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Inequality and development: the role of dualism

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Abstract

This paper suggests major factors in country differences in income distribution largely overlooked in the literature on inequality and development. They concern the extent of economic dualism, as proxied macroeconomically by the relative labour productivity of non-agricultural sectors vs. agriculture and related variables. The result is robust with respect to both the composition of the sample, the observation period and inclusion of country fixed effects, in marked contrast to what happens when the analysis is limited to more traditional variables, like GDP per capita or average level of schooling.

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1. Introduction

A lot has been written over the past two decades about the link between inequality and development. A consensus seems to have been reached [2] that there

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[2] See Paukert (1973), Ahluwalia (1976), Saith (1983), Lecaillon et al. (1984), Ram (1988), Anand and Kanbur (1993a,b).

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is probably no iron law governing this relationship as once supposed following Kuznets, but that some macroeconomic variables related to development could be significant, along with others, in explaining country differences in income distribution. This is not really challenged by recent empirical studies which point to a significant cross-sectional positive relationship between income equality and growth, rather than development levels [see in particular Alesina and Rodrik (1994), Persson and Tabellini (1994), Clarke (1995) and others].

This paper belongs to the old strand of literature on the empirical approach to the relationship between inequality, as observed in microeconomic data, and development-related macroeconomic variables. It suggests major determinants of country differences in income distribution which we think have been largely ignored and concern the dualistic nature of developing countries and the nature of the agricultural sector. We show that the comparative advantage a country may have in agricultural production as measured by its relative endowment in arable land, the distribution of land, and, above all, the extent of macroeconomic dualism measured by the relative productivity of labour in agriculture and the rest of the economy were, with more traditional variables, very powerful explanatory factors of differences in income inequality in about 40 developing countries around 1970. Recent data suggests these variables still explain a significant part of international differences in income inequality in the late 1980s. From this point of view, they contrast with more usual cross-sectional explanatory variables like GDP per capita or education, the role of which seems to have become less important over time.

Such a finding would be tautological if the relative labour productivity ratio between agriculture and the rest of the economy were simply a good proxy for the rural–urban income differences. It would be like saying the overall level of inequality in a country depends largely on the difference in the mean income of rural and urban households. As the data sources for rural–urban income differential and income distribution are probably the same in most developing countries, we would simply be dividing up total inequality into inequality *within* urban and rural sectors, and inequality *between* them. The interesting point in the present paper is precisely that, for theoretical and empirical reasons, relative labour productivity between agriculture and the rest of the economy is far from being perfectly correlated with rural–urban income differential, yet the link with observed differences in income inequality is quite strong.

There are several reasons for the existence of a wedge between relative labour productivity and observed rural–urban income differential. On one hand, much of the total product generated outside agriculture—and more scarcely in agriculture —is not distributed to households and so is not part of income inequality. This is especially true of retained earnings, profit taxes and repatriated profits. On the other hand, a lot of non-labour incomes are under-reported in the surveys used to estimate income inequality. So a significant relationship between the extent of income inequality and the relative productivity of labor in agriculture appears as an interesting and new result.

That relative labour productivity and income differentials are observationally distinct variables prevents to interpret the statistical relationship in this paper with the familiar Kuznets inter-sectoral explanation of changes in income inequality, as formalised later by Robinson (1976), Knight (1976) and Fields (1979). [3] In their framework, the rural–urban income differential is constant but the share of the population in the agricultural sector changes with development, producing the familiar inverted U-shape for evolution of income inequality over time. The distinction made in this paper between relative household incomes and relative labour productivity obliges us to go further and, like Rauch (1993), to explain how the labour market works and how the population spreads across sectors as development proceeds. The proportion of the population in agriculture and rural–urban income differential are then endogenous variables which cannot be used directly to explain international differences in income distribution. This is what motivates the short theoretical section at the beginning of the present paper, which generalizes our previous work in this field.

The organization of the paper is as follows. Section 2 presents a simple theoretical framework defining how the role of agriculture and dualism in shaping income distribution may be taken into account in cross-sectional regressions through observed macroeconomic relative labour productivity ratios and other variables. Section 3 gives results based on a sample of 38 medium-sized developing countries with data from the late 1960s and early 1970s. Both sections rely on our previous work in this area (Bourguignon and Morrisson, 1990) but considerably extend its scope and results. Section 4 repeats the exercise with a sample of 33 developing countries around 1985. Results from pooling the two sets of data, tests of coefficient stability, and fixed effect estimation are also discussed. The conclusion emphasises some policy implications of this paper.

2. Reference framework

Differences in income distribution among developing countries in a Kuznets-type framework appear primarily as a function of the rural–urban income differential and the share of the population in one or the other sector, which is itself proxied by GDP per capita. In what follows we will adopt a more general framework where the endogeneity of these two variables is taken into account.

In a general equilibrium framework and assuming all incomes are distributed, differences in distribution between two countries would be mainly due to differences in factor endowments, which possibly determine relative factor rewards—except in pure free trade situations—and in the distribution of factor ownership in the population. In such a framework, the rural–urban income differential would simply correspond to differences in the skill composition of the labor force in the

[3] Rauch (1993) refers to this as the 'RKF' model.

two sectors or to different combinations of labor with other factors of production in the determination of the total income of households. However, like the sectoral allocation of labor, it would be fully determined by the general equilibrium of the economy and the variables mentioned above. In order for the rural–urban income differential or the sectoral allocation of labor to acquire some additional power in explaining the distribution of income, the assumption of perfect competition on the labor-market must be relaxed like in the well-known dual economy model. However, doing so would not prevent these variables to stay endogenous. In this extended framework, exogenous explanatory variables of differences in distribution across countries should thus include factor endowments and factor distributions as above, and an indicator of the imperfection of the labor-market responsible for the dualism of the economy.

