ECONOMIC OPENNESS AND INCOME INEQUALITY: DECONSTRUCTING SOME NEOLIBERAL FALLACIES

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"We can by immanent criticism in logical terms challenge our own thinking and cleanse it from opportunistic conformism."
Gunnar Myrdal[1]

"Neoliberalism is to neoclassical economics as astrology is to astronomy".
Dani Rodrik[2]

This paper examines the relation between some prevailing neoliberal ideas on the nexus between openness and inequality issues, and mainstream economic theory, more specifically, neoclassical economics. We will show that these propositions are not rigorously grounded on mainstream economics. Since most supporters of the criticized ideas consider themselves neoclassical economists, this paper is an exercise in immanent criticism. We will discuss the theoretical foundations of the following three common fallacies: (1) trade liberalization reduces inequality within developing countries, (2) trade liberalization reduces inequality across countries, and (3) capital account liberalization also reduces inequality across countries.

Fallacy 1: "Trade liberalization reduces inequality in developing countries by raising the employment levels and real wages of the poor".

This fallacy can be illustrated with the following typical quote from two World Bank economists, Matusz and Tarr (1999):

> "Unskilled labor is relatively abundant in developing countries. In the context of the Heckscher-Ohlin model, trade reform can be expected to increase the overall demand for such labor in the long run. This follows since such countries have a comparative advantage in goods that use unskilled labor intensively. Removing policies that favor import-competing sectors at the expense of (labor-intensive) export sectors ultimately results in an expansion of the latter and contraction of the former. Any increase in the demand for unskilled labor results in a combination of higher wages and employment for this segment of the population".

This is an example of the simplified, commonly used version of the Heckscher-Ohlin-Samuelson model of international trade, which assumes two goods, two factors, identical production functions across countries and no factor-intensity reversals. The factor couple is usually capital and labor, or capital and unskilled labor, as in the quotation above.

The implication of the quoted proposition is quite obvious: developing countries should not fear trade liberalization, because it would bring not only higher efficiency but also

[1] Nobel Lecture, 1975.
[2] Rodrik (2002).

more equity. Then, the costs of adjustment associated with liberalization would mainly be due to a temporary jump in frictional unemployment.

However, the quoted proposition is not a simplification, but a generalization of some South Asian and East Asian cases, which in regard to Latin America, is a wrong one. It is a simplification because it tells a two-factor story in a world with more than two factors, and it is a wrong generalization because the more relevant couple (if it were defensible to stick to the two-factor version of the model) of factors need not be the same across the developing world.

Indeed, the most relatively abundant factors in Latin America are natural resources. Hence, trade liberalization most likely raises the rents perceived by the owners of these resources. In some Latin American countries, for instance Argentina and Chile, unskilled labor is even a scarce factor; therefore, the rigorous application of Heckscher-Ohlin theorems would imply (if we stick to the two factor version) that most likely trade liberalization hurt the poor and raised inequality, especially, because of the high concentration in the property of natural resources. See the appendix for some evidence on relative factor endowments in some Latin American and other developing countries.

On the other hand, the non-reversal of factor-intensities assumption might be too strong in some cases.[3] For instance, there is evidence that agriculture, more specifically, corn production, is labor intensive in Mexico while it is capital intensive in the United States. These reversals have been detected long ago comparing rice production factor intensities in Asia *vis-a-vis* the United States (Arrow *et al*, 1962). This means that even if unskilled labor is among the abundant factors, which is probably true in the case of Mexico, we cannot predict a higher demand for unskilled labor. Indeed, in a two-good, two-factor model, if the autarky relative price of corn in Mexico is higher than the free trade price (after a still not accomplished removal of agricultural subsidies in the United Sates), trade liberalization will lead to a lower demand of unskilled labor at initial factor prices.

