than income inequality until 1998 (included), and the other way around thereafter.

Estimation results for China indicate fairly clearly that, there, there is a positive long-run relationship between GDP per capita and the Gini index. A 1 per cent increase in GDP per capita causes a 0.54 per cent increase in the Gini index of income inequality.

3.4.1 Testing for stationarity of the residuals

In order to assess a valid inference and not spurious regressions, stationarity of residuals from the DOLS cointegrating regression is checked for both countries. The null hypothesis is that residuals are integrated, so a Z-statistics with a p-value smaller than 0.10 implies a rejection (at 10%) of the null of nonstationary.

Table III. ADF Test for residuals

H₀: series are integrated

Brazil		China	
<i>Z-Stat</i>	<i>Prob.</i>	<i>Z-Stat</i>	<i>Prob.</i>
-1.994	0.0514	-1.396	0.0964

Source: Own elaboration

Hence residuals from the cointegrating regressions of both Brazil and China are found to be stationary, thus the cointegrating regressions are not spurious.

4. Brazil and China: two different (*models/strategies for*) economic growth?

⁷ The marginal effect of trend on GDP, say, the derivative of GDP with respect to trend, is computed by summing the estimated coefficient for trend to 2*trend*the estimated coefficient for trend squared. It is then possible to compute the marginal effect of trend at each level of trend, which goes from 1 (1980) to 30 (2009). This marginal effect changes sign between a level of trend of 18 and 19, which corresponds to years 1998 and 1999.

While, to our knowledge, most of the existing empirical literature on the income inequality/growth relationship uses (after Kuznets) a cross-country or a panel approach, the analysis of individual case studies and their comparison may throw some new light, also on the implications for economic development. Cointegration analysis performed separately for Brazil and China - countries that rose from low to middle income over the same time period— allows us now to examine comparatively their performance. Moreover, we could in particular address the question whether the functional relationship **between those variables** be qualitatively the same. It is not, as we have already found, but why?

Redistribution policies undertaken along the development process may help to mitigate its adverse distributional shortcomings, and even speed it up, as in the EAM countries. In our two economies, they were implemented at different points of the time, and their impact was different, too. Economic expansion has also made it possible to reduce the numbers of those living in extreme poverty both in Brazil and in China, though with different degrees of success.

The following **sections** will sketch out only some of the relevant facts.

4.1 China

At least, until around 2004, China's success in poverty reduction has not been accompanied by a reduction in household's income inequality, which had been on a steady increase, likely as a consequence of the reforms undertaken since the 1978-early 1980s to boost economic growth⁸. That confirms how the two goals, poverty reduction and equity, are unrelated.

First, a land reform took place with the allocation of plots to farmers with the possibility of keeping any production in excess of the government quota for personal use or for selling. It is this reform and the associated policies that are esteemed to have had the greatest impact on poverty reduction (Ravallion and Chen, 2007). Apparently, these initial reforms, while ignited growth giving stronger incentives to farmers, led to

⁸ Reforms were done in four major areas: trade liberalization, exchange rate (partial) liberalization and devaluation, promotion of FDI and FIE (foreign invested enterprises), and accession to the WTO.

increased inter-farmer inequality (Chaudhuri and Ravallion (2006) and ignited the late 1980s inflation, the first episode after the new regime had taken over⁹.

On the other hand, the increase in *households' income inequality* can be mostly attributed to the industrial policies, which led to resource concentration through measures favoring large (private as well as state-owned) firms. In brief, such policies introduced subsidies on the prices for key inputs (energy, utility and land), weak (or weakly enforced) regulation, especially as far as environmental impacts, favorable treatment in accessing to finance, especially for large enterprise, and finally restrictions on labor movements (Ravallion, 2009)¹⁰.

