DELTA
DÉPARTEMENT ET LABORATOIRE D'ÉCONOMIE THÉORIQUE ET APPLIQUÉE
48, Bd Jourdan - E.N.S. - 75014 Paris
TÉL. : 33 (0) 1 43 13 63 00 - FAX : 33 (0) 1 43 13 63 10
www.delta.ens.fr

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The distributional effects of growth : case studies vs. cross-country regressions

François Bourguignon
DELTA and The World Bank

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François Bourguignon
Delta and World Bank, Paris

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Abstract

Considerable attention has been devoted lately to the empirical relationship between growth and inequality. Mostly based on cross-sectional econometric analysis, this literature is largely inconclusive in the sense that no systematically significant relationship has been found between distribution indicators and growth rates or their known determinants. Were such a result granted, it would be tempting to conclude that 'growth is good for the poor' whatever the nature of growth, as recently done in an influential paper by Dollar and Kraay (2001). The present paper adopts a different perspective. Using a few case studies and an original micro-economic methodology for decomposing time changes in the distribution of income, it shows that important socio-demographic factors are at work that may contribute to hiding the true distributional consequences of growth during a particular period of time in a given country. Because of the inherent difficulty of controlling for these factors, aggregate cross-country analysis may thus not be the best method for the study of the growth-inequality relationship.

Résumé

La relation empirique pouvant exister entre croissance et distribution a suscité dernièrement un intérêt considérable. Presque exclusivement basée sur des analyses économétriques en coupe transversale, les travaux récents se sont cependant révélés assez décevants dans la mesure où aucune relation significative entre des indicateurs décrivant la distribution et le taux de croissance des économies ou ses principaux déterminants n'a été mise en évidence. Si un tel résultat était avéré, il serait alors tentant de conclure comme Dollar et Kraay (2001) dans un article récent que "la croissance est bonne pour les pauvres", quelle qu'en soit la structure. Le présent article adopte un point de vue différent. A partir de quelques études de cas et d'une méthode micro-économique originale de décomposition des variations de la distribution des revenus au cours du temps, il montre que d'importants facteurs socio-démographiques sont à l'oeuvre qui peuvent contribuer à dissimuler les véritables conséquences distributives de la croissance durant une période et dans un pays déterminés. Du fait de la difficulté inhérente à contrôler l'influence de ces facteurs, l'analyse agrégée en coupe transversale peut donc ne pas être la méthode la mieux adaptée pour identifier la relation entre croissance et inégalité.

[1] Paper prepared for the Raul Prebisch seminar, "La teoria del desarollo en los albores del siglo XXI" ECLAC, Santiago de Chile, August 2001. Sections 1 and 2 borrow from Bourguignon, Ferreira and Lustig (2002). Comments by Jose Antonio Ocampo are gratefully acknowledged. The opinions expressed here are the author's and do not necessarily reflect those of the World Bank, its Executive Directors or the countries they represent.

Introduction and motivation

With the turn of the century, distributional issues in development economics seem to have gained an importance they may never had before, even in the 1970s when so much attention focused on the so-called 'Kuznets curve' relating development and inequality. Distribution is not only 'back from the cold', as Atkinson noted a few years ago.[2] It clearly has become a 'hot' issue. Raul Prebisch would certainly not have been against such a state of affair since equity, both between and within nations, always ranked very high in the list of his concerns about development.

The recent resurgence of interest for distribution came with a considerable broadening of the questions being debated. The increasing awareness, towards the end of the 1960s, that growth was not necessarily distribution neutral[3] was responsible for the emphasis that was then progressively put on understanding the effects of economic growth and its features on the distribution of welfare within society. However, the world macroeconomic disruption that followed the oil crisis of the mid-70s almost stopped that evolution. Research priorities in development shifted from growth and equalizing the gains from growth to achieving macro-economic stabilization and 'structurally adjusting' inefficient economies. Growth and distribution issues came back to the forefront only in the 1990s, as growth was being reactivated in several parts of the world. This occurred with a slight switch of emphasis, though. In particular, more importance was given than before to the effects that the initial distribution of resources may have on the rate and structure of economic growth. The question of whether disparities in inequality could explain the observed heterogeneity in growth performances across countries, and especially the limited growth impact of structural adjustments achieved during the 1980s, attracted very much attention. Today, the Millenium Development Goal set by the United Nations of halving world poverty before 2015, makes a better understanding of this multi-causal relationship among growth, inequality and redistribution all the more important. Indeed, achieving this crucial goal logically requires: either a) to accelerate

[2] Atkinson (1997).

growth, provided this does not benefit only the rich by increasing inequality; or b) to redistribute, provided that this does not slow down growth at the same time; or, more likely, c) some combination of these two strategies.

Results obtained by economic research on these various fronts during the last decades are mixed. On the theoretical side, several channels through which the distribution of income and/or economic resources may interact with economic growth have been explored. Progresses in the understanding of that interaction have been considerable, a disproportionate part of them having taken place in the last 10 years or so.[4] But theory is often inconclusive in the sense that it identifies alternative channels through which growth and inequality may interact in opposite ways, thus leading to opposite policy recommendations. Eliminating that ambiguity must ultimately rely on empirical analysis. Unfortunately, empirical analysis has been disappointing so far. On the one hand, cross-country aggregate analysis could not detect any strong relationship among growth, inequality and policy instruments likely to affect one or the other.[5] On the other hand, empirical micro-economic analysis did not contribute much evidence. In effect, it was not seen until recently as an adequate tool for analyzing a relationship that involves a macro-economic concept like growth.

That cross-sectional studies of the relationship between growth and inequality essentially are inconclusive may be a little bit strong. After all, finding no significant statistical relationship between some variables may itself be an important result. In the field of growth and inequality, this may mean that the rate of growth of an economy has no impact on the distribution per se, in which case 'growth is good for the poor' as recently concluded by Dollar and Kraay (2001). In a different perspective, it might also be interpreted as implying that redistribution has no effect on growth. Both conclusions hide two fundamental weaknesses, however. First, cross-country comparisons may reveal

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[3] That economic development could not be defined as simply the growth of GDP per capita and therefore involved a distributional dimension had indeed been pointed out by several early thinkers on development like Perroux , Prebisch – see in particular Prebisch (1963) – or Singer.