Perhaps, what is most disturbing about the use of an unqualified textbook version of the Heckscher-Ohlin for policy advice is the fact that even its most sophisticated versions have been empirically rejected (see, for instance, Bowen et al, 1987; Trefler, 1993 and 1995). The existence of significant technological differences across countries, even after controlling for different kinds of natural resources and categories of labor is the main reason behind the empirical failure of the Heckscher-Ohlin model. The fact that these differences have not been uniform across countries and goods, might have important distributional implications. For instance, suppose that a labor-abundant country has a larger technological gap in labor-intensive goods than in other classes of goods, then a likely result of trade liberalization will be a lower demand for labor-intensive goods with negative distributional consequences. Clark and Feenstra (2001) report that something like this happened in India under British rule: Indian exports were land-intensive while Indian imports were labor-intensive.

[3] Recall that factor-intensity reversals are only ruled out when factor elasticity of substitution do not differ between sectors (Bhagwati and Srinivasan, 1983, p.58)

Fallacy 2: "Trade liberalization favors income convergence and therefore it reduces inequality across countries".

In a well known paper, Ben-David (1996) claims to provide empirical "evidence that income convergence, while far from being a worldwide phenomenon, seems to be a prevailing feature among countries that trade a lot with one another". He also claims that "the *degree* of convergence is also likely to be affected by the magnitude of trade among partners. Groups that experience greater increases in volumes of trade are also more likely to experience faster reductions in their income disparity".[4] Ben-David concludes that his findings "would appear to corroborate Heckscher (1919) and Ohlin's (1933) intuition that trade does indeed play an equalizing role ..." and does not hesitate to draw the following policy conclusion: "evidence that heightened trade may be associated with a reduction in these [income] gaps should provide some reassurance to the advocates of free trade."

Ben David's "equalizing exchange" argument for trade liberalization had an impact in the 1990s and it was used to support preferential trade agreements between developing and developed countries, such as the so-called Free Trade Area of the Americas. It is interesting to point out that Ben-David's hypothesis was not derived from theory but merely conjectured as an extrapolation of the factor-price equalization theorem. Slaughter (1997) has rightly shown that factor-price equalization does not ensure income convergence since the latter depends not only on the former but also on convergence of relative factor endowments. Following Slaughter (1997), this can be illustrated with Equation 1, an accounting identity which shows that GDP per worker can be decomposed into two terms, capital income per worker and the worker's wage (W); in turn, capital income per worker equals the rental price of capital goods (R) times a real measure of the stock of capital goods per worker (K/L). Let's assume that trade liberalization equals R and W across countries. Still, income (absolute) convergence will need equalization of K/L across countries. As a static model, Heckscher-Ohlin is mute on this issue.

(1) $Y/L \equiv R\ K/L + W$

Indeed, not even factor price equalization should reduce the income gap between countries. Both, Ben-David and Slaugther have overlooked this possibility. Suppose there are two autarkic countries: a rich country, endowed with a high stock of capital goods per worker, and a poor country endowed with a lower stock of capital goods per worker. Under orthodox assumptions, both countries will gain from trade liberalization, which means that income per worker will go up in the two countries. Income per worker convergence would require a larger relative gain in the poor country than in the rich one, but this result is not warranted. In fact, it can be shown that the relative income per worker gain of a country is increasing in the country's relative capital per worker gap with respect to the free trading world average, regardless the sign of the gap. In fact, since the world's average relative factor endowment is closer to the region's relative factor endowment with more workers, most likely, the relative gains from trade liberalization will be larger for the richer and smaller (in terms of labor) region, implying divergence instead of convergence.

[4] Causality is an issue, since correlation between two variables says nothing about the former. At the beginning of the paper, Ben-David recognizes trade could be caused by income similarity between countries as claimed by Linder, instead of income convergence being caused by trade.

However, the main problem with Ben-David's conjecture is the confusion between static model (trade theory) and dynamic model (growth theory) results. Let us examine more carefully the consequences of plugging some trade model results in two popular neoclassical growth models, Solow's and Ramsey's. To accomplish this, we need to open up Uzawa's two sector growth model, which assumes different production functions for capital and consumption goods. Recall that a recurring sufficient condition for uniqueness of the momentary equilibrium, the balanced growth path, and the stability of the latter in Uzawa's closed economy two sector growth models, is a lower capital intensity in capital goods sector[5]. Otherwise, it wouldn't be possible to make predictions.