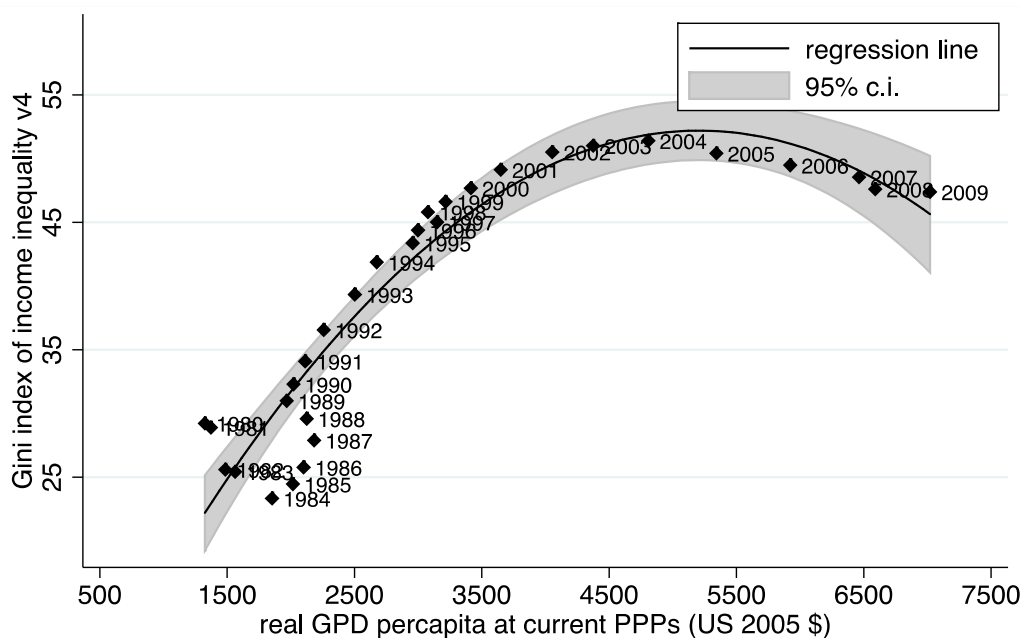
Figure 1 plots the country's time series for pc GDP in PPP (constant 2005 USD), and Gini measure of income inequality in the *K-plane*, showing also a quadratic fit. It shows that the relationship between economic growth and inequality is increasing at least until around 2004-5, but it reverses thereafter.

Such a pattern is somewhat reminiscent of Kuznets prediction and related structural dynamics.

⁹ In fact, after establishing, the government had stabilized prices and cost of living. Ever since the agrarian reform, though, inflation has become a problem, fuelled by many causes (food prices related to increased demand from city dwellers, excess liquidity due to the enormous trade surplus, excess lending that more recently supported a housing price boom, the monetary control over the exchange rate). Until a point of time, the Central Bank reacted implementing controls and price caps, more recently cautious monetary policy is being implemented. Price stability has been declared a priority. Surely, inflation had a role in income redistribution. One can surmise that its cost was born by wage earners all along a long first phase of the growth process, while now wage demand supported by labour shortage is trying to make up with the increasing cost of living.

¹⁰ Song *et al.* (2011) offer a growth model consistent with China's economic transition, with high output growth, sustained returns on capital, reallocation within the manufacturing sector, and a large trade surplus.

Figure 1. Gini index of income inequality vs pc GDP. CHINA: 1980 – 2009.



Source: Own elaboration.

Accordingly, in a Kuznets-like story, China initiated in late 1970s and thereafter boldly proceeded by means of economic reforms and the interplay between government and market forces, going through major structural changes, generating an export-led fast growth relying on large labor shifts from low-productivity agriculture to higher-productivity industry.

Thus, after a timid beginning (as early as the 1970s), whose immediate effect was a lowering of inequality together with growth in pc GDP, the ensuing expansion conjugates growth with a steady increase of inequality. But high growth has been generating substantial social costs: in anticipation of the new 2011 Plan and probably as a delayed effect of the 1992 one (launched by Den Xiao Ping), both correcting for a larger domestic market, the improvement in distribution of income is what can be seen starting 2004 (it is an explicit target of the 2011 plan).

If China's path since the 1980s to the middle of the first 2000-decade looks very much like the one Kuznets predicted for developing countries. Thereafter, a change of gear seems to have taken place.—China, we will argue, seems to have moved onto a model more similar to Brazil's and, to some extent, to that of the EAM countries, growth going

along with people's lives improvement (only indirectly captured by the Gini index, we have to acknowledge).

Such a switch took place at a value that may look like the inversion point of a Kuznets curve, a point to be discussed, albeit briefly, later.

4.2 Brazil

That model (growth with redistribution, social transfers and other social programs) is claimed (mostly rightly) to have been followed by Brazil, at least from one point in time (after the liberal reforms of the 1990s) onwards, more clearly as result of a policy strategy by the recent Presidencies, Cardoso's and even more so Lula da Silva's (Bourguignon 2004; Rodrik 2005).