To formalize the preceding argument, consider a small open economy with n individuals, m factors and p sectors of production. [4] Let a_{ij} be the share of factor j owned by individual i, E_j the total endowment in factor j, and $F_k(L_{k1}, L_{k2}, \ldots, L_{km})$ the production function in sector k, where L_{kj} is the quantity of factor j used in that sector. Finally, let w_j be the remuneration rate of factor j and p_k the exogenous price of output k. With perfect competition in factor and product markets, income distribution $Y = (y_1, y_2, \ldots, y_n)$ among individuals is defined by the following equations:

$$y_i = \sum_{j=1}^{m} a_{ij} \cdot E_j \cdot w_j, \qquad i = 1,2,\ldots,n \tag{1}$$

$$F_{kj}(L_{k1}, L_{k2}, \ldots, L_{km}) = \frac{w_j}{p_k}, \qquad k = 1,2,\ldots,p;\ j = 1,2,\ldots,m \tag{2}$$

$$\sum_{k=1}^{p} L_{kj} = E_j,\ \sum_{i=1}^{n} a_{ij} = 1,\ j = 1, 2, \ldots, m \tag{3}$$

where $F_{kj}(\cdot)$ is the marginal product of factor j in sector k. Eq. (2) defines the demand functions for the various factors of production, whereas the first part of Eq. (3) describes the equilibrium of the factor markets at full employment. Solving this system for the factor remuneration rates, w_j permits to define the income distribution Y as a function of the exogenous factor endowments, E_j, the exogenous price system, p_k, and the matrix of factor ownership, $\mathbf{A} = (a_{ij})$. This may be summarized as:

$$Y = h(E; p; \mathbf{A}) \tag{4}$$

If there are constant returns to scale, only relative, not absolute factor endowments matter in Eq. (4) and all E_j may be expressed on a per capita basis. This

[4] The argument which follows is also true when non-tradeable goods are included in the model, provided the components of p refer only to tradeable goods. The mapping $h()$ in Eq. (4) then depends not only on technology but on preferences for non-tradeable goods.

was the theoretical argument and estimation framework in Bourguignon and Morrisson (1990). Under the assumption that all countries face the same prices, income distribution indicators were explained as functions of 'relative endowment' variables like capital per worker measured by GDP per capita, or the amount of human capital per worker proxied by the enrolment rate in secondary school lagged 10 to 15 years, a dummy variable standing for the presence of mineral resources, and 'factor distribution variables' like concentration of land ownership.

Two important variables are logically missing from this list: the distribution of capital ownership and the relative endowment in arable land. The former is mostly unobservable, except in a few (developed) countries. This may not be too much of a problem, however, because, as indicated, income distribution data in developing countries greatly underestimates income from capital. [5] The latter was overlooked in our previous work. It is introduced here and is intended to reflect the effect on distribution of the rent of land and the (endogenous) allocation of other productive factors between agriculture and the rest of the economy.

We now introduce in the analysis a factor market imperfection which can have a powerful effect on income distribution and modifies the preceding framework. This is the dualistic nature of the labour market, first stressed by Lewis (1954), after which it became a cornerstone of development theory. [6] According to this model, the real wage in the modern sector of the economy is fixed exogenously at a level higher than the opportunity cost in the rest of the economy. So employment in the modern sector is determined by the fixed factors of production in that sector and the exogenous real wage, whereas workers not in the modern sector are paid at the marginal, or possibly average revenue product in the rest of the economy.

The formal generalisation of Eq. (4) where there are market imperfections like the above is rather complicated. We may simply say the overall income distribution will now be linked to the same arguments as in Eq. (4) but also to: (a) exogenous real remuneration of factors exchanged in imperfectly competitive markets; and (b) accessibility to this exogenously-fixed remuneration for the owners of these factors—i.e., the rationing scheme.

Applying this argument to the textbook dual developing economy means distinguishing traditional agriculture, and the informal sector generally, from the rest of the economy and emphasizing the real wage in the modern sector as a major determinant of income distribution. So in this simplified economy, income distribution is linked to the variables listed above—including the relative endowment in arable land—as well as the real wage in the modern sector. When

[5] Moreover, there is probably little variation in the concentration of the ownership of physical capital anyhow since most of it is likely to belong to the top twentieth of the income distribution.

[6] A full theoretical analysis of income inequality generated by this market imperfection is in Bourguignon (1990).

agriculture is identified with the traditional sector of the dual economy model, a natural proxy for this exogenous real wage (w°) is the relative labour productivity (RLP) in agriculture with respect to the rest of the economy, a variable easily computed from usual macroeconomic aggregates and census-like data. Indeed, it is readily shown that RLP is a monotonic function of w° and of the fixed factors of production in the two sectors of the economy. So RLP can be a proxy for w° conditionally on the allocation of fixed factors across sectors.

To see this note that labour productivity in the modern, or non-agricultural sector is an increasing function of w° and the fixed factors there, whereas employment is a decreasing function of w°. According to the dualistic model of the labour market, employment in agriculture is defined as that part of the labour force not employed in non-agricultural sectors at the imperfectly competitive wage, w°. It is therefore an increasing function of w°. With declining returns, due to the fixity of land, this means labour productivity in agriculture decreases with w°. So, depending on fixed factors of production in the two sectors (practically physical capital outside agriculture and land in agriculture), the productivity of labour in non-agricultural vs. agricultural sectors is an increasing function of w°. [7]

The preceding argument also applies when there are two types of labour skills in the non-agricultural sector. Both the relative apparent labour productivity variable and the skilled/unskilled wage differential are then functions of the (supposedly exogenous) real product wage for unskilled workers in the non-agricultural sector and of the relative endowment in capital and skilled workers in the economy. Thus, the RLP variable along with relative endowment and factor ownership distribution variables is still a proxy for the real product wage of unskilled workers.

3. The influence of agriculture and dualism on income distribution around 1970

The above model was tested first on a group of 38 small and medium-sized developing countries for which we had comparable and reasonably reliable income distribution data from surveys done around 1970 and considered reasonably open. This data set is an extension of the one used in our previous work. The data, as well as statistical sources for countries not in the original sample, is given in Appendices A and B.

Income distribution data comprises the shares of three income groups (the bottom two and three quintiles, and the top quintile) in total disposable household income. We have preferred to work with the full Lorenz curve rather than a few

[7] This argument is valid for an open economy with fixed terms of trade between agriculture and the rest of the economy. Things are more complicated in a closed economy.

summary measures like the Gini Coefficient. This enables us to see how and when distributional effects concentrate in specific parts of the distribution. Results obtained with summary inequality measures were not very different from those reported here, but we only indicate the estimates obtained with the ratio of the share of the top quintile to that of the three bottom quintiles as a synthetic measure of income inequality. This measure was recently used in a similar context by Birdsall et al. (1995).