[4] For a review of this literature see the introduction and various chapters in Atkinson and Bourguignon (2000). See also Aghion et al. (1999).

[5] For an early critical evaluation of that voluminous literature, see Benabou (1996).

relationships, or the absence of a relationship, that are valid only *on average* across countries, but may not be valid for a specific country or a particular set of countries. Second, it is often difficult to control for the effect of omitted variables and misspecification, which, as will be seen below, is likely to be quite strong in several instances.

If this skepticism about the possibilities of macro-econometric analysis is justified, then what should be done? The basic point made in this paper is that efforts must bear more on the micro-economic side. A good reason for focusing on aggregate data in the past was that disaggregated data, which would have permitted more powerful hypothesis testing, were not available, or not available on a fully comparable basis across countries or on a regular basis within countries. Today, this situation is changing radically. Reliable household surveys are available in numerous developing countries on a periodic basis. They permit following the evolution of the distribution of income, and of alternative welfare concepts, with considerable detail over time. In Latin America, for instance, there are at least 10 countries where this kind of information has been available yearly for more than 20 years. Analyzing the relationship between growth and distribution while accounting for the structure of growth, rather than overall growth rates, as well as the full distribution of welfare, rather than some Gini coefficient or some other summary inequality measure, should thus be possible within an increasing number of countries. The challenge of the years to come may precisely be to design methods that will permit exploiting the opportunities linked to the increasing availability of detailed household or individual data, and the computing facilities offered by modern technology.

This paper draws some lessons from recent work made in that direction. It relies very much on the results obtained in the MIDD (Microeconomics of Income Distribution Dynamics) project undertaken under the auspices of the World Bank and the Interamerican Development Bank.[6] The ambition of that project was to identify and compare the sources of distributional changes in the long run long-run – i.e. 10 to 20 years – in several Asian and Latin-American countries. The analysis is pushed further in

[6] See Bourguignon, Ferreira, Lustig (2002).

the present paper by trying to relate these sources of change to the nature of the growth process observed in some of the countries covered in the original project. Doing so, it is found that, unlike what is suggested by the recent cross-sectional growth-inequality literature alluded to earlier, growth seems indeed to matter very much for the long-run evolution of the distribution of income. However, identifying this role requires to control for several socio-demographic factors that may also influence the distribution and may in some cases hide the effect of growth. This is typically something that is not possible in aggregate analysis for lack of the relevant data in a sufficiently large number of countries.

The paper is organized as follows. Sections 1 and 2 present succinctly the methodology of the MIDD project and the main results obtained in the case of four countries : Brazil and Mexico on the Latin American side, and Indonesia and Taiwan on the Asian side. Section 3 then discusses what the implications of these results may be for the relationship between growth and distribution in general, and for cross-country analysis in particular. Section 4 summarizes and concludes.

1. Micro-simulation analysis of changes in household income distribution

Standard methods for analyzing changes in the distribution of income or consumption expenditures among individuals or households are based on the decomposition of changes in some specific aggregate poverty or inequality measure by population subgroups. The change in this measure of inequality or poverty is decomposed into what is due to changes in the relative income of various predetermined groups of individuals, changes in their population weights and, residually, changes in inequality within those groups. When groups are defined by some common attributes, such as location, age or schooling, this method permits identifying the contribution of changes in the distribution of these attributes and in the economic returns associated to them to changes in total poverty or inequality.[7]

[7] The decomposition of changes in the mean log deviation of earnings in UK by Mokherjee and Shorrocks (1982) is the best illustration of this method. The comparison over time of poverty profiles (Huppi and Ravallion (1996)) or of poverty probit analysis (Psacharopoulos et. al., 1993) belong to the same tradition.

There are two main limitations to this approach. First, the analysis relies on summary measures of inequality and poverty rather than the full distribution. Second, the decomposition of changes in inequality or poverty measures often leaves an unexplained residual of a nontrivial magnitude.[8]

Micro-simulation techniques permit avoiding the preceding problems. They are based on income regression analysis and the micro data behind it. The idea is simply to simulate what would be the distribution of individual earnings or household incomes in a given sample if one ore several coefficients of the regression were modified, or if the joint distribution of explanatory variables within the population were different. Juhn, Murphy and Pierce (1993) used this type of technique to study the determinants of the change in the whole distribution of individual earnings in the US during the 1970s and the 1980s.[9] Their decomposition methodology has been generalized to the distribution of income among households by Bourguignon, Fournier and Gurgand (2001). The extension consists of broadening the income model. A full household income generation model is estimated that comprises a system of equations rather than a single equation describing individual earning determinants. It includes earning functions for all working individuals, household self-employment income function and occupational choice models describing how household members at working age allocate their time between wage work, self-employment and non-market time.

A related approach decomposes changes in scalar poverty measures into a component due to growth in the mean and one due to redistribution (Datt and Ravallion, 1992)

[8] Another decomposition, inspired by Shorrocks (1982), is based on income or earning regressions run at various points in time. In these regressions, income or earnings are expressed as the sum of various characteristics - age, schooling, etc. - weighed by coefficients. Income inequality measures may thus be expressed as the sum of the inequality of these characteristics in the population weighed by the regression coefficients, conveniently interpreted as economic returns on these characteristics. Changes in total inequality may then be decomposed into changes in those returns and changes in the distribution of characteristics within the population. Such a method has been applied by Fields and Leary (1999) to the case of Taiwan. The same kind of problem arises with this approach as with the group-decomposition analysis, however. The residual remains non-trivial.

[9] Non-parametric methods that generalize this approach have been proposed by diNardo, Fortin and Lemieux (1996) and more recently by Donald, Green and Paarsch (2000).