This, however, completed a long process began in the mid 1970s, and, for a time, frozen during the 1980s, the so-called *lost decade* with a hidden "marcha forcada"¹¹. The decade was *lost* (if at all) in the sense that no further inequality improvement went with a mild growth in pc GDP. Macroeconomic stability, abandonment of the exchange rate management and opening the economy, better fiscal management and (moderately successful) inflation-targeting policies starting with the Plano Real (1994), curbing a roaring inflation, created a new more economically favorable scenario. Fuelling investment from inside and outside and thus growth, together with new trade ties (with China in particular)) converted Brazil in a commodities export giant, while generating employment as well as extra resources available for social policies.

At the same time, policies were implemented (more aggressively after 2002, with Lula da Silva's Presidency) had the target of promoting the expansion of the formal labor market, wages increase and redistributive public policies such as passive and active labor market policies, and massive cash transfers programs targeting poor households, along economic growth¹².

It is in this new economic atmosphere (and because of it) that, since about year 2000, Brazil *actually returned* to growth with redistribution. In the meantime, as a joint result of this process, it graduated to the rank of a middle income country, more recently,

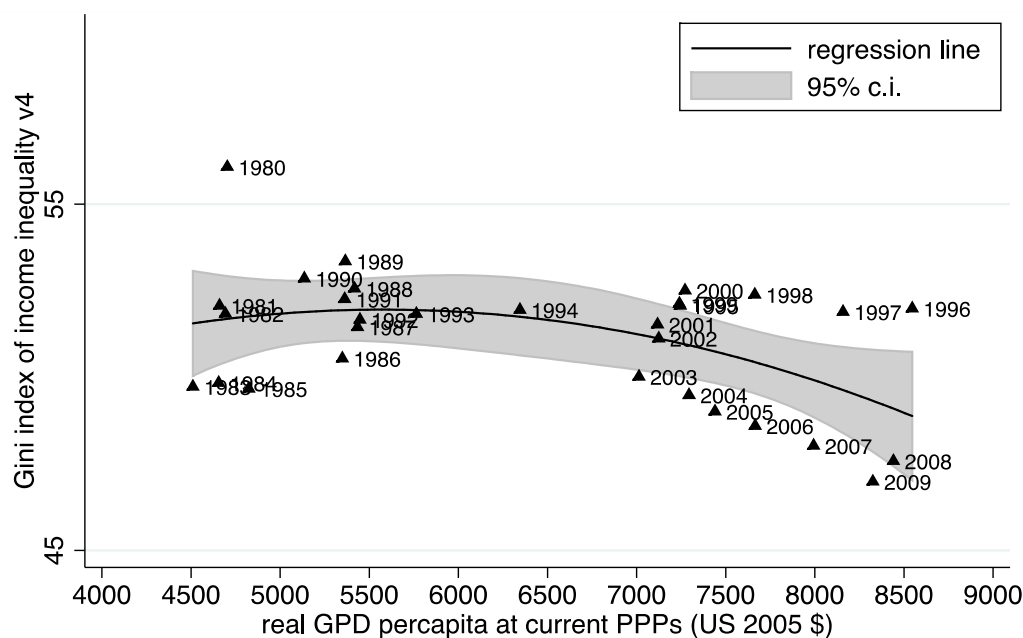
¹¹ See Barros de Castro and Pires de Souza (1985).

¹² Ravallion (2009) shows that Brazil has complemented market-oriented reforms with progressive social policies aimed directly at poverty reduction. That is, after its market-oriented reforms of 1994, it implemented active pro-poor distributional policies, notably, social assistance spending, that were critical to a substantial reductions in poverty. Of course, a natural reference is to its pillar, the Bolsa Familia program (whose distributional implications are assessed in e.g. Soares et al. (2010)).

climbing into the club of the upper end middle income countries with a pc GDP a little over \$ 8,500 USD (at PPP). A middle class was born.

This is the story we think lies behind Figure 2 that plots the time series of the two-variables for Brazil in the *Kuznets-plane*.

Figure 2. Gini index of income inequality vs pc GDP. BRAZIL: 1980 – 2009.



Source: own elaboration.

Figure 2 exhibits an almost flat central piece, whereby the income index is confined within a corridor with mid value around 50 per cent showing the growth without redistribution of the 1980s, which continues the pattern began in the mid seventies (at a much higher income concentration). Per capita GDP continues to grow well into the 2000s, while since the time of the stabilization policies and the opening of the economy, as early as mid 1990s, income concentration begins to decrease. (For its shape¹³, it is a sort of anti-K curve.) Between 1993 to around 2009, the Gini index fell by 9 per cent, the decline considerably accelerating after 2000.