The other variables used and the rationale behind them are as follows:

- *PPP-corrected GDP per capita in 1970 (GDPPC)*, as reported in Heston and Summers (1991). This variable is used as a proxy for the stock of capital per worker (K). Theoretically, it also incorporates the effects of other factors of production, so it can be interpreted as reflecting differences in relative capital endowment between countries only if this done conditionally on other factors of production. For comparison with existing literature, we included both the GDP per capita and its square in the regressions below. Without entering the debate about the Kuznets curve, this simply assumes some non-linearity in the influence of relative capital endowment on distribution of income.
- *Secondary school enrolment in 1960*. This variable is used as a proxy for the share of skilled workers in the total labour force around 1970. This 10-year lag might be considered a little short when comparing the mean age of the labour force and of children in secondary school. However, data on school enrolment before 1960 did not seem precise enough in a number of countries to be included. Also, attempts to use the estimates of the mean schooling of the population at working age made available by Barro et al. (1993) showed insignificant effects of education on the distribution of income. This may not be surprising since these estimates reflect the inaccuracy of schooling data in the 1950s and before.
- *arable land per capita* is the third relative endowment variable. It is odd that it never seems to have been used to explain international differences in income distribution.
- *Exports of mineral products* is a dummy variable which stands for a country's endowment in mineral resources. It is set to unity where exports of mineral products account for more than 5% of GDP in 1970. Despite this definition as a function of GDP, we consider this variable largely exogenous.
- *The distribution of land variable* is the share of arable land cultivated by small and medium farmers.
- *The relative labour productivity variable* (RLP) is the ratio of the value added per worker in the non-agricultural sector to that added in agriculture and may be expressed as a function of the shares of agriculture in total GDP [8] and in

[8] Three-year averages are used for sectoral GDP shares in calculating the variable RLP to smooth possible effects of annual variations in agricultural prices which may be quite large in some countries.

employment. [9] For comparison with previous literature (Ahluwalia, 1976), we also use the share of agriculture in GDP (Y_a) as an alternative independent variable. It explains almost nothing, whereas the related variable RLP, which seems never to have been used to explain country differences in income distribution [10], is very significant.

· *Nature of income distribution data*. Depending on the country and year of observation, three definitions of income and recipient unit are used in the data collected here: total income of active individuals, income per individual, consumption expenditures per individual. As distribution of income differs systematically from one type of data to the other—see Lecaillon et al. (1984)—we control for this by introducing a dummy variable representing the nature of the data.

Table 1 reports five types of regressions run on the income share of the top quintile and of the bottom three quintiles of the income distribution. Only the most complete regressions are reported for the share of the bottom 40% (regression 3d) and for the ratio of the share of the top 20% to the bottom 60% (4d–4f).

Cross-sectional regressions sometimes yield misleading results driven by a few strong country fixed effects (see the criticism made of the cross-sectional approach to the Kuznets Curve in Bruno et al. (1995)). We shall see in Section 4 that accounting explicitly for fixed effects in countries where data are available in both 1970 and 1985 does not change the conclusions which may be drawn from the estimates in Table 1.

Regressions 1a and 2a test the significance of the relative labour productivity variable in isolation from other variables. Both regressions unexpectedly strongly support the main hypothesis here that income distribution is partly determined by the dualism in an economy, as represented by the relative labour productivity (RLP) variable.

A possible interpretation of this strong relationship between the Lorenz curve of the income distribution and the RLP variable is simply tautological. If all GDP were distributed to households and if income distribution data accounted for all household income, then the RLP variable would simply be the urban–rural income differential, and the preceding relationship would be equivalent to acknowledging that rural–urban income differences do contribute to overall income inequality, and that there is some consistency between the macroeconomic aggregates behind the statistical definition of RLP and microeconomic data behind the income Lorenz curve.

A way of checking that we are not in front of a tautology of this kind is to test whether the correlation between RLP and the rural–urban income differential, as

[9] If s_a and e_a are the shares of agriculture in GDP and in employment, RLP is simply defined as $\mathrm{RLP} = (1 - s_a) \cdot e_a / [(s_a \cdot (1 - e_a)]$.

[10] Papanek and Kyn (1986) made an extensive review of variables which could explain international differences in income distribution. Surprisingly, very few of the variables they use are related to the dualism between agriculture and the rest of the economy.

Table 1
Regressions on income inequality circa 1970 (sample of 38 countries)[a]

	Dependent variable	Intercept	GDP per capita (1970) (thousands US$)	Square of GDP per capita (1970) (thousands US$)	Secondary school enrollment (1960)	Mineral resources dummy variable	GDP share of agriculture (1970)	Cultivable land per capita	Share of land cultivated by small and medium farmers	Relative labor productivity, 1970 (non-agriculture/agriculture)	Adjusted R^2
1a	Share of bottom 60%	25.033								−0.292	0.231
		17.37								*−2.03*	
1b	Share of bottom 60%	25.511	−7.587	1.050	0.409		4.754				0.453
		5.54	*−2.82*	*2.51*	*4.80*		*0.58*				
1c	Share of bottom 60%	26.567	−5.990	0.820	0.360	−3.169					0.485
		10.71	*−2.26*	*1.96*	*4.15*	*−1.77*					
1d	Share of bottom 60%	17.645	−4.259	0.650	0.286	−2.604		3.123	0.100	−0.188	0.601
		5.69	*−2.09*	*2.07*	*3.82*	*−1.90*		*1.97*	*4.77*	*−1.67*	
2a	Share of top 20%	53.697								0.574	0.316
		29.11								*3.12*	
2b	Share of top 20%	57.774	7.990	−1.140	−0.561		−6.501				0.446
		9.11	*2.16*	*−1.99*	*−4.78*		*−0.58*				
2c	Share of top 20%	55.796	6.828	−0.960	−0.518	2.913					0.458
		15.88	*1.82*	*−1.63*	*−4.22*	*1.15*					
2d	Share of top 20%	63.640	5.237	−0.830	−0.378	1.835		−3.459	−0.117	0.402	0.551
		13.12	*1.64*	*−1.68*	*−3.23*	*0.86*		*−1.40*	*−3.59*	*2.29*	
3d	Share of bottom 40%	8.415	−2.347	0.333	0.146	−2.373		2.058	0.057	−0.066	0.542
		3.66	*−1.56*	*1.43*	*2.62*	*−2.34*		*1.76*	*3.70*	*−0.79*	
4d	Ratio of share of top 20% to bottom 60%	3.527	0.655	−0.102	−0.043	0.357		−0.631	−0.016	0.048	0.597
		6.89	*1.95*	*−1.96*	*−3.48*	*1.58*		*−2.42*	*−4.62*	*2.58*	
4e	Ratio of share of top 20% to bottom 60%	4.666	0.427	−0.074	−0.058	−1.348	0.401	−0.684	−0.014		0.568
		6.42	*1.12*	*−1.29*	*−4.76*	*−1.22*	*1.62*	*−2.34*	*−3.83*		

[a]All regressions include two dummy variables controlling for the nature of original data (consumption vs. income, active individuals vs. households). The corresponding coefficients are not reported. *t*-statistics in italics.