Micro-simulation proved to be a powerful tool for identifying the main sources of changes in the distribution of incomes, or individual earnings, in a given country during a given period. In the MIDD project and several other studies based on the same methodology,[10] the observed change in distribution between two given years, say year 1 and 2, were decomposed into the following sources.

a) The '*price effect*' shows how the distribution would change if the coefficients of the earning equations in year 1, assimilated to the 'price' of, or return to individual attributes present in the equation, were replaced by the coefficients of the earnings equations of year 2, or vice-versa. By rescaling all earnings so that means are kept unchanged after this operation, this type of micro-simulation actually shows the effect on the whole distribution of individual earnings or household incomes of changing the 'structure' of earnings as defined by the usual socio-demographic characteristics of earners : gender, age, schooling, area of residence, etc… The simulation also covers self-employment income functions, which include additional income determinants (number of household members involved in household business, land and other assets available, etc…). The simulation can bear on all coefficients at the same time, or only on some aspects of the structure of earnings, like schooling, gender differentials or returns to land. Note also that the analysis is 'partial' in the sense that it is made for given occupational choices by all individuals in the household.

b) The '*occupational*' effect is obtained by applying to year 1 the coefficients of the models that describe the allocation of household members among alternative occupation types (wage employment, self-employment or inactivity)in year 2, and vice versa. The occupations being considered essentially are :– which may possibly include unemployment. In this experiment, all individual attributes remain constant. Likewise, earnings remain the same for individuals whose occupational status is not modified, but do change in the opposite case. In particular, individuals who are simulated to take a job are given earnings that correspond to their characteristics. The original earning – or self-

[10] See in particular Altimir, Beccaria and Gonzalez Rosada (1999), Gasparini, Marchionni and Sosa Escudero (2000), Grimm (2001), Bravo, Contreras and Rau (2001).

employment income - regression – is used to randomly simulate these earnings or income. This simulation is partial, too, but in a double sense. On the one hand, general equilibrium effects of changes in occupational choices on earnings are ignored. On the other hand, the occupation models are 'reduced form' models where earning rates or self-employment income determinants do not appear explicitly. It follows that coefficient changes observed between years 1 and 2 are taken to be associated with changes in occupational choice behavior, whereas they could partly reflect changes in the returns to wage or self-employed labor.

c) The '*population effect'* corresponds to the effect on the distribution of income of the change in the joint distribution of all individual and household socio-demographic attributes that are taken as given in the household income generation model. These include not only the explanatory variables in the earning, self-employment income and occupational choice equations, but also the effect of unobserved variables summarized by the usual residual terms of regressions. Altogether, these effects account for all the changes in the distribution not explained by the price and occupational choice effects and may be computed as a residual. Obtaining more detail requires some specific modeling. For instance, a natural way of modifying the distribution of schooling in the population consists of performing a rank preserving switch of distributions in years 1 and 2, conditionally on age, gender, and possibly area or geographical region. In this switch, the highest educated women aged 25-30 in year 1 are given the schooling level of the highest educated women aged 25-30 in year 2, with random matching in case of equal ranks, the same is done for the next schooling level, and so on. An analogous procedure may be used for family size, or for the matching of educational levels among household members.

For other socio-demographic characteristics, changing the distribution can be done by changing the sampling weights in year 1 conditionally on the characteristics under analysis, say age or region, so as to obtain year 2's distribution of the population with respect to these characteristics. The results of the micro-simulations performed in these ways must be taken with care, though. They indeed rely on the strong implicit assumption

that all unobserved determinants of household income – that is unobserved determinants of individual earnings, self-employment income and occupational choices – are independent of the socio-demographic characteristics being modified. In some cases, this assumption is quite restrictive. For instance, modifying the regional distribution of the population in the way just described is equivalent with assuming that migrations are neutral with respect to unobserved income determinants.

As in the preceding cases, this identification of population effects is essentially partial. To be sure, changes in the distribution of schooling or migration flows might very well have modified the equilibrium of the labor market and generated changes in the structure of earnings, which in turn could have triggered changes in occupational choices. The reason why these effects are ignored is that taking them into account would logically require making assumptions on the production side of the economy, rather than concentrating on the household sector. Incorporating the present household-focused framework into an economy wide model so as to account for these general equilibrium effects was beyond the scope of the MIDD project.[11]

All this decomposition methodology must be seen as purely descriptive. It essentially permits identifying the major direct source of changes in the distribution between two points of time, something that the mere inspection of the data and simple decomposition of some summary inequality measure might miss. Once these direct changes are correctly identified, it is then necessary to reflect on whether they are likely to be related to each other through some common economic phenomenon or whether they are independent. The case studies reviewed in the next section give examples of the usefulness of this way of analyzing distributional changes.

2. Comparative facts about development and distribution: four country stories

[11] For attempts in that direction, see Ganuza et al. (2001) and Bourguignon, Robilliard and Robinson (2002).

This section summarizes the results obtained with the preceding decomposition method in four case studies: Brazil (1976-1996, urban sector only), Indonesia (1980-1996), Mexico (1984-1994) and Taiwan, China (1979-1994).[12] The discussion is first limited to comparing the decomposition of distributional changes into the various effects defined earlier across countries. Then, the 'economic story' suggested by this decomposition exercise is briefly presented for each country.

Table 1 shows some general features of the evolution of the socio-demo-economic structure of the population in the four countries during the various periods of analysis. Several points are noticeable there. First, the growth performances of the four countries over periods extending from 10 to 20 years differ markedly, with very fast growth in the two Asian countries and very slow growth in Latin America. Second, the socio-demographic structure of the population changed substantially and in the same direction in the four countries. In all cases, one may observe a fall in the average family size and an increase in the urbanization rates, the mean level of schooling and women participation to the labor force. These changes proceeded at a different speed in the various countries but there are good reasons to expect that all them had some comparable direct impact on the distribution of income. Yet, it appears at the bottom of the table that the change in inequality of household income - as measured by the Gini coefficient - is quite different in the four countries. It more or less stagnated in Brazil, increased moderately in Indonesia and Taiwan and surged in Mexico. The problem is to know to what extent this disparity of distributional changes may be explained by differences in growth performances.