The former assumption has strong implications. After trade liberalization the labor-abundant country will specialize in the production of the capital goods and the capital-abundant country will specialize in the production of consumption goods. Of course, this outcome is brought about by an increase in the after trade relative price of capital goods for the labor-abundant country and vice-versa for the capital abundant country. The impact of the after trade change in relative prices implies that GDP would decrease in terms of the good which became more expensive and would increase in terms of the other good. For the labor-abundant country this means that its GDP would buy less units of the capital good. If capital accumulation were driven a-la-Solow by a constant savings rate, then the stock of capital goods (and GDP) would fall after trade. Therefore, the dynamic effect of trade liberalization would be negative in a stable two-sector neoclassical model for the poorer country. Since the effect would be the opposite in the rich country, the case for "equalizing exchange", that is to say, income convergence, is even weaker.[6]

It is unclear whether the fall of GDP caused by a lower capital stock, the dynamic effect of trade liberalization, will offset the static gain mentioned above. Of course, a priori we cannot rule out the possibility that the negative dynamic effect might be greater (in absolute value) than the static gain. Perhaps the most interesting thing about these results is that we did not assume any market failure. Of course, the presence of market failures would weaken or even destroy the case for trade liberalization. The wide class of dynamic comparative advantage models has grown significantly. Even Lucas (1988) contributed to this literature arguing that it was impossible to explain the Korean miracle on the basis of traditional neoclassical models of trade and growth. But this is well known.[7]

Let us examine now what we can get from combining Heckscher-Ohlin with the infinite-horizon neoclassical model, usually known as the Ramsey model. It is worth noticing that the so-called Ramsey model differs in some important respects from the original: (1) Ramsey assumed no discounting of future utility; (2) he modeled a planner's problem instead of a household choice, that is to say, his model was rather

[5] For a summary of all the sufficient conditions see Stiglitz and Uzawa (1969), pp. 406-7.

[6] The implication that in the open "well-behaved" two-sector growth model the poor country should specialize in capital goods might seem at odds with the facts. Please, keep in mind that we are not judging the empirical relevance of the two-sector neoclassical model but to what extent some popular conjectures might be derived from it.

[7] See Aghion and Howitt (1998) chapter 11 for a good summary.

normative than positive. Therefore, from now on we will talk about the infinite-horizon neoclassical model (IHNM).

Assuming constant returns to scale, output per worker *y* can be expressed as a function of the stock of capital goods per worker *k*. The closed economy aggregate IHNM has a steady state or balanced growth path when the rate of return on capital *r* equals the rate of time preference ρ (assuming no growth in consumption per worker for simplicity).[8] This pinpoints the steady state stock of capital goods per worker k^* from the aggregate production function, given the depreciation rate δ:

(2) $y = f(k)$

(3) $r = \rho = f'(k^*)-\delta$

(4) $k^* = f'^{-1}(\rho+\delta)$

In the transitional dynamics towards the steady state of the economy, capital accumulation is driven by the difference between *r* and ρ. In other words, *k* grows as long as $r > \rho$. Reasonably, this result translates to the two-sector version of the IHNM. It is not clear how to explain differences in the stocks of capital per worker between a poor country and a rich country within the IHNM. Some alternatives are: (a) the rate of time preference is the same in both countries, but the while rich country is already at the steady state level of capital per worker, the poor country is still behind in this regard because it is in the transitional dynamics; (b) both countries have reached their steady state levels of capital accumulation but they differ because the rate of time preference is greater in the poor country (it is more "impatient"). Explanation (a) can be interpreted as a situation resulting from different initial conditions. Explanation (b) is harder to sustain; certainly, rates of time preference might differ across countries and times, but then we would like to understand what causes their variation.

