Globalization, Poverty, and All That:

Factor Endowment versus Productivity Views

William Easterly

New York University

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Globalization causing poverty is a staple of anti-globalization rhetoric. The Nobel prizewinner Dario Fo compared the impoverishment of globalization to September 11th: "The great speculators wallow in an economy that every year kills tens of millions of people with poverty—so what is 20,000 dead in New York?" [1] The protesters usually believe globalization is a disaster for the workers, throwing them into "downward wage spirals in both the North and the South." Oxfam identifies such innocuous products as Olympic sportswear as forcing laborers into "working ever-faster for ever-longer periods of time under arduous conditions for poverty-level wages, to produce more goods and more profit."[2] According to a best-selling book by William Greider,

> in the primitive legal climate of poorer nations, industry has found it can revive the worst forms of nineteenth century exploitation, abuses outlawed long ago in the advanced economies, including extreme physical dangers to workers and the use of children as expendable cheap labor.[3]

Oxfam complains about how corporate greed is "exploiting the circumstances of vulnerable people," which it identifies mainly as young women, to set up profitable "global supply chains" for huge retailers like Walmart. In China's fast-growing Guandong Province, "young women face 150 hours of overtime each month in the garment factories – but 60 per cent have no written contract and 90 per cent have no access to social insurance." Women at the bottom of these global supply chains must work "at high speed for low wages in unhealthy conditions." [4]

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[1] Quoted by David Levy and Sandra Peart, The Secret History of the Dismal Science: Parasite Economics and Market Exchange, December 2001, http://www.econlib.org/library/Columns/LevyPeartdismal5.html

[2] http://www.oxfam.org.uk/what_we_do/issues/trade/playfair_olympics_eng.htm

[3] William Greider, One World, Ready or Not: The Manic Logic of Global Capitalism, Touchstone Books: New York, 1997, p. 34

[4] http://www.oxfam.org.uk/what_we_do/issues/trade/trading_rights.htm

Even Western diplomats are scared by the effects of globalization on poor people: Jean-Paul Fitoussi, advisor to French prime minister Lionel Jospin, referred to "deregulated global markets" as "Frankenstein," who somehow must be brought "under control."Anthony Giddens, director of London School of Economics and advisor to Tony Blair, said there was a "general realization" that "you cannot leave people unprotected before the global market." [5] (But can you leave them unprotected before G-7 bureaucrats?)

Economists find such rhetoric hard to take, since our standard textbook models identify at least three ways in which globalization makes the poor of the world better off. Let us define globalization as the movement across international borders of goods and factors of production. Let us identify the world's poor as largely belonging to the group of unskilled workers in poor countries. Then globalization has three beneficial channels for poor workers: (1) It gives them access to inflows of capital, which will raise the marginal product of labor and thus wages (part of which can be taken in the form of increased health and safety benefits and shorter hours), (2) It gives them the opportunity to migrate to rich countries, where their wages will be higher; and (3) It gives them market access for their goods, raising the wages of unskilled workers in labor abundant countries according to textbook trade theory.

Do the poor indeed benefit from globalization through these three channels? I review how these predictions arise from models in which income differences between rich and poor countries are explained by factor endowments. If income differences are instead explained by productivity differences, then these simple predictions do not hold. Hence, it is important to decide to what extent factor endowment models explain the stylized facts as opposed to productivity models. I examine the actual behavior of poverty and trade, trends in trade and factor

[5] John Micklethwait and Adrian Wooldridge, p. 283

flows, factor returns, and relative incomes to assess whether the factor endowment predictions come true.

I conclude that the clear theoretical channels between globalization and poverty featured by factor endowment models help us understand some important globalization and poverty episodes. Unfortunately, many other episodes seem to require productivity channels to accommodate the facts. Even more unfortunately, we know much less about how productivity channels work than we know about factor endowments.

Part I: The channels by which globalization affects poverty in standard models

I define globalization as the free movement of capital, labor, and goods across national borders. When I discuss effects of globalization, I have in mind unhindered flows as compared to a situation with restricted flows, or in the extreme, no flows at all. Factor endowment models feature equal productivity levels across nations, while the productivity model is defined as differing productivity levels. These are polar cases, of course, as there are intermediate cases of differences in both factor endowments and productivity. I use the polar cases for pedagogical clarity.

Factor movements

In the factor endowment model of factor movements, free movement of factors tends to reduce poverty gaps between nations. In this view, income differences between countries are due to different capital-labor ratios. Rich nations have more capital per worker than poor nations. Rates of return to capital will be higher in poor nations than in rich nations, while wages will be higher in rich nations than poor nations.