<Table 1 around here >

Table 2 reports the results of the decomposition methodology presented in the preceding section. Distributional changes are summarized by changes in the Gini coefficient between the initial and terminal years of the periods under analysis. Using a single

[12] References for these studies are respectively : Ferreira and Paes de Barros (2000), Alatas and Bourguignon (2000), Legovini, Bouillon and Lustig (2001), and Bourguignon, Fournier and Gurgand,

summary inequality measure is of course quite restrictive and a more general approach is indeed feasible. But it makes the discussion simpler. The decomposition is made into two steps. Bold entries in the table refer to the general effects identified above: price, occupational and population effects. In addition, the table also shows in bold the effects of changes in the distribution of unobservable determinants of earnings and self-employment income, as summarized by the usual residual terms in earning and self-employment income regressions. Normal entries refer to various sub-components of these aggregate effects. The price effect has been decomposed into what is imputable to changes in the returns to schooling and what is due to other dimensions of the structure of earnings - essentially gender and rural/urban gaps. Within the overall population effect, the table distinguishes two particular effects. These are the changes in the distribution of schooling and of family size within the population.

The first stage decomposition (bold entries) in table 2 suggests that, in all countries, there are numerous and powerful individual forces for change in the distributions, even though they sometimes tend to offset each other. The absolute value of the various effects identified by the decomposition methodology is indeed frequently larger than the absolute value of the actual total change. For instance, the Gini coefficient hardly changed in Brazil. Yet, it could have fallen by 2.6 percentage points because of the population effect. In the opposite direction, the reason why inequality increased so much in Mexico is precisely because the (negative) occupation effect was not strong enough to compensate for the other strongly unequalizing effects.

<Table 2 around here>

Although there is little uniformity across countries, it is interesting to note that the sum of the price and occupation effect is positive in the four countries. Except for some autonomous changes in occupational choice behavior, this sum may be interpreted as the result of economic forces which tend to modify conditions on the labor market. On the contrary, population effects essentially reflect the distributional consequences of changes

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2000). They can all be downloaded from www.iadb.org/sds/pov/publication.

in the socio-demographic structure of the population. With this interpretation in mind, it would thus seem that economic forces contributed to an increase in inequality in the four countries during the 1980s and the early 1990s, an evolution partly compensated by socio-demographic factors in Brazil and Indonesia, and reinforced by them in the case of Mexico. This is an interesting hypothesis that would be worth checking in other countries. However, the partial nature of the decomposition methodology being used must be kept in mind. Separating out economic forces from socio-demographic influences on the distribution logically requires a more complete analytical framework allowing in particular for general equilibrium effects.

Except for the preceding regularity there is no row with uniformly positive or negative, or uniformly large or small (in absolute value) bold entries in table 2. In other words, there is very much country specificity in the way the income distribution behaves over time and in the forces responsible for its evolution. For instance, the population effect would seem to be pretty big in absolute value, when considering Brazil, Indonesia and Mexico. But it is small, almost negligible overall, in Taiwan, despite the fact that changes in the socio-demographic structure of the population appears in table 1 as strong as in other countries. Likewise, the price effect is moderate in Brazil, a little bigger and negative in Indonesia, and very strongly positive in Mexico and Taiwan.

A third feature of table 2 is the potentially important role of unobservables. The change in the variance of the residuals of the regressions on earnings and self-employment income are responsible for a 2 percentage point fall in inequality in Taiwan and a 2 point increase in Indonesia. In comparison, this effect is negligible in Brazil and Mexico. By definition, there is some ambiguity about the interpretation to be given to this term. It may correspond to a change in the distribution of unobserved income determinants in the population, or to a change in their remuneration.[13] But it may be given other interpretations too. For instance, it may correspond to transitory income components or even measurement errors. This latter case is particularly interesting because it gives more

weight to the other components of the decomposition. If indeed, the change in the residuals' variance corresponds to changes in the size of measurement errors or transitory income components then it should simply be ignored. With this interpretation in mind, the actual change in permanent income inequality would be a 3.9 points increase in Taiwan and a .4 drop in Indonesia.

More detailed effects appearing in table 2 shed light on the nature of the phenomena behind the aggregate effects just analyzed. Taken together, they also suggest specific stories to explain the evolution of the distribution of income in the four countries. Rather than considering them in turn, it seems more efficient to jump directly to these stories.[14]

- *Brazil*

Neither mean income – or GDP per capita – nor inequality changed much in Brazil between 1976 and 1996. But the moderate increase in the Gini coefficient actually corresponds to a sizable absolute and relative fall in the income of poor people (practically the bottom 15 per cent). According to table 2, this increase in poverty is to be explained mostly by changes in labor-force participation or in employment depending on the way the 'occupational effect' is interpreted. In effect, a more detailed analysis reveals that the main phenomenon behind these changes essentially is less employment, or more unemployment, and more informality among the poorest households.

It is difficult not to relate such an evolution to the sluggish growth performance of Brazil during the two decades under analysis. Within a dual economy framework, which seems to fit well the Brazilian economy, the general story would thus be as follows. Slow growth was responsible for a weak labor market, which may have caused an increasing differential between wage workers and self-employed, as well as job losses or worker discouragement. Both phenomena, but mostly the latter, contributed to an increase in

[13] In the case of individual earnings in the US, Juhn, Murphy and Pierce (1993) interpret the observed increase in the variance of the residuals as the sign that unobserved 'talents' are paid a higher price. But they provide no real justification in support of that interpretation.

poverty in the bottom 15 per cent of the population. The reason why this poverty increase was not as strong as suggested by this argument is that it was compensated by falling family sizes which were more pronounced at the bottom of the distribution.

Above the 15th percentile, urban Brazilians essentially 'stayed put'. But this also was the result of some hard climbing along a slippery slope. They had to gain an average of two extra years of schooling - which still leaves them undereducated for the country's per capita income level - and substantially reduce fertility, in order to counteract falling absolute and relative returns in both the formal labor market and in self-employment.