Table 2
Comparison of relative labor productivity and rural–urban income differentials selected countries[a]

Country	Year	Relative labor productivity between agriculture and the rest of the economy	Rural–urban income differential as given by microeconomic surveys
Egypt	1970	0.28	0.54
South Korea	1970	0.38	0.68
Malaysia	1970	0.27	0.47
Morocco	1970	0.15	0.40
	1985	0.27	0.47
Nepal	1970	0.14	0.50
	1985	0.12	0.50
Philippines	1970	0.23	0.48
Sri Lanka	1970	0.40	0.60
	1985	0.31	0.64
Sierra Leone	1970	0.11	0.73
Sudan	1970	0.11	0.44
Tanzania	1970	0.08	0.35
Tunisia	1970	0.20	0.43
	1985	0.35	0.39
Thailand	1970	0.10	0.29
Turkey	1970	0.13	0.63
Zambia	1970	0.03	0.25

[a]RLP is computed from the data in Appendix of this paper; sources for rural–urban income differentials are the same as for the distribution data used in this paper, see Sections A.5.1 and A.5.2.

observed in microeconomic data, is not abnormally high. This is what is done in Table 2 for a small number of countries where rural–urban income differentials were available in the same data base as the one used to estimate the full Lorenz curve. The correlation between the two variables in this subsample of 15 countries proves to be limited, amounting to 0.45 only.

Under the maintained assumption that, conditionally on relative factor endowments, RLP represents the exogenous labour market imperfection, we should precisely expect a limited correlation with the rural–urban differential which logically is a joint function of both RLP and relative factor endowments. Available evidence does not seem to be in contradiction with this assumption. It is unfortunately impossible to conduct rigorous tests because of the limited number of observations.

We now turn to results obtained with the complete specification of the model. Regressions 1b and 2b may be considered archetypical of the old Kuznets Curve literature and are directly inspired by Ahluwalia's well-known 1976 paper. [11] Income inequality depends largely on income per capita (with the celebrated

[11] Unlike Ahluwalia's, these regressions do not include literacy rate and population growth rate.

inverted U-shape) and negatively on the average level of secondary schooling in the population. It also depends negatively, as in Ahluwalia (1976) on the GDP share of agriculture—although that effect is not significant even at 10% probability level. The explanatory power of these four variables is also comparable to the Kuznets Curve literature. Together they explain a little less than 50% of the variance of income distribution indicators. Replacing the GDP share of agriculture, whose exogeneity may be open to doubt [12], by the dummy variable for exportable mineral resources (regressions 1c and 2c) does not change the explanatory power of the model very much.

The main novelty of this paper is the dramatic progress in explaining country differences in income distribution due to the three agriculture-related variables added in regressions 1d and 2d: land per capita, the share of land cultivated by small and medium farmers, and the relative productivity differential between agriculture and the rest of the economy. Together, these three variables increase the adjusted R^2 statistic by 10 to 15 percentage points (almost 5 due to the relative labour productivity) to a level higher than in any previous study on developing countries only. Comparison with regressions 1b and 2b and between regressions 4d and 4f shows these agriculture-related variables perform together much better than the GDP share of agriculture used in previous studies. So they permit to capture something quite different from the effect of the relative importance of the agricultural sector as in the standard Kuznets argument.

These three variables are very significant in all regressions on the share of the bottom 60%, the top 20%, and the ratio of both shares, the exception being land per capita in regression 2d. Distribution of land and relative labour productivity variables have everywhere the expected sign. This is also true for arable land per capita, although care must be taken in interpreting the coefficient of that variable which depends on relative labour productivity. In the dual open economy model we referred to, the fixed real product wage in the modern (non-agricultural) sector implies that more land per capita leads to higher real income in the traditional sector and more equal distribution. The results in Table 1 confirm this.

The effect of the relative labour productivity variable, representing the dualistic nature of the economy, on distribution of income is quite substantial, and not very different from that obtained with univariate regressions. A change in RLP equal to one standard deviation in the sample increases the income share of the bottom 60% of the distribution by 1 percentage point and reduces that of the top 20% by more than 2 percentage points. These figures are comparable to, although smaller than the effect of the distribution of land.

[12] The problem is that this share may be determined by the demand side of the economy (if all goods are not fully tradeable) and therefore by the distribution of income. The problem is not as serious with our own RLP variable which reflects more production than demand conditions. However, this variable also depends implicitly on the price of agricultural relative to non-agricultural goods, which is influenced in turn by demand and income distribution when the economy is imperfectly open.

A pleasant feature of regressions 1d and 2d is that inclusion of the agriculture-related variables does not much change the coefficient of the other variables of the model, and that these variables retain their statistical significance, or non-significance in the case of the mineral resource dummy variable in regressions 2c and 2d. This indicates considerable independence between the two sets of variables and confirms that the agriculture-related variables truly improve our understanding of the determinants of inequality in developing countries, at least around 1970.

It is also to be stressed that, unlike in many studies of this type, the results of the regressions in Table 1 are not affected by inclusion of regional dummy variables for Latin America and Africa. [13] This suggests no important variable which would be correlated across countries of the same region has been omitted.

These very positive results must be balanced by the fact that the good performance of agriculture and dualism related-variables in explaining international differences in income distribution seems to be limited to the upper part of the distribution. As shown in line 3d of Table 1, the explanatory power of the model falls when the share of the bottom 40%, rather than the bottom 60% or top 20% or their ratio as in regressions 4, is used as the dependent variable. More importantly, the relative labour productivity variable then loses significance. This may be because the phenomena put forward in Section 2 of this paper refer to the upper half of the income distribution. Perhaps imperfect competition for unskilled labour actually affects only that part (supposedly in the third quintile) of the unskilled labour force which would first qualify for jobs in the modern sector, as in the efficiency wage selection model of Dasgupta and Ray (1986). So the bottom of the income distribution would not be very sensitive to changes in the real wage rate in the modern sector. Also, the bottom of the income distribution is less accurately measured, because most national surveys on household income are very imprecise about the poorest rural households.

Whatever the reason the bottom 40% of the income distribution is less well explained, the main conclusion here is that some structural variables we have reason to believe should shape income distribution, on the basis of the simplest theoretical models of development, prove significant in an international comparison of income inequality. This role of agriculture and dualism-related variables may have been overlooked in the past because most writing about the relationship between inequality and development focuses on the Kuznets Hypothesis and the exclusive relationship between income distribution indicators and GDP per capita. [14]

[13] Corresponding regression results are not reported here.