Is such *virtuous* process to be imputed to the domestic market expansion generated by the mentioned redistributive and social policies? Is it to be imputed to the positive growth performance driven by commodities exports and FDIs, mostly to China and by Chinese? In fact, the picture would be very incomplete without recalling that Brazil and

¹³ Taking into account the behavior in the whole of the 1970s, not represented hereafter, this curve would be closer to a slanted S. Hence, its name.

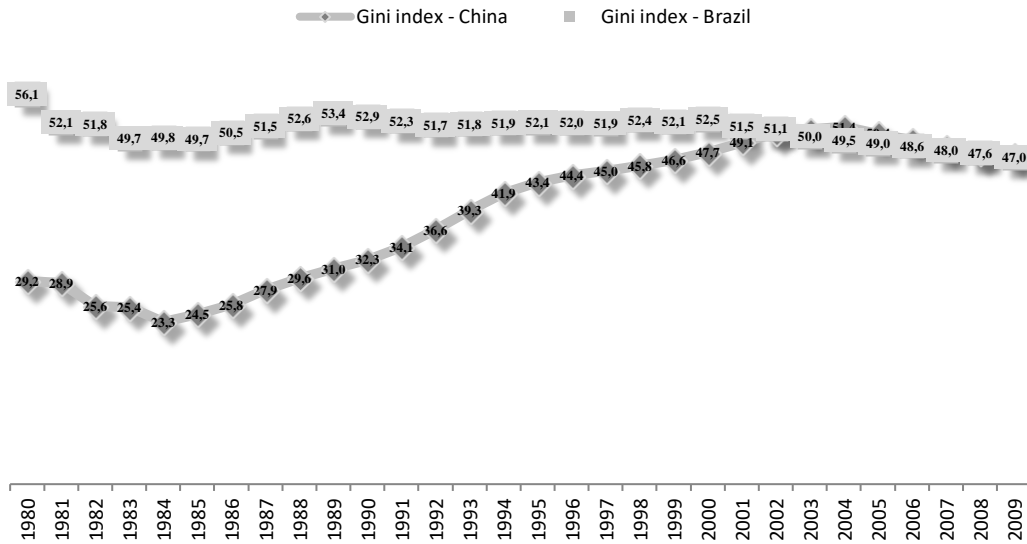
China economies are bound together in many ways, in particular, the latter being the first importer of Brazil's various commodities as well as the first in FDIs oriented towards extraction and general infrastructure (Cardoso and Teles (2010), Lattimore and Kowalski (2008)). This has permitted a Brazilian growth since 2000 faster than any other Latin American countries (at an average rate of 3.2 per cent), but still, definitely, slower than China's.

This adds interest to our comparison, and also raises the question as to the reason(s) of the difference in performance.

5 Brazil versus China

A closer look at the comparative evolution of Gini indices in the two countries is definitely useful (Figure 3).

Figure 3. Income inequality in BRAZIL and CHINA: 1980 – 2009.



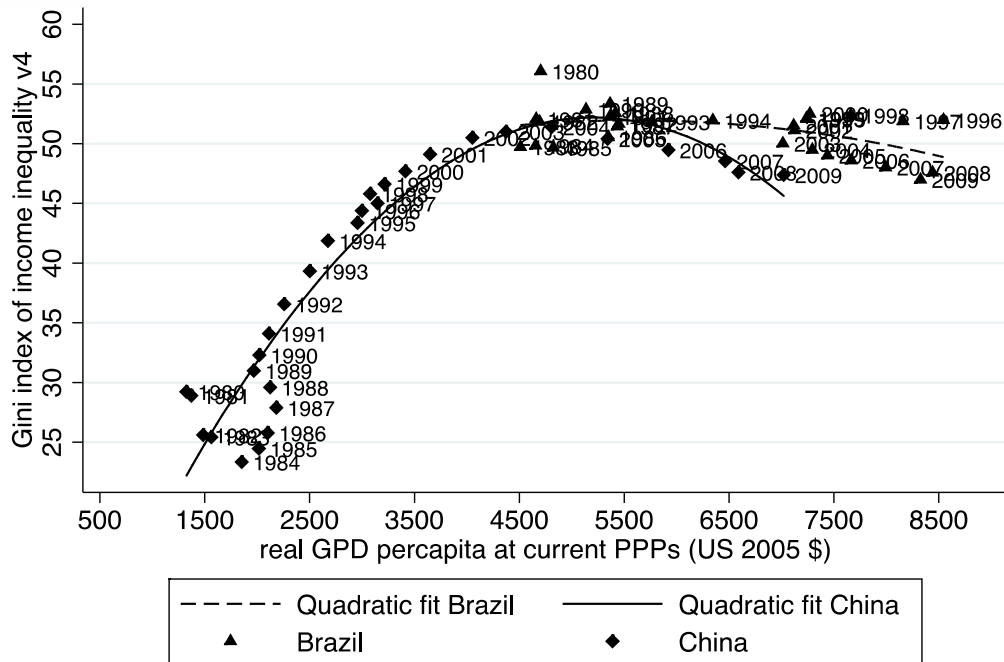
Source: Own elaboration.