- *Indonesia*

With an annual rate of income per capita above 5 per cent, growth in Indonesia during the period under analysis (1980-1996) was impressive. Yet, overall inequality did not change much. In effect, the moderate increase in the Gini coefficient is the result of various phenomena that pushed the distribution of income in various directions and may have produced switches in the relative position of specific groups of households without affecting too much the overall distribution.

Several noticeable phenomena are behind the overall price effect that are not well described by the decomposition appearing in table 2. Of special importance are the equalization of earnings and self-employment income across Indonesian islands - in particular the falling gap against Java - the improvement in the terms of trade of farmers and the increase in the returns to land for small holdings. Taken together, these phenomena, which may be traced back to both the rate of growth and the structural changes it caused, contributed to a small equalizing of the overall distribution. Yet, this limited variation in the overall distribution may have hidden more important changes in the relative ranking of various household groups.

[14] For a systematic cross-country analysis of each effect appearing in table 2, see Bourguignon, Ferreira and Lustig (2002).

Another important phenomenon was the vigorous rural-urban migration movement that resulted from the boom in non-agricultural activities throughout the period. This may only be inferred from the data because the migration status of people is imperfectly observed in the data. But this phenomenon is behind both the strongly unequalizing effect of occupational choices in table 2 and the equally strongly equalizing population effect. Both are linked to each other and reflect the selectivity of migration, which primarily affected rural wage workers, or more generally people in rural areas with little other employment opportunities than wage work. With constant occupational choice behavior, the population effect should have contributed to a substantial increase in the proportion of urban wage workers and a fall in the proportion of rural wage workers in the whole population. Both effects would have been strongly equalizing, as shown by the bold entry at the bottom of table 2. However, cities were not able to absorb the whole inflow of migrants, which contributed to increasing the proportion of self-employed. This latter evolution is captured by the strongly unequalizing 'occupational effect' in table 2. Actually, it may not be that occupational choice behavior was modified, as implicitly assumed in the definition of the occupational effect. It may simply be that workers who demanded a wage job were simply rationed. It is unfortunately not possible to distinguish these interpretations when considering the change in the coefficients of the model that describes the allocation of people among occupations. These changes simply summarize all economic mechanisms that tended to compensate the direct effects of population movements.

Even though it was a dominant factor, not all the occupational and population effects can be explained by migration. Table 2 shows in particular that the increase in the mean level of schooling and the change in its distribution contributed to an increase in inequality. As will be seen in the case of Mexico, such an evolution is not contradictory in presence of increasing marginal returns to schooling. In any case, given the logic of the decomposition method, this means that other changes in the socio-demographic structure of the population must have compensated that increase.

In net terms, it turns out that the factor responsible for the slight overall increase in inequality during the period under analysis is the increase in the variance of 'unobservables', that is the residuals of the earning equations and self-employment functions. As mentioned earlier, this terms may actually correspond to measurement errors or possibly a larger volatility of incomes. Under these conditions, it cannot be discarded that Indonesian remarkable growth between 1980 and 1996 took place without any noticeable change in the distribution of household income, but with some reshuffling of relative positions. However, it cannot be discarded either that the observed increase in inequality reflects a higher remuneration of unobserved talents, itself a possible consequence of growth.

- *Mexico*

Dominant factors in explaining the surge in income inequality between 1984 and 1994 have to do with changes in the structure of earnings by educational levels and by area of residence. The conventional average rate of return to the number of years of schooling did not change much during the period under analysis, but the whole return schedule became more convex. In other words, marginal returns increased for the highest educational levels and decreased for low levels. There are several competing explanations for this evolution. They have to do with skill-biased technological progress or the transition towards a more open economy. In any case, such an evolution contributed to a substantial increase in the inequality of both individual earnings and household incomes. It was complemented by a change in agricultural terms of trade which contributed to widening the income gap between the urban and the rural sector. Altogether these changes in the structure of earnings and self-employment income were responsible for an increase of the Gini coefficient equal to 3.6 percentage points in the case of individual earnings and 2.2 for household income.

Part of the increased disparity in labor incomes among households was offset by a change in the participation behavior of women, which itself may be related to the observed change in the structure of earnings. In this respect, two phenomena were revealed by the

decomposition methodology. On the one hand, lower earnings of household heads at the bottom of the distribution may have caused a compensating increase in women participation. On the other hand, higher earnings at higher educational levels may have contributed to increasing the participation of women in the corresponding income range. The former effect proved to be stronger than the latter. If the preceding analysis relating the two phenomena is right, behavioral responses to unequalizing changes in the structure of earnings may thus have partly mitigated the effect of the latter upon inequality.

Education played an unequalizing role too. Somewhat paradoxically, the general increase in the level of schooling observed in the working age population may have contributed to more, rather than less inequality. The explanation for this result is to be found in the convexity of the returns to schooling. Larger marginal returns at the top than at the bottom of the schooling range implies that a uniform increase in schooling would benefit more the rich than the poor households. This effect might have had a contribution as high a one percentage point increase in the Gini coefficient.

The last explanatory factor responsible for the increase in inequality is linked with non-labor incomes which became much more unequal in 1994 and at the same time more strongly correlated with household labor income.[15] If this income component could be thought to give an accurate representation of capital income, it would be tempting to conclude that higher and more unequal capital incomes contributed to the worsening of the distribution of household income during the period under analysis. Unfortunately, it is well known that capital income is generally grossly under-estimated in household surveys, and it is quite possible that the evolution observed between 1984 and 1994 simply corresponds to a change in the coverage of that particular income source by the survey. For the time being, the status of that component in the decomposition analysis for Mexico is comparable to that of the variance of residuals in other countries. It might well be purely spurious, in which case the observed increase in Mexican inequality might be overestimated.

[15] This effect is included in the population effects since it is concerned with the change in the joint distribution of variables that are exogenous with respect to the household income model.