Let us now open up the two-good model. Suppose that trade liberalization leads to the equalization of good and factor prices across countries; then, rates of return on capital should also be equalized, as shown by Findlay (1995, chapter 2). This stems from the definition of the rate of return as the ratio of the rental rate of the capital good to its price p_K minus the depreciation rate:

(5) $r = R/p_K - \delta$

Before we consider Let us now consider the effect of trade liberalization on capital accumulation. The crucial issue is what will happen to the rate of return. Again, Findlay shows that the rate of return should be a decreasing function of the relative price of the labor-intensive good, which once more is presumed to be the capital good (the "well-behaved" case). Therefore, the impact of trade liberalization on the poor country will be a fall in the rate of return on capital. If the poor country accumulated less capital per worker because it was still in the transition, trade liberalization will bring *r* down to its steady state level, ρ, and therefore, capital accumulation will stop. The truncation of the

[8] If we assumed positive growth of consumption per worker in steady state at the rate g, then steady state r would equal $\rho+\theta g$, where θ is the inverse of the intertemporal elasticity of consumption. For a standard and complete treatment see chapter 2 in Romer (1996) or Barro and Sala-i-Martin (1995).

transitional dynamics implies that trade liberalization will abort income convergence. Again, we have a dynamic effect that runs contrary to the apparently equalizing static effect.

The case with different rates of time preference poses some logical puzzles. Let us assume that we start from autarkic steady states; then, rates of return will differ across countries. If after trade, factor price equalization takes place, the prevailing rate of return on capital will be lower (higher) than the rate of time preference for the poorer (richer) country. Therefore, *k* will rise in the richer country and decrease in the poorer leading to ... income divergence! The divergence in *k* will eventually reverse factor price equalization.[9] From then on, *r* will fall in the rich country and rise in the poor country until they equate each country ρ and reach new steady states with wider differences in *k*.

Fallacy 3: "Capital account liberalization also favors income convergence across countries".

The following quotation from the econometric literature is quite typical: "we find that financial liberalization mostly strengthens convergence" (Bekaert *et al*, 2002). It is also typical not to ground the hypothesis tested on any theory. A popular and informal argument for fallacy 3 goes like this: poor countries have lower stocks of capital per worker and higher rates of return on capital than rich countries; then, capital account liberalization will benefit all countries because it will enable capital flows from the rich countries to the poor countries, thereby increasing the returns to rich countries' savers and lowering the cost of capital for poor countries' investments.[10] Capital account transactions are usually interpreted as intertemporal trade. The presumptions of gains from intertemporal trade stem from the analogy to commodity trade. Again, gains from intertemporal trade will not necessarily imply convergence since the latter will depend on the distribution of the gains.

The rationale behind the argument of what we might call "equalizing intertemporal trade" is a Solovian neoclassical aggregate production function like the one in equation 2. However, it is crucial for the argument that the production function be not only neoclassical (that is to say, with constant returns to scale and decreasing marginal productivities) but also the same across countries.

Let us illustrate the point with a Cobb-Douglass production function (equation 6). Symbols have their usual meanings and A is a parameter reflecting the efficiency of labor, usually interpreted as related with the state of technical progress. Equation (6') and (6'') show the production function in its "intensive form", in which output per worker *y* depends on the stock of capital goods per worker *k* and the efficiency of labor.

(6) $Y = K^{\alpha}(AL)^{1-\alpha}$, $0<\alpha<1$

[9] Given the usual assumptions of the Heckscher-Ohlin model, that is to say, constant returns to scale, no factor intensity reversals, and same technology across countries, factor price equalization will fail when countries relative factor endowments are very different.

[10] For the present discussion we will leave aside the important issues related to uncertainty in capital markets. Somehow, this means that we will examine the strongest case for capital account liberalization.