For China one sees a process of steady increase, starting at a lowest value in 1984, the immediate result of the 1980 reforms or the delayed result of the previous economic order, till a value round 49 per cent is hit, in 2001. On the other hand, after an all time high in 1976 (years of the Import Substitution Policies, ISI), and a second one in 1988 (years of the second “miracle”), Brazil's index declines first softly (throughout the years of the liberal reforms) and then decidedly after 2000, the years across the Cardoso-Lula da Silva mandates. China's Gini overtakes Brazils' around 2001, and thereafter the two

countries *stay close*, at a value slightly above 49 per cent but with a tendency to decrease.

Such “convergence in income distribution” is all the more interesting if plot China and Brazil together, in the *K-plane*.

Figure 4. Gini index of income inequality vs pc GDP in the K-plane.



Source: Own elaboration.

Figure 4 represents the time evolution of two low-income countries graduating to the middle-income club. It allows us to draw some *cautious* conclusions. It is there that one may appreciate the difference between the experiences of the two countries, possibly relevant also for other emerging economies, and one can see the sense and purpose of our exercise.

First of all, we see both countries landing onto the same value of the Gini index, though at different times. Moreover, we see that “convergence in Gini” going with the better known convergence in pc GDP only for a time.

The picture shows, in fact, that something important may be going on in the associated income distribution. In the *K-plane*, there is no evidence that Brazil was (mid 1980s, now) in the so-called middle-income trap, as often said, nor that China is on the verge

of falling into it. A so called trap may *hide* a growth model switch¹⁴.

In fact, China is also seen to follow an expansion path that, until around 2004, conjugates pc GDP growth with steadily increasing income concentration. Ever since, the relation does not stabilize around a value of pc GDP but it reverses: growth continues with diminishing income concentration. This looks like the path Brazil has been following (though with bumps and other irregularities) at least since the 1980s. Recently, both economies decelerated, more so the Brazilian one that almost zeroed its average growth rate (China running at a “low” 7 per cent). Such phenomenon has been variously interpreted, one story being that, together with other Latin American and South African countries, Brazil would have been caught *now* in the aforementioned “middle income countries trap”¹⁵, which would be the near future of China.

Our explanation is different. China would have been following a certain *model of growth* since mid 1970s till a switch took place that may look like a turning point of a Kuznets curve. However, by comparison with other countries in an ongoing study, the value at which the switch takes place seems to be determined not so much by the level of pc GDP (as it would be in the latter) as, rather, by the level of income concentration (or by the pair of coordinates, with income concentration as the trigger¹⁶). Such value (roughly 50 per cent) also belongs to Brazil’s path (and to e.g. Argentina’s).

Thus, the figure suggests the existence of two distinct models of growth, prevailing in in a different country and/or in different times. Moreover, it seems to suggest that the process of growth generates forces that make certain income disparities (socially, politically, not to say economically) unsustainable. This might be the relevant lesson for LDCs.

One can conclude that in China a *Kuznets-like* structural change mechanism has indeed been at work¹⁷, a fact that seems to set the country apart from all other countries of the EAM, as Stiglitz depicts it. Its model would be one capital-accumulation driven, with a mix of public and private investment and major structural changes that altered the equilibrium between country and town, and agriculture and industry. This is a classical

¹⁴ A *model of growth* is defined as a two dimensional description of the growth phenomenon, variables being chosen depending upon the interests

¹⁵ The trap would be connected with loss of competitiveness *vis-a-vis* lower income countries, and the incapacity of climbing up the technological ladder. Its implication is the slowing down in the long-term growth. See Eichengreen et al. (2012a), (2012b), (2013).

¹⁶ In the specific case of these two countries levels too coincide. Argentina shows the same switch value in the Gini though at a much higher level of pc GDP.