- *Taiwan*

As in Mexico, the leading factor in explaining the evolution of the distribution of income in Taiwan between 1980 and 1994 is the increase in the rate of return to schooling among both wage earners and self-employed. This increase amounted to 2 percentage points for men and almost 4 for women and may have been responsible for a rise in the Gini coefficient of the distribution of household income equal to 2 percentage points – and obviously more for the distribution of individual earnings. One possible explanation for that increase in the price of educated labor may be the high rate of growth of Taiwan's GDP per capita throughout the period (6 per cent). However, it may be inferred from table 1 that the supply of educated labor has also grown extremely quickly during the period under analysis. Under the assumption of no change in the skill structure of labor demand, it can be estimated that both supply and demand of skilled workers would have increased by 60 to 70 per cent. Within a competitive framework, the increase in the rate of return to schooling and in inequality in Taiwan is thus to be sought in the evolution of the structure of the economy and a possible increasing bias towards skilled workers in labor demand. In this respect, it makes little doubt that Taiwanese growth was heavily biased towards skill intensive sectors – i.e. away from light manufacturing to heavier manufacturing, services to firms, and financial services. But skill-biased technological change may have had some importance too.

The increase in women participation was less pronounced than in other countries, but participation behavior became more concentrated on wage work, and schooling became a stronger determinant of participation – perhaps as a reflection of higher returns to educated labor. Also women work became more autonomous with respect to household heads' income. All this may explain why women wage work became more frequent in well to do households, which contributed to an increase in inequality.[16]

Altogether, it would thus seem that the exceptional growth performances of Taiwan would have contributed to increasing quite substantially the inequality of the distribution of household income, if it had not been for a drop in the variance of the residuals of earning equations. It is also to be noted that the substantial changes in the socio-demographic structure of the population did not do very much to counteract that evolution. Mildly equalizing effects of the general increase in schooling and the drop in fertility were offset by other changes in the distribution of socio-economic characteristics which remain unidentified.

3. Cross-country relationship between growth and distribution in the light of the four country stories

The four preceding stories are based on a thorough micro-economic analysis of the evolution of the distribution of income. The question addressed in this section is whether they are consistent with the cross-country framework used to study the relationship between growth and inequality at the aggregate level. In other words, is it possible to establish a direct link between decomposition analyses of the type shown above, and the country stories they suggest, on the one hand, and the cross-country regressions found in the literature on the other? If so, then what does explain that the results obtained in cross country regressions with distribution on the left hand side are so disappointing? In the opposite case, is there a way to improve the initial specification? Or is there any inherent weakness in the cross-country aggregate approach?

To a large extent, the country stories in the previous section essentially are about the consequences of the pace of economic growth for the distribution of income. The literature on the aggregate growth-inequality relationship that is of relevance here bears directly or indirectly on the so-called Kuznets curve hypothesis. According to that hypothesis, inequality and the mean income of a population would be related to each other through an inverted U curve, after controlling for several other variables. Growth

[16] Paradoxically, the same phenomenon contributed to a drop in individual earnings inequality because women entering wage work were situated in a (upper) middle position among men and women wage

would thus contribute to increasing inequality at low levels of development and reducing it later. There may have been such a statistical relationship in the cross-country data available in the 1970s, which raised very much interest at that time. Yet, more recent attempts at explaining variations of inequality across countries while using better data and controlling for fixed country effects have identified only a limited set of statistically significant variables and most often failed identifying the inverted U-curve. Land inequality, mean schooling, schooling inequality, and economic dualism are among the very few variables the significance of which proved to be robust. In most cases, however, significance is achieved by mixing regressions in levels across countries and time variations within countries. Few significant results are preserved when the analysis is restricted to the latter, even though time variations would seem to be the appropriate specification to use for the study the distributional effects of growth. [17]

Recent attempts at explaining income distribution, or variations in it, by the same variables as those used in cross-country growth regressions have been disappointing too – see in particular Lundberg and Squire (2001) and Dollar and Kraay (2001). The latter go as far as concluding that 'growth is good for the poor' because the mean income level, its growth rate or its major known policy determinants are without significant effect on the distribution. Table 3 illustrates that conclusion. The (log) income share of the bottom 20 per cent of the population is regressed on the mean income of the population, proxied by GDP per capita,[18] and several other variables which have proven to be significant in explaining cross-country differences in growth rates: trade openness, monetary and fiscal policy, financial development, and the rule of law. That none of these variables turns out being significant would seem to suggest that the income share of the bottom 20 per cent is insensitive to growth and known growth determinants. Under these conditions, the income of the 20 per cent poorest people would generally tend to grow as fast as that of other income groups. Growth would thus be favorable to the poor since it affects their

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earners.

[17] On all this see the survey by Kanbur (2000). See also Deininger and Squire (1998), and Li, Squire and Zou (1998).

[18] Actually, Dollar and Kraay use the (log) mean income of the 20 per cent poorest on the left-hand side. They then test whether the coefficient of GDP per capita is different from unity. In table 3, (log) GDP per

income in the same proportion as that of other groups, whatever the nature of the policy variables behind it and its sectoral structure .

This general conclusion of distribution-neutral growth seems in direct contradiction with the preceding country stories where growth seemed to play a prominent role in explaining the evolution of the distribution of income. It may thus be the case that cross-country regression analyses are subject to biases that hide the actual role of growth in distributional changes. There may be several sources for these biases, but omitted variables and inappropriate specification probably are the most serious ones. Two arguments may be invoked in support of this statement. On the one hand, the evolution of the distribution in the four countries was hardly seen as independent from growth, but, at the same time, growth was certainly not the only factor of importance. The problems is whether these other factors are properly accounted for in cross-country regressions. On the other hand, it was also seen that growth could have contradictory distributional effects. This may be consistent with the absence of significant effect of growth in a cross-country regression if no control is provided for the interaction of growth with the appropriate temporary or permanent country characteristic. The next few paragraphs illustrate these points.