(6') $Y/L = (K/L)^{\alpha}A^{1-\alpha}$

(6'') $y = k^{\alpha}A^{1-\alpha}$

(7) $\partial y/\partial k = \alpha k^{\alpha-1}A^{1-\alpha}$

The popular argument for capital account liberalization implicitly assumes that differences in *y* across countries are mainly explained by differences in *k* and neglects the role of differences in the efficiency of labor. Equation 7 shows that the marginal productivity of capital (*the* determinant of the rate of return in the neoclassical view), also depends on both the stock of capital per worker *k* and the level of *A*. Hence, it is perfectly possible to find countries that are richer than others in terms of income per worker but do not have lower marginal productivities of capital. Why? because differences in capital per worker are offset by differences in the efficiency of labor. But if the marginal product of capital is not necessarily lower in rich countries than in poor countries, the case for capital account liberalization will break down. Indeed, discussions about "why doesn't capital flow to the poor countries?" are commonplace in the new growth literature (Lucas, 1990); explanations differ but the fact is not disputed.

We mentioned before that the case for capital account liberalization rests on the hypothesis that differences in income per worker across countries are mainly explained by differences in capital per worker. However, this hypothesis has been so consistently rejected from an empirical viewpoint that it became a standard textbook example of the failures of the Solow growth model (Romer, 1996, chapter 1; Mankiw, Romer and Weil, 1992). As usual, the empirical failures might have several interpretations, but the evidence against the assumption of a common production function with no differences in efficiency across countries is overwhelming and ranges from the trade literature (v.g., Bowen, Leamer and Sveikauskas, 1987; Trefler, 1993 and 1995) to the growth literature (v.g., Easterly and Levine, 2001; Clark and Feenstra, 2001). This empirical evidence shows that factors other than capital per worker play an important role in explaining differences in income per worker. Then, the opening up of the capital account *per se* will not necessarily bring in major capital inflows in developing countries.

In a well-known paper, Mankiw, Romer and Weil (1992) have included human capital in the Solow model while keeping the assumptions of constant returns and common technology. Therefore, the above differences in labor efficiency are interpreted as differences in human capital endowments. It is interesting to note that even this conservative departure from Solow also invalidates the argument for capital account liberalization precisely because the differences in human capital endowments across countries have the same effect as the differences in A, namely, they might compensate for differences in *k* preventing the marginal product of capital from falling.

On the other hand, the endogenous growth literature has built a strong case against the hypothesis of a rate of return that decreases in the level of output per worker. Partly motivated by the need to explain nonconvergence in income per worker (Romer, 1986), all endogenous growth models predict nondecreasing rates of return. The well known "AK models" are examples of the constant rate of return variety. Two examples are the two-sector growth models developed by Lucas (1988) and Rebelo (1991), both based on Uzawa's (1965) idea of a self-reproducible factor. It is interesting to recall that Lucas

(1988) paper was partially motivated by the need to explain the failure of many developing countries to attract foreign capital inflows.

Within the endogenous growth literature, the knowledge-based models developed by Paul Romer (1986, 1990) and others, provide even stronger ammunition against capital account liberalization. Romer (1986) argues for increasing returns to scale based on R&D externalities that might lead to increasing rates of return. We will present a simplified version of Romer's 1986 model. Equation 8 shows the firm's production function which has constant returns to scale on the factors controlled by the firm. Output Y_i is produced with a composite capital good K_i which combines physical capital and an R&D firm's specific investment,[11] and labor L_i. The efficiency of labor is an exogenous parameter for each firm but it is determined by the aggregate stock of the capital good[12] (equation 9). Parameter φ measures the degree of R&D spillovers from a firm's specific investment to the rest of the economy. As a result of these spillovers, the aggregate production function has increasing returns to scale. There is also a wedge between the private and social marginal productivity of capital, as shown in equations (11) and (12), which leads to a suboptimal level of investment in a market equilibrium.