¹⁷ For an interpretation of the evolution of the Brazilian economy in terms of structural growth patterns, see Feijo, Lamonica, Punzo (2012).

picture very much in the mind of Kuznets, whereby development goes along with increases in inequality, the historical experience of many a country.

On the contrary, the reverse (Granger) *causal* relation found for Brazil appears more similar to the one operating in EAM countries, growth in pc GDP feeding into the reduction of inequality, and the latter further feeding into growth. An explanation was found in the redistributive policies, but also in the liberalization policies of the end of the 80s that created a stable and more international business-friendly environment, and of course in the importance of trade in commodities and FDIs with certain countries, China to begin with.

6 Final remarks

We commented on empirical evidence after carrying out an exercise in comparing two emerging economies against the backdrop of an extensive literature on less developed countries against developed ones. Some such literature refers to the K curve and the related theory of development stages; some provides reformulations or give alternative growth-inspired explanations.

Most literature is however critical, some questioning the very foundations of a cross-country regression over a pool of heterogeneous economic structures¹⁸. Sharing such critical attitude we studied the time evolution and the long run relationship between income inequality and pc GDP over the period 1980-2009.

On the hand, in terms of *Kuznets-like* curves, while we seem to have China on a classical one (vindicating in a sense Kuznets), we have Brazil on a sort of *anti-K* curve (and the same would be true of the EAM countries)¹⁹. Evidence for both an inverted U (or a Kuznets) and anti-K curves can be used to support the thesis of the “end of the K

¹⁸ This latter is actually the main point in Palma (2011). According to his 2005 evidence, a large number of countries, (accounting for almost 80 per cent of total population, China among them), line up inside a cloud expanding horizontally in the K-plane within a Gini corridor with middle value around 40 per cent. Associated values of the pc GDP may thus vary a lot, at the far right side the rich countries creating a vertical cloud along the Gini axis. Latin American countries (with Brazil) would be outliers with a much higher Gini value. However, in our interpretation, the picture taken in 2005 *freezes* an ongoing process of change.

¹⁹ Our considerations, however, refer to the dynamic implications of the K and anti K relationship, in other words to the relationship between (differences in) pc GDP and (differences in) Gini indices. We will call the latter the *dynamic K* and (*dynamic anti-K curves*). The ambiguity of the approach is in that, while stated in terms of point variables (levels of pc GDP and of Gini indices), the interpretation almost always refers to the rates of changes of the former.

curve”, or of its outright non existence, i.e. to reject the thesis that “things have to get worse before getting better”. The tales of these two countries seem to show that we can encounter both of them, probably in a broader picture a whole variety.

Our main results have been summarized in the previous section; hereafter, we need only add a few remarks.

Most of the past Chinese growth has gone on with huge deferred social and environmental costs, trading the future for the present. If so, the bill has come due recently, at the same time as claims against income inequalities and in particular demand for higher wages are also on the surge, supported by the new shortage of cheap labor. The mid 2000s, and definitely since 2011, reorientation of the economy towards a stronger domestic market, and a lesser dependence on a weaker international one, are a way to face till then unaccounted for costs of growth. China had traded the future for the present. If this is so, the current slow down may not be a short-term phenomenon, it reflects a serious re-orientation of the economic policy.

Brazil’s redistributive and socially integrative income policies of the years 2000, showing up in the decline in the concentration index, have financed a stronger consumption demand, with the birth and growth of a low middle and middle class, with higher services demands. To cater for such new demand, the Brazilian economy will have to grow and diversify, tilting its econ balance towards the production of services rather than the extraction of resources to export (the international slack could help in this direction). But, more importantly, most of the new demand reckoned in the statistics as households’ consumption, is in fact households’ investment for the future: education, health, more home computers, etc. Brazil has been statistically ‘consuming’, to be able to grow more in the future. It has traded the present for the future.

It’s difficult to see it now, in the middle of the present turmoil, though.

It is clear that, in an exercise like ours, with the technical instruments and the approach we have chosen, many phenomena (and “explanatory variables”) are left out. The most relevant are those related with the interdependence between the two economies, which through trade of commodities (Brazil to China) and FDI’s (China to Brazil) have created a symbiotic, albeit asymmetric system of the two. (We mentioned this in the previous text.) This has fuelled the Chinese with key raw materials for growth and even food to cater for the income richer new population. On the other hand, it has permitted Brazil to fare rather well even through the earlier years of the downturn.

Still asymmetries imply dependence, as Brazil has known all along its history, as its “curse of natural resources”.

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