[14] Although the inclusion of GDP per capita and its square in the basic cross-sectional model were originally seen as an indirect way of accounting for the dualism explicitly mentioned in the seminal paper by Kuznets (1955).

4. Explaining differences in income inequality among developing countries in the 1980s

As Chen et al. (1994) noted, there have been very few studies of the most recent data on income distribution in developing countries. Most data sources used in analysing the relationship between inequality, development and growth concern income distribution in the late 1960s and early 1970s, although more and better data is now available. This possibly reflects the present tendency to see income distribution as a rather constant structural characteristic of a country. However, income distribution and its determinants may change substantially and quite quickly.

We will apply the preceding regressions to a group of developing countries where comparable and reliable income distribution data is available around 1985. This 1985 sample (S85) comprises 24 developing countries which appear in the 1970 sample (S70) used in Section 3, plus nine others. The list of countries, as well as income distribution and other data used in the analysis, is in Appendix B.

The presence of some countries in both the 1970 and the 1985 samples enables us to spot any influence of fixed effects on our estimates by pooling the two samples. But the limited number of countries sampled on the two occasions limits this. Estimates obtained from pooling the two samples are based on the following econometric model.

$$y_{it} = X_{it} \cdot b + \sum_{i \in I} D_{it} c_i + u_{it} \text{ with } Eu_{it} = 0 \text{ and } V(u_{it}) = \sigma_0^2 - \sigma_1^2 D_{it} \qquad (5)$$

where y_{it} is the dependent income distribution variable observed in country i at date t, X_{it} the vector of explanatory variables, and D_{it} a set of dummy variables taking the unit value for countries observed at two dates. This is a conventional fixed effect model for countries observed at two dates and a standard cross-sectional model for countries observed only once. Note that accounting for fixed effects for only part of the sample introduces some heteroscedasticity which must be corrected for in the estimation procedure.

This econometric specification is equivalent to combining cross-sectional or 'between' estimators for the countries observed only once and longitudinal or 'within' estimators for countries observed twice. Assuming the fixed effects, c_i, are not correlated with the explanatory variables, X_{it}, it is also possible to combine 'within' and 'between' estimators for countries observed both in 1970 and 1985, as in the usual 'random effect' model. It turns out that this still reinforces the results discussed below and those obtained in Section 3. Estimation of a random effect model can also be limited to countries appearing in both S70 and S85. This substantially reduces the size of the sample and makes estimation less accurate. However, even then, the relative labour productivity variable is significant.

As with the 1970 sample, Table 3 first reports the results of univariate regressions of income distribution characteristics on the relative labour productivity variable for the 1985 sample of countries (regressions a). It then shows the results of running the most complete model of Section 3 on this 1985 sample (regressions b) as well as on the sample resulting from pooling the two samples S70 and S85 without (regressions c) and with (regressions d) the correction (Eq. (5)) for fixed effects. Together with the regressions appearing in Table 1, these pooled regressions permit to test for the identity of the coefficients of the complete model in 1970 and 1985.

The univariate regressions of income distribution on the relative labour productivity variable RLP (regressions a) yield results with S85 which are fully comparable with those obtained previously. The relative labour productivity differential between agriculture and the rest of the economy is very significant, as it was with the 1970 sample. The relationship found, in line with the theoretical model of a dual economy, between microeconomic income distribution data and sectoral distribution indicators thus appears to be robust to the composition of the sample and the period of observation.

The striking result when examining the complete regressions 1b and 2b is that this robustness holds only for this dualism-related variable and the distribution of land. Other variables in the model are less or not at all significant in explaining country differences in income distribution around 1985. The coefficients of the two GDP per capita variables are insignificant in the 1985 sample. Although significant at the 10% probability level, the coefficient of secondary school enrolment is more than three times smaller in absolute value than in the 1970 sample. So the importance of those variables most often used to explain country differences in income inequality seem to depend strongly on either the composition of the sample or the period of observation.

These rather negative results were no surprise. Studies over the last 10–15 years have shown that evidence in favor of the so-called Kuznets Hypothesis, where inequality is an inverted U-shaped function of GDP per capita, is very little robust to econometric specifications, sample composition and period of observation. [15] Fields and Jakubson (1994) even found an 'inverted Kuznets Curve' by pooling data from different periods in a small sample of developing countries. So the coefficients of the GDP per capita variables appearing in regressions 1b, 2b and 3b in Table 3 are not unexpected.

It may be more surprising that secondary school 1970 enrolment rate had such little effect on country differences in distribution of income during the 1980s, after the strong effect shown by studies based on 1970 data—and 1960 enrolment rates.

[15] See among others Saith (1983), Ram (1988), or Anand and Kanbur (1993a,b).

Table 3
Regressions on income inequality: 1985 and pooled samples[a]

	Dependent variable, sample and type of estimates	Intercept	GDPpc (thousands US$)	GDPpc^2 (thousands US$)	Secondary school enrollment	Mineral resources dummy variable	Cultivable land per capita	Share of land cultivated by small and medium farmers	Relative labor productivity (non-agriculture/agriculture)	Adjusted R^2
Share of bottom 60%										
1a	Sample: 1985	23.921							−0.292	0.309
		18.87							*−2.4*	
1b	Sample: 1985	11.469	2.744	−0.250	0.076	−2.287	−0.569	0.096	−0.210	0.536
		3.43	*1.22*	*−0.73*	*1.48*	*−1.55*	*−0.2*	*3.83*	*−2.04*	
1c	Sample: 1970 + 1985[b]	13.360	−0.808	0.190	0.153	−2.846	2.010	0.096	−0.190	0.621
		5.92	*−0.57*	*0.87*	*3.99*	*−2.89*	*1.46*	*6.03*	*−2.63*	
1d	Sample: 1970 + 1985[b,c]	23.319	−4.154	0.070	0.088	−4.892	2.677	0.054	−0.110	na
	(Fixed effect)	*6.95*	*−2.26*	*2.41*	*2.14*	*−4.1*	*1.6*	*2.57*	*−2.03*	
Share of top 20%										
2a	Sample: 1985	56.434							0.384	0.299
		33.64							*2.39*	
2b	Sample: 1985	71.850	−3.337	0.270	−0.110	3.233	1.170	−0.109	0.249	0.511
		15.35	*−1.06*	*0.55*	*−1.52*	*1.57*	*0.29*	*−3.08*	*1.73*	
2c	Sample: 1970 + 1985[b]	70.389	2.468	−0.170	−0.191	3.151	−2.008	−0.113	0.316	0.581
		21.47	*0.12*	*−0.53*	*−3.42*	*2.2*	*−1*	*−4.87*	*3.01*	
2d	Sample: 1970 + 1985[b,c]	51.506	7.916	−0.140	−0.058	3.495	−5.346	−0.026	0.235	na
	(Fixed effect)	*11.18*	*3.14*	*−3.5*	*−1.03*	*2.13*	*−2.33*	*−0.9*	*3.17*	
Ratio of share of top 20% to bottom 60%										
3b	Sample: 1985	4.386	−0.524	0.047	−0.007	0.329	0.010	−0.013	0.029	0.541
		9.81	*−1.74*	*1.02*	*−1.07*	*1.67*	*0.03*	*−3.99*	*2.13*	
3c	Sample: 1970 + 1985[b]	4.142	0.030	−0.017	−0.020	0.405	−0.485	−0.014	0.036	0.596
		11.49	*0.13*	*−0.47*	*−3.23*	*2.58*	*−2.2*	*−5.64*	*3.13*	
3d	Sample: 1970 + 1985[b,c]	2.506	0.594	−0.096	−0.012	0.801	−0.599	−0.007	0.018	0.619
	(Fixed effect)	*4.02*	*1.74*	*−1.76*	*−1.47*	*3.62*	*−1.94*	*−1.69*	*1.81*	