(8) $Y_i = BK_i^{\alpha}(AL_i)^{1-\alpha}$, $0<\alpha<1$

(9) $A = (\sum_i K_i)^{\varphi}=K^{\varphi}$, $\varphi>0$

(10) $Y = BK^{\alpha+(1-\alpha)\varphi}L^{1-\alpha}$

(11) $\partial Y_i/\partial K_i = \alpha BK_i^{\alpha+(1-\alpha)\varphi-1}L_i^{1-\alpha} = \alpha B(K_i/L_i)^{\alpha-1}K_i^{(1-\alpha)\varphi} = \alpha Bk_i^{\alpha-1}K_i^{(1-\alpha)\varphi}$

(12) $\partial Y/\partial K = [\alpha+(1-\alpha)\varphi]BK^{\alpha+(1-\alpha)\varphi-1}L^{1-\alpha} = [\alpha+(1-\alpha)\varphi]B(K/L)^{\alpha-1}K^{(1-\alpha)\varphi-1}=$
$= [\alpha+(1-\alpha)\varphi]Bk^{\alpha-1}K^{(1-\alpha)\varphi-1}$

If φ equals 1, the marginal productivity of capital will be an increasing function of the amount of labor: constant with constant labor (an "AK model") and increasing if labor grows over time. If φ is greater than 1, the marginal productivity of capital will be increasing in capital. In all cases, even when φ is between 0 and 1, the marginal productivity of capital will be an increasing function of the stock of capital. That is to say, larger (in this regard) countries will, *ceteris paribus*, have a greater rate of return. In such a world, capital account liberalization might lead to polarization and divergence through cumulative processes, a result that certainly rings a bell in the developing world.

Romer (1990) presents a more Schumpeterian model in which market power allows innovators to recover their R&D investments. An important result is that both the growth rate and the rate of return are increasing functions of the stock of human capital. Therefore, capital account liberalization might again lead to income divergence.

[11] This idea is akin to Arrow's learning by doing.
[12] This means that the measure of each firm is negligible, that is to say, we are talking about competitive markets.

Conclusions

We have examined three neoliberal propositions regarding economic openness and inequality that are commonplace in multilateral financial organizations, the business community, and even in the academia. According to them, free trade and capital account liberalization should, on one hand, help the poor and decrease inequality in developing countries, and on the other hand these policy reforms should reduce inequality between developing and developed countries by fostering income per capita convergence.

After careful scrutiny we show that these propositions are a *non sequitur* of mainstream neoclassical economics. That is why we call them fallacies. Some of them are based on wrong simplifications and generalizations of textbook models that have been consistently disproved in the empirical arena. Others are just plain wrong as they stem from the confusion between static theory results and dynamic theory problems.

Given the weak theoretical foundations of these fallacies, their popularity, especially in some academic circles, deserves an explanation. Perhaps, they bear testimony to the power of ideologies and vested interests in our profession.

APPENDIX

Based on Leamer (1984) data, it can be said that the most abundant factor in Latin America was not unskilled labor,[13] but some natural resource, namely, some kind of land (Argentina, Brazil and Mexico), or minerals (Chile), depending on the country (see Table 1). Indeed, for our selected Latin American countries, only Brazil and Mexico counted unskilled labor as one of the abundant factors while for Argentina and Chile, unskilled labor was one of the scarce factors, as can be seen in Table 1. In contrast, unskilled labor was the most abundant factors in India, and Mauritius, and the second most abundant in South Korea.

Data collected in a classic study of factor content of trade (Bowen, Leamer, and Sveikauskas, 1987, Table 1), also shows a similar picture. Argentina exported arable land, pastures, capital and only one labor category, namely, agricultural labor, while it imported all other labor categories. Brazil only exported arable land while it imported all other factors. México exported arable land, forests, all labor categories but production labor, and pastures, while it imported production labor and capital. Korea exported pastures and all labor categories while it imported forests, arable land and capital. Chile was not included in the study.