That slow growth, or almost stagnation in Brazil is responsible for more inequality because the economy did not provide enough employment opportunities at the bottom of the distribution makes little doubt. At the same time, stagnation may have been responsible for more equality because it possibly contributed to a drop in the rate of return to schooling. At the other end of the spectrum, fast growth was also seen to be responsible for more inequality in Taiwan because it may have put pressure on the market for skilled labor. By pushing up the rate of return to schooling and creating employment opportunities with a bias in favor of educated women, fast growth led to a more unequal distribution. Likewise, in Indonesia, growth is undoubtedly responsible for changes in inter-regional earning differentials, an improvement in the terms of trade of farmers, and

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capita has been subtracted from both sides of the regressions and the relevant test of the influence of growth on distribution is whether the coefficient of GDP per capita is different from zero.

rural-urban migrations, with neutral effects on the distribution but substantial reshuffling of relative income positions. In practically all countries, growth was thus found to be responsible for significant changes in the distribution but with very different overall effects. Slow growth was potentially unequalizing in Brazil whereas fast growth was unequalizing too in Taiwan, and neutral in Indonesia.

According to this observation, the effect of growth on the distribution depends on some specific conditions in the economy under analysis. Simple explanation for such a state of affairs come readily to mind. For instance, it seems natural that the evolution of the supply of skilled labor matters for the effect of growth on the structure of earnings. If supply, as determined by both the average level of schooling of the population at working age and occupational choices of the more educated, lags behind growth, then the rate of return to skill is bound to increase, resulting in more inequality. This may have been the case in Taiwan, the opposite being true in Brazil. In both instances, it was not so much growth that mattered for earnings and household income inequality as the gap between the demand and supply of skilled labor. In addition, demand is affected not only by the rate of growth of the whole economy but also by its structure, which may itself result from policy choices. For instance, the reason why demand for skilled labor grew so much in Taiwan may have to do with the openness of the economy and the strong changes it caused in the structure of production toward sectors more intensive in both physical and human capital. The same may be true in Mexico if the increase in the rate of return to schooling is indeed to be related to the opening up that took place since the mid-1980s in that country.

One would probably be embarrassed if being asked to translate the growth-related part of the stories told above into a simple linear regression with the change in inequality on the left hand side. Among right-hand side variables and in addition to the growth rate of GDP, the preceding argument and the country stories suggest that it would be difficult not to have at least some indicator of exogenous changes in labor-force participation, differentiated by skill level and policy variables like openness or change in openness. Without all these variables and cross-products of them with growth, it would not be

possible to describe the contrasted experiences of countries like Brazil, Taiwan or Mexico during the 1980s and the 1990s. For practical reasons, however, not all the preceding variables are present in cross-country regressions of the type found in the empirical growth literature and simpler specifications are made necessary by data limitations. Also, they are based on growth spells which are much shorter than the ones considered in the country studies above and are therefore more likely to be contaminated by short-run phenomena.

Of course, it may be held that some of the phenomena found to be important in explaining distributional changes in the country stories are not really exogenous. For instance, the supply of skilled labor may depend on the earning differentials, which are themselves the consequence of the rate of growth and its structure. Under these conditions, it would be more satisfactory to work with reduced form models where only the exogenous determinants of growth and the supply of skilled labor would be present. This is very much the approach taken by Dollar and Kraay (2001). The problem is that a rather complex specification should be used in order for these variables to describe implicitly the phenomena identified in the country stories.

Another important lesson to be drawn from the country stories above is the importance of several socio-demographic variables largely ignored in aggregate cross-country analysis. Two such variables appearing in table 2 are the distribution of schooling within the population at working age – different from mean schooling, which may be supposed to influence distribution only indirectly through its aggregate effect on the rate of return to schooling - and fertility, or more exactly the distribution of family size within the population. Omitting these variables, as generally done in cross-country regressions raises two problems. First, they may be correlated with other variables in the regression, growth for instance, in which case estimators will be biased. Second, even in the absence of such a correlation, omission of relevant variables tends to increase the variance of residuals and prevents making tests on the significance of the variables actually taken into account. Because of important missing variables, one might thus incorrectly conclude that growth has no significant impact on distribution.

Taking the effects of these long-run socio-demographic trends properly into account is not an easy thing. The example of education is quite illustrative of that difficulty. As can be seen in table 1, schooling made important progresses in the population at working age in practically all the four countries, although less rapidly in Brazil and Mexico. Yet, it may be seen in table 2 that the effect of schooling expansion on the distribution of income is very different from a country to the next. For instance, schooling expansion increased inequality in Mexico, for the reasons seen above, and also in Indonesia but reduced it in Taiwan and Brazil. The reason for this difference is mostly that earning profiles with respect to education are less convex in Taiwan and Brazil than in Mexico and the expansion of education in the former countries may have been stronger, in absolute value, at the bottom than at the top of the schooling range. Under these conditions, the sign of the effect of a variable like schooling expansion on inequality is likely to be highly country specific. Not controlling for that specificity in a cross-country regression would likely lead to the conclusion that schooling expansion has little impact or no impact on the evolution of the distribution, and therefore that educational policies have no significant influence on distribution in the long-run. The four country stories suggest this would indeed be wrong.

In sum, in-depth micro-economic analysis of distributional changes in the four countries considered in this paper reveals important, and possibly inherent weaknesses in the macro-econometric cross-country analysis of the effect of growth and policy on distribution. On the one hand, it is not clear that the standard linear specification being used in those regressions is adequate in view of the mechanisms revealed by micro-economic analysis. The relationship between growth, development policy and distribution appears to be much more complex than a standard regression model would allow for. On the other hand, some variables are omitted despite the importance they seem to have in micro analysis. This may introduce biases in the coefficients of actual regressors and/or in the tests made on these coefficients.

All this invites to considerable care in interpreting the results of cross-country aggregate analysis. In particular, the conclusion obtained so far with this approach that there is no significant effect of growth or growth policy on distribution may be misleading. In effect, this conclusion may be strongly dependent on the specification and the variables being used. The problem is that alternative specifications allowing for the proper interactions that would permit representing satisfactorily the country specificity of the effect of growth on inequality might be difficult to implement. In particular, the required variables may simply not be available in a sample of countries large enough to reach the necessary degrees of freedom for efficient testing. Where would one find cross-country data on the convexity of the schooling/earning profile, for instance?