[a]All regressions include two dummy variables controlling for the nature of original data (consumption vs. income, active individuals vs. households). The corresponding coefficients are not reported. *t*-statistics in italics.
[b]A 1970/1985 dummy variable is included whose coefficient is not reported.
[c]Dummy variables included to control for fixed effects for countries present in both the 1970 and the 1985 samples; estimates are corrected for heteroscedasticity.

A natural explanation would be that the sizeable progresses made in primary and secondary schooling in most developing countries throughout the 1960s and the 1970s has narrowed inequality in personal educational levels. Our 1970 and 1985 samples may exaggerate this because the former is biased toward Africa, where enrolment rates are the lowest among developing countries, whereas these countries are under-represented in the 1985 sample.

This apparent instability of the coefficients of several variables over time must be weighed against the fact that, despite apparent differences between regressions b in Table 3 and regressions d in Table 1, the null hypothesis that the coefficients of these regressions are equal for the two samples S70 and S85 is not rejected by a standard Chow test on the basis of regressions c in Table 3. This remains true when a different intercept is allowed for the two samples so as to take into account a possible change over time in unobserved inequality determinants, as for instance the structure of international prices in our original specification (Eq. (4)).

The above results are based on a standard cross-sectional regression analysis where fixed country effects are ignored. Regressions d take into account fixed effects for countries observed both in 1970 and in 1985 (most of countries in both samples—24 out of 38 in S70 and 33 in S85) as well as fixed effects linked to the year of observation. This correction for fixed effects points to conclusions close to those drawn from the 1970 sample. This is despite the fact that these estimates rely largely on observed time variations of income distribution within the same countries rather than just on differences observed between countries as in previous regressions. So cross-sectional differences between countries where only one observation is available (either in 1970 or in 1985) prove to be similar to cross-sectional differences in the full 1970 sample, and time variation in income distribution in the other countries is fully consistent with observed cross-country patterns. [16] Both remarks tend to make more robust the conclusions from the 1970 sample and make less significant those drawn from regressions run on just the 1985 sample.

Even though they seem closer to their 1970 counterpart, these fixed effect estimates show some differences similar to those discussed above between pure cross-sectional estimates based either on the 1970 or the 1985 samples. But the important point is that the significant role of the relative labour productivity variable and, to a lesser extent, the other agriculture-related variables, is fully confirmed by these new estimates, while more conventional explanatory variables of international differences in income distribution seem to play a smaller part. The same result holds when the estimation is limited to the countries where income

[16] Introducing some 'between' component for the sample of countries observed on the two occasions, rather than relying on the pure 'within' component as in Eq. (5), would make the estimation of the fixed effect model still closer to the results obtained for 1970.

distribution data is available both in 1970 and 1985, and the standard combination of 'within' and 'between' estimators based on the weights of the 'within' and 'between' variance is used. RLP and the distribution of land are significant whereas only school enrolment remains significant among more conventional explanatory variables. [17]

5. Conclusion

This paper contributes to the empirical literature on differences in income distribution across developing countries by putting into evidence the major role played by the extent of economic dualism, as proxied by the ratio of labour productivity in agriculture to that in the rest of the economy, conditionally on relative productive factor endowments like land, skilled labour and capital. This evidence, which is in full agreement with elementary models of developing economies, appeared to be both strong and robust over time. This is in marked contrast with more traditional variables like GDP per capita or schooling enrolment whose explanatory power seems to have significantly declined between the beginning of the 1970s and the end of the 1980s.

It is interesting to stress that the mostly cross-sectional evidence offered in this paper in favor of such policy orientations seems to be reinforced by the recent study by Ravallion and Datt (1996) on the importance of the sectoral composition of growth for the reduction of poverty in India. By following the evolution of poverty in India through 35 household surveys taken between 1951 and 1991, these authors have been able to show that, ceteris paribus, agricultural and tertiary sector growth mattered more for poverty reduction than manufacturing sector growth, and rural growth more than urban. As an important part of differential growth across sectors actually corresponds to changes in relative sectoral labour productivity, these differences in the evolution of poverty across the Indian states are fully consistent with the cross-country evidence analyzed in the present paper.

Taken literally, all these results have important consequences for policy-making in the field of income distribution. They suggest in particular that, in many countries increasing the level of productivity in traditional agriculture may have become the most efficient way of reducing inequality and poverty. Expanding the

[17] In particular GDP per capita and its square failed to be significant contrary to what is observed in regressions d in Table 3. This seems to agree with the results of Fields and Jakubson (1994), although their conclusion is based on 'within' estimates. In the present case, the dummy for mineral resources and the relative endowment of land lose significance because, being constant over time, they do not appear in the 'within' component of the model.

schooling system was rightly seen as a very efficient way of promoting more equality and less poverty in developing countries during the in the 1970s and had indeed received a lot of attention. Results obtained in this paper show that the priority may have now shifted to another type of policy.

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Appendix A. Data sources

A.1. Land: arable land and land under permanent crops in 1965

Source: FAO, Production Yearbook 1968 (Table 1, Land use).

A.2. Share of agriculture in GDP and population: World Bank, World Tables

Sample 70: percent in 1965–1967 (World Tables, 1980).
Sample 85: percent in 1985–1987 (World Tables, 1993).

A.3. School: rate of secondary school enrolment from UNESCO Yearbook

Sample 70: rates in 1960.
Sample 85: rate in 1975.