TABLE 1
RANKING OF RELATIVE FACTOR ENDOWMENT[1]
(Year 1975)

Country	← More abundant factors						Scarcer factors →				
Argentina	+LD3	+LD2	+OIL	+L2	+L1	-K	-L3	-MIN	-COAL	-LD1	-LD4
Brazil	+LD1	+MIN	+L3	+L2	+LD3	+L1	-K	-LD2	-OIL	-COAL	-LD4
Chile	+MIN	+LD1	+LD2	+L2	+OIL	0L1	-L3	-K	-COAL	-LD3	-LD4
Mexico	+LD2	+LD1	+MIN	+L2	+OIL	+L1	+L3	-K	-COAL	-LD3	-LD4
India	+L3	+L2	+L1	+COAL	+LD3	+LD1	+LD2	+MIN	-K	-LD4	-OIL
Korea	+L2	+L3	+COAL	+L1	+LD4	-L3	-K	-MIN	-LD1	-LD2	-OIL
Mauritius	+L3	+L1	+LD1	-K	-L2	-LD2	-LD3	-LD4	-COAL	-MIN	-OIL

1/ Relative factor abundance is defined in the Vanek sense: the ratio of a country's factor endowment share in the world total endowment to the country's GDP share in world GDP. A ratio greater (less) than 1 for some factor in a country means that that factor is relatively abundant (scarce) in that country.
Relative factor abundance is ranked according to the ratio of each factor. The more leftward a factor, the more abundant it is; the more rightward, the scarcer.
+X means that X's ratio is greater than 1, then X is an abundant factor; -X means that X's ratio is less than 1, X is a scarce factor; 0X means that X's ratio is 0, a factor neither scarce or abundant.
K: capital, L1: professional or technical workers, L2: literate nonprofessional workers, L3: illiterate workers, LD1: land area in tropical rainy climate zone, LD2: land area in dry climate zone, LD3: land area in humid mesothermal climate zone, LD4: land area in humid microthermal climate, COAL: value of production of primary solid fuels, MIN: value of production of minerals, OIL: value of oil and gas production.
Source: based on Leamer's Appendix D (1984).

Table 2 shows several recent indicators of educational attainment of the population aged 25 and over in our four Latin American countries and other developed and developing countries. Argentina and Chile compares favorably to Italy and Spain. Mexico is above the low-wage exporters. Although Brazil's average years of schooling are similar to some of the low-wage exporters, it has a significantly lower fraction of the population with no schooling, and higher fraction with post-secondary studies than the low-wage exporters.

[13] We assimilate unskilled labor to Leamer's L3 category, illiterate workers.

TABLE 2

EDUCATIONAL ATTAINMENT IN SELECTED COUNTRIES

	Highest Level Completed (% of population aged 25 and over)				Average Years Of Schooling
	No Schooling	First Level	Second Level	Post Secondary	
Country	**2000**	**2000**	**2000**	**2000**	**1999**
Japan	0.0	12.9	17.4	15.0	9.72
France	**0.7**	19.8	22.4	9.4	8.38
United States	1.0	4.5	21.6	30.3	12.25
United Kingdom	2.9	17.9	12.3	10.8	9.35
Spain	**3.6**	22.0	13.8	9.2	7.25
Chile	**5.3**	9.6	15.1	10.7	7.89
Cuba	**5.7**	15.6	16.8	8.6	7.78 *
Argentina	**5.8**	30.1	10.4	11.9	8.49
Korea	**8.0**	15.9	34.5	19.1	10.46
Mexico	12.4	19.4	13.3	6.6	6.73
Taiwan Province of China	12.4	15.4	22.9	9.7	8.53
Italy	12.4	19.0	11.6	8.3	7.00
Thailand	17.3	27.3	4.1	11.2	6.10
China	20.9	15.3	14.1	2.3	5.74
Brazil	21.2	11.5	5.4	5.7	4.567
Kenya	32.8	10.8	1.3	1.0	3.99
Indonesia	36.2	18.0	11.5	2.2	4.71
India	44.5	12.4	6.5	3.3	4.77
Bangladesh	55.7	7.6	5.0	2.3	2.45

* Year 2000

Source: Based on Barro & Lee

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