Conclusion

Very much emphasis has been put in the growth-inequality literature on the results of cross-country regressions run on a few aggregate variables available in a relatively large number of countries. In theory, such an approach is very commendable. If some theoretical model were available and could be tested at the country level, the same could certainly be done on a cross-sectional basis. It might even be quite efficient to do so because more data points are then available, especially when working with cross-sections of time series, and also because of the diversity of national experiences. At the same time, however, country specificity may require more detailed data than the aggregate variables generally available in cross-country data bases. Also regression specification may have to account for very diverse country conditions. The major problem in taking these requirements into account is that actual degrees of freedom are likely to be insufficient to do serious estimation and serious testing. This is especially problematic when focusing on the long-run consequences of growth because one cannot then rely on multiple growth spells and on fixed effects controlling for all unobservables.

Summarizing the results obtained in several recent country studies, the present paper has shown that very much insight about the distributional consequences of growth could be obtained from the comparative analysis of micro household data at the two ends of a

growth spell. Beyond observing changes in the distribution, a simple decomposition methodology based on micro-simulation facilitates the identification of the sources of changes in the distribution of income. With some stretch of imagination, it permits putting together economic stories that could explain these changes or the way in which various forces for change may in some cases have offset each other. The stories summarized in this paper permitted identifying various ways through which growth and policy significantly affected the evolution of the distribution in single countries. This is in contrast with the conclusion obtained in the recent literature based on cross-country work, which suggests that growth and distribution policies are distribution neutral, when taken on average across growth spells. The reason for that apparent discrepancy seems to lie mostly in a high country specificity of the relationship between growth and distribution, which can hardly be properly taken into account in cross-country aggregate analysis.

It is true that the decompositions methodology used to guess country stories in this paper is essentially partial, whereas theoretical models behind reduced form cross-country analysis integrates general equilibrium effects in some implicit way. Progresses have thus to be made in the decomposition methodology to relate the various effects that it permits identifying in a rigorous way and to get better articulated stories consistent with the available theoretical models of growth and distribution. Some work is presently being developed where the decomposition methodology is explicitly linked to some macro model of the economy.[19]

In any case, the main message of this paper is that the micro analysis of distributional changes is a direction that should now be given some priority. An obvious distinctive feature of the 21st century will be the increasing availability of detailed micro data on individuals and households, as well as rapidly growing treatment capacity. It would thus seem natural to extend the type of methodology summarized in this paper. This may be made in several directions: a) multiplying country studies based on statistical decomposition techniques that may reveal the sources of change in the distribution; b)

[19] See for instance Ganuza et al. (2000), Bourguignon, Robilliard and Robinson (2002).

improving these techniques by linking them with counterfactual modeling either though calibrated models Applied General Equilibrium or macro-econometric models; c) expanding the modeling of micro-economic behavior, in particular by getting into dynamics and making the models more structural. Following these various research directions should be useful from a double perspective. On the one hand, they will enrich micro-based stories and will permit accumulating stylized facts on the effects of growth and policy on distribution, something that is crucially missing for the moment. On the other hand, this line of research will progressively make available the detailed data necessary for more efficient aggregate analysis across countries and more rigorous hypothesis testing.

<Reste la biblio>

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Table 1. Selected indicators of long-run structural evolution

Country	Brazil	Indonesia	Mexico	Taiwan
Period being analyzed	1976-1996	1980- 1996	1984-1994	1979-1994
GDP pc in 1980 (ppp US $)	4499	1430	5758	3786
Annual growth rate of GDP pc (1980-1996, %)	1	5.7	2.4	6
Growth rate of mean household per capita income[b] (%)	0.2	5.1	1.1	5.7
Average years of schooling : initial year	3.2	3.8	5.6	6
: terminal year	5.3	6	6.9	9.5
Urbanization rate (%) : initial year	68	23		70
: terminal year	77	35		84
Women participation (%) : initial year	28		33	46
: terminal year	42		41	50
Family size : initial year	4.6	5	5.3	4.9
: terminal year	3.6	4.4	4.9	4.2
Gini coefficient (household income per capita, size weighted households) : initial year	0.595[a]	0.384	0.491	0.271
nal year	0.591[a]	0.402	0.549	0.29

[a] Urban sector only

[b] As given by household surveys in initial and terminal years

Table 2. Decomposition of the evolution of the inequality of household income per capita

(Absolute change in Gini coefficient, percentage points)

	Brazil (urban)	**Indonesia**	**Mexico**	**Taiwan**
	1976-1996	1980- 1996	1984-1994	1979-1994
Observed change	**-0.4**	**1.6**	**5.8**	**1.9**
Overall Price Effect	**0.3**	**-0.9**	**1.9**	**2.4**
- Education	-0.2	0.1	1.1	(2.1) [b]
-Wage gaps[a]	0.6	0.3	1.1	
Overall Occupation Effect	**1.5**	**4.7**	**-0.5**	**1.3**
Distribution of residuals in earning and self-employment income functions	-	**2**	**0.1**	**-2**
Overall Population Effect	**-2.6**	**-4.3**	**4.6**	**0.2**
- Education Effect	-0.3	1.3	1	-0.2
-Number of children	-2			-0.8

Source : MIDD project, various studies

[a] Between gender, urban/rural, wage/self-employed …, depending on the country
[b] Indirectly inferred from various pieces of information in the Taiwan study, as this figure is not directly available there.

Table 3. Example of regression on the distributional effects of growth[20]

Dependent variable : Log of the ratio of the income of the poorest 20 per cent to mean income of the population)

Independent variables	Coefficients	*(standard error)*
	0.140	*(.100)*
(Exports+Imports)/GDP	0.023	*(.056)*
Log (1+ inflation)	-.163	*(.107)*
Government consumption/GDP	-.746	*(.386*
Commercial Bank Assets/Total Bank Assets	-.209	*(.172)*
Rule of law	-. 032	*(.060)*

Number of observations = 210 (3 observations per country on average)

Type of estimation = system GMM

[20] From Dollar and Kraay (2001), table 5.