A.4. Distribution of land: share of small and medium size farms in agricultural output

- for 36 countries (1970 sample) data from Table A1 in the paper of Bourguignon and Morrisson (1990);
- for other countries, estimates with the same method (Bourguignon and Morrisson, 1990, pp. 1130–1131). Usually the information is available in World Bank's country economic memorandum.

A.5. Income distribution

A.5.1. 1970 sample

All countries except Madagascar, Nepal, Tunisia, Turkey, Bourguignon and Morrisson, 1990, Table A1.

Madagascar. Source: F. Pryor, Malawi and Madagascar. The Political Economy of Poverty, Equity and Growth, Oxford University Press.

F. Pryor, Income Distribution and Economic Development in Madagascar: some historical statistics, World Bank discussion paper, p. 37.

Nepal. Source: W. van Ginneken and Jong-Goo Park, 1984.

Turkey. Source: United Nations. Survey of National Sources of Income, 1981 (data for 1963, 1968 and 1973).

Tunisia. Source: M. Boumediene, Distribution des revenus en Tunisie et au Maghreb, Thèse de 3e cycle, Paris, Université de Paris I, 1983. Enquête nationale sur les budgets des ménages et la consommation en 1968, en 1975, Tunis, INS.

A.5.2. 1985 sample

For 18 countries (Bolivia, Botswana, Colombia, Costa Rica, Ghana, Honduras, Ivory Coast, Jordan, Kenya, Malaysia, Panama, Philippines, Senegal, Tanzania, Thailand, Venezuela, Yugoslavia, Zimbabwe) the sources for distribution data are in every country, S. Chen, G. Datt and M. Ravallion, Statistical Addendum to 'Is Poverty Increasing in the Developing World?', *Review of Income and Wealth*, December 1994 (hereafter C.D.R.) and in some countries *Social Indicators of Development* (hereafter S.I.D.) (World Bank, every year). When, exceptionally, data from C.D.R. and those from S.I.D. were different, we have given average value.

For other countries, the sources are:

- Argentina, from O. Altimir, JDE, 1995.
- Chile, from P. Meller, 'Adjustment and social costs in Chile during the 1980's', World Development, 1991, p. 1545–62, referring to 1983 and from S.I.D. referring to 1990.
- Dominican Republic, from C.D.R., concerning 1989, and 'Dominican Republic. Growth with equity: an agenda for reform', World Bank, May 1995; concerning 1985, 1989 and 1992.
- Ecuador, from S.I.D. (about 1975 and 1990) and 'A Social Sector Strategy for the 90's', World Bank, Nov. 1990, concerning 1978.
- Guatemala, from 'Guatemala: Country Economic Memorandum', World Bank, 1991, concerning 1980–1981 and 1986–1987.
- Jamaica, from 'Jamaica. A Strategy for Growth and Poverty Reduction: Country economic memorandum', World Bank 1994, concerning 1988, 1989, 1990, 1991, and 1992.
- Korea, from Jong Goo Yoo, 'Income distribution in Korea' in Wages, Employment and Income Distribution in South Korea, 1960–1983' by Jang Ho Kim.

- Morocco, from 'Consommation et dépenses des ménages 1984-1985', Direction de la Statistique, 1987.
- Nepal. The estimate for 1976 (cf. above, 1970 sample) was kept, assuming stability.
- Peru, from O. Altimir, JDE, 1995.
- Sri Lanka, from Consumer Finance and Socio-economic Survey (1981–1982).
- Taiwan, from S. Kuo, Chapter IX in F. Bourguignon and C. Morrisson, External Trade and Income Distribution, OECD Development Centre, 1989 (concerning 1985).
- Tunisia, from 'Enquête nationale sur les budgets et la consommation des ménages en Tunisie', INS, Tunis.
- Uruguay, from O. Altimir, JDE, 1995.

A.5.3. Comparability of income distribution data with Deninger and Squire (1996)

The data shown in this appendix is generally in agreement with the data base recently collected by Deninger and Squire—Inequality and Development: a New Data Base, World Bank Economic Review, 1996—except for a few discrepancies. These come from several consistency checks which have been made in our own data. In some instances these led us to prefer one data source to another among those listed in DS and in some other instances to prefer another data source. These checks were based on: (a) the inter-temporal consistency of the data—i.e., no big change in the distribution could possibly have been observed in a country without a big change in the structure of the economy or in its rate of growth, (b) the comparability with other data sources when they exist, (c) and consistency with National Account data, censuses and Sam where available. Here are examples of consistency checks which led us to prefer our own data to those listed in DS.

• *Morocco*: DS report for 1990 data based on a household budget survey which show much less inequality than what is suggested by the 1984–85 survey on individual incomes, even after the necessary adjustment has been made to convert estimates of household expenditure distribution into individual earnings distribution data. The point is that there has been no significant change in Morocco during these 5 years. Also, the data for 1990 in DS suggests a distribution of income similar in Morocco and Tunisia, when it is known that the distribution of land and urban earnings is much more unequal in the former country. For these reasons, we stuck to our 1985 data on individual earnings.

• *Nepal*: DS data for 1984 shows much less inequality than our own for 1976 despite the fact that no significant change seems to have occurred in the distribution. However, the survey they use has not been corrected for some severe underestimation pointed out by van Ginneken and Park (1984), which is itself based on a survey taken of 5000 households in 1976 and which has been corrected by these authors to be consistent with national accounts. Also, the low inequality figure reported in DS is inconsistent with the very high concentration of arable land or the urban–rural differential reported by Svejnar and Thorbecke, Economic Policies and Agricultural Performances, OECD, 1986.

Appendix B. Data

	Population (1970, thousands)	GDP per capita (1970, US$)	Share of agriculture in the labor-force (1970, %)	Share of agriculture in GDP (1965–1967, %)	Cultivable land (thousands km^2)	Share of bottom 40 % (%)	Share of bottom 60 % (%)	Share of top 20% (%)	Secondary school enrolment rate (1960)	Share of small and medium farmers	Mineral resources dummy
1970 sample											
Algeria	13746	2010	66	15.9	7100	10	20.5	58.5	8	100	1
Argentina	23963	4356	21	14.4	29500	13.5	26.6	55.1	32	28	0
Chile	9504	4046	30	8.9	4500	10	23	59.5	24	73	1
Colombia	21266	2386	50	30.4	5050	8.9	19.1	62.6	12	69	0
Costa Rica	1727	3075	51	21.7	620	12.5	24.5	57.1	21	82	0
Egypt	33053	788	58	28.4	2500	14.4	29.2	50.1	16	98	0
El-salva	3588	1733	61	27.8	650	12	20.8	61.4	11	22	0
Gabon	504	2923	85	25.2	130	8.8	16.7	67.5	5	49	1
Honduras	2627	1147	70	39.4	820	6.4	15.6	64.9	8	32	0
Iran	28397	2698	54	30.8	11600	7.9	18.1	64.8	12	98	1
Ivory-coast	5510	1428	86	34.1	2050	10.1	21.9	57.2	2	84	0
Kenya	11498	711	87	36.4	1700	10	18.5	68	2	85	0
South Korea	31923	1757	61	36.8	2250	16	30.5	48	27	100	0
Madagascar	6752	1055	86	30.8	2900	15.2	26.5	59.5	4	90	0
Malawi	4518	540	93	55.5	1270	13.9	26.2	55.2	1	93	0
Malaysia	10853	2408	63	31.2	2700	9	20.9	59.8	19	69	1
Morocco	15310	1400	66	22.1	7900	10	19.5	63	5	33	0
Nepal	11350	639	94	68.6	2330	11	22.3	61.2	6	90	0
Panama	1531	2642	51	23.2	560	8.2	20.5	60.6	29	28	1
Peru	13193	2922	52	20.3	2600	8	18.2	64.4	15	57	1
Philippines	37542	1482	61	25.8	8300	9.4	22.1	56.7	26	89	0
Senegal	4415	1166	83	25.1	5500	13	22.4	64.4	3	100	0

	Population (1970, thousands)	GDP per capita (1970, US$)	Share of agriculture in the labor-force (1970, %)	Share of agriculture in GDP (1965–1967, %)	Cultivable land (thousands km^2)	Share of bottom 40 % (%)	Share of bottom 60 % (%)	Share of top 20% (%)	Secondary school enrolment rate (1960)	Share of small and medium farmers	Mineral resources dummy
Sierra-Leone	2651	1360	81	33.2	3700	13.2	25.9	54.5	3	100	0
South Africa	22459	4235	32	10.7	12000	4.2	14.3	60	15	18	1
Spain	33779	5361	42	15	20600	15.3	31.1	46	23	75	0
Sri Lanka	12516	1436	56	34.2	1880	13.5	28.5	48	27	89	0
Sudan	13859	953	86	41.4	7100	11	26	51.5	3	93	0
Taiwan	14676	1883	47	22	890	20	36.3	41.4	37	100	0
Tanzania	13513	387	92	44.5	11800	13	24	61	2	92	0
Thailand	35745	1539	84	34.4	11300	8.7	20.5	58.9	12	98	0
Togo	2020	677	79	44.2	2160	16	31	46	2	100	0
Tunisia	5127	1725	56	19.7	4300	12	25.3	51	20	65	1
Turkey	35321	2319	79	34	26100	8.8	20	61.2	14	50	0
Uruguay	2808	4665	21	14.8	2250	10.5	24.8	52.5	37	32	0
Venezuela	10604	5253	33	6.7	5200	9.5	20.5	59.5	21	34	1
Yugoslavia	20371	2950	63	23.7	8300	15.3	31.8	43.7	34	100	0
Zambia	4159	1277	81	12.5	1920	7.3	15.8	68.7	1	100	1
Zimbabwe	5249	1025	81	18.2	1850	8	16.3	68	6	50	0

	Population (1985, thousands)	GDP per capita (1985, US$)	Share of agriculture in the labor-force (1985, %)	Share of agriculture in GDP (1985–1987)	Cultivable land (Thousands km^2)	Share of bottom 40 % (%)	Share of bottom 60 % (%)	Share of top 20% (%)	Secondary school enrolment rate (1970)	Share of small and medium farmers	Mineral resources dummy
1985 sample											
Argentina	30331	3982	13	10.4	29500	10.5	23	60	55	28	0
Bolivia	6371	1566	42	24	3100	11	22	60	31	65	1
Botswana	1070	2555	63	4.1	520	8	17	64.5	16	80	1
Chile	12121	3763	16.5	9.8	4500	10	22	62.5	48	73	1
Colombia	28418	3300	34	20.6	5050	9.8	21.8	57.8	39	69	0
Costa Rica	2489	3611	31	22.2	620	12	24.5	53.5	43	82	0
Dominican Republic	6416	2101	36	35.2	1100	9	19	61	36	20	0
Ecuador	9378	2775	30	15.3	2900	9	19	62	39	30	1
Ghana	12620	852	50	57	2500	15	29	49	37	100	0
Guatemala	7963	2200	57	26.2	1470	9.7	21.5	59.5	12	20	0
Honduras	4383	1240	61	25.8	820	6.7	16.9	65.5	16	32	0
Ivory-coast	10252	1447	65	30.7	2050	11.6	24.4	54.5	13	84	0
Jamaica	2336	2381	27	10	240	12	24	55	58	35	1
Jordan	3506	2731	6	7	1140	14	26	53	45	50	0
Kenya	20353	845	81	31.5	1700	8.5	19	64	13	85	0
South Korea	41056	3858	25	13.7	2300	15.6	30	49	56	100	0
Malaysia	15682	4751	41	23.8	2700	10.9	23.9	55.7	43	69	1
Morocco	22120	2013	46	19	7900	12	23.5	57	16	33	0
Nepal	16687	729	93	62.3	2330	11	22.3	61.2	13	90	0
Panama	2180	3655	32	9	560	8	19	61.5	57	28	1
Paraguay	3693	2345	49	31.8	880	6.8	15.5	70.5	20	30	0
Peru	19383	2730	40	12.7	2600	10	21	60	45	57	1
Philippines	55819	1749	52	29	8300	12	26	52.5	54	89	0
Senegal	6567	1156	81	20.9	5500	10.5	22	60	10	100	0
Sri Lanka	15837	1962	53	25.8	1880	16.5	32	44.5	48	89	0
Taiwan	19258	4524	13	10.1	900	20.5	37	40	64	100	0
Tanzania	22242	480	85	50.3	11800	8.1	18.5	62.7	3	92	0
Thailand	51683	2516	71	23.9	11300	11	24	56	26	98	0
Tunisia	7261	3104	35	16.4	4300	13.5	28	49	21	65	1
Uruguay	2940	4521	16	12.3	2250	11	25	52	61	32	0
Venezuela	17317	5660	16	6.1	5200	12.3	24	55	43	34	1
Yugoslavia	23123	4485	32	12	8300	15	30.5	45.5	76	100	0
Zimbabwe	8406	1434	73	14.5	1850	8	16	66	9	50	0

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