The equations are as follows. Let Y_i, A_i, K_i, and L_i stand for output, labor-augumenting productivity, capital, and labor in country i (where i can either be rich (R) or poor (P)).

$$Y_i = K_i^{\alpha}(A_i L_i)^{1-\alpha}$$

Let $k_i = K_i/L_i$ and $y=Y_i/L_i$. the rate of return to capital r and wage w in country i is:

$$r_i = \frac{\partial Y_i}{\partial K_i} = \alpha k_i^{\alpha-1} A_i^{1-\alpha}$$

$$w_i = \frac{\partial Y_i}{\partial L_i} = (1-\alpha) k_i^{\alpha} A_i^{1-\alpha}$$

I am going to use the wage of unskilled workers in poor countries as the indicator of poverty to be affected by globalization. I prefer this to the usual poverty headcount numbers, as the latter has a number of undesirable properties: (1) it is very sensitive to the poverty line chosen, and there is no clear guidance how to choose a poverty line; (2) it has an illogical discontinuity at the poverty line, implying a large leap in welfare with an ε movement across the poverty line, but little effect of even a substantial movement as long as one stays either below or above the poverty line. Note that $w_i=(1-\alpha)\ y_i$, so I can simply use per capita incomes of poor countries as indicators of unskilled wages (assuming the same α across countries).

The per capita income measure is potentially subject to the critique that increases in Gini coefficients could mean that income gains all accrue to the rich. Hence I will do some robustness checks on changes in Gini coefficients. I will show in a moment that factor endowment models generally predict that globalization will lower inequality in poor countries, not increase it.

If $A_R=A_P=A$, then the per capita income ratio between the two countries when A is the same is:

$$\frac{y_R}{y_P} = \left(\frac{k_R}{k_P}\right)^{\alpha}$$

If there is free mobility of factors, then capital will want to migrate from rich to poor nations, while workers will want to migrate from poor to rich nations. This will decrease the capital-labor ratio in rich countries, while increasing it in poor countries.These flows will continue until capital-labor ratios are equal across nations and factor prices are equal, steadily decreasing income gaps between nations (reducing poverty in poor countries). Compared to the

no factor mobility state, returns to capital will rise in rich countries and fall in poor countries. With factor mobility, wages will fall in rich countries and rise in poor countries. Poverty in the South falls for two reasons: (1) the migration of capital to poor countries raises wages in poor countries, (2) the migration of unskilled labor from poor to rich nations raises income both of the migrants (who will gain access to higher capital per worker in the North) and of those workers who remain behind (because capital per worker in the South increases with the departure of some Southern workers).

If everyone has raw labor but less than 100 percent of the population owns capital, then the capital rental/wage ratio is positively related to inequality. Hence, factor flows (globalization) will reduce inequality in poor countries and increase it in rich countries.

The predicted capital flows are very large. Denoting k_i^* as the capital-labor ratio in country i (i=P or R) in the final equilibrium, the unstarred values of k_i and y_i as the initial values, and then we have the following:

$$\frac{k_P^* - k_P}{k_R^*} = 1 - \left(\frac{y_P}{y_R}\right)^{\frac{1}{\alpha}}$$

$$k_P^* = k_R^*$$

$$\frac{k_p^* - k_p}{y_P^*}\frac{y_P^*}{k_P^*} = 1 - \left(\frac{y_P}{y_R}\right)^{\frac{1}{\alpha}}$$

$$\frac{y_P^*}{k_P^*} = \frac{r^*}{\alpha}$$

$$\frac{k_p^* - k_p}{y_P^*} = \frac{\alpha}{r^*}\left[1 - \left(\frac{y_P}{y_R}\right)^{\frac{1}{\alpha}}\right]$$

In the factor endowment model, even small differences in initial income trigger massive factor flows. If we assume a capital share of 1/3, a ratio of poor to rich country income of 0.8, a marginal product of capital (r^*) of .15, then the cumulative capital inflows into the poor country will be 108% of the terminal equilbrium GDP in the poor country!

Suppose instead that income differences between nations are due to productivity differences rather than differences in capital per worker. If there are multiple sectors, suppose first of all that relative productivity is the same across any two sectors in both nations, but the rich country has an absolute productivity advantage in all sectors. Now both capital and labor will want to move to the rich country, unlike the prediction of opposite flows in the factor endowment model. Unlike the latter case, the final outcome in a frictionless world would be a corner solution in which all capital and labor moves to the rich country to take advantage of the superior productivity. Obviously there have to be some frictions such as incomplete capital markets, preference for one's homeland, rich country immigration barriers, costs of relocating to a new culture, etc. to avoid this extreme prediction. Lant Pritchett argues that there may in fact be countries that could become "ghost countries" if factor mobility was unimpeded, just like the rural counties currently emptying out on the Great Plains in the United States (Pritchett 2003).

In the productivity differences model, equating rates of return to capital across countries implies that the ratio of k_R to k_P is the same as the ratio of A_R to A_P. This will also be the ratio of relative per capita incomes *and* the ratio of relative wages under free capital mobility:

$$\frac{\partial Y_R}{\partial K_R} = \alpha k_R^{\alpha-1} A_R^{1-\alpha} = \frac{\partial Y_P}{\partial K_P} = \alpha k_P^{\alpha-1} A_P^{1-\alpha}$$

$$\frac{k_R}{k_P} = \frac{A_R}{A_P}$$

$$\frac{w_R}{w_P} = \left(\frac{k_R}{k_P}\right)^{\alpha}\left(\frac{A_R}{A_P}\right)^{1-\alpha} = \frac{A_R}{A_P} = \frac{y_R}{y_P}$$

If income differences are due to productivity differences, then opening up to capital inflows will have no effect on unskilled wages in the poor country. The relative income of the world's poor will remain unchanged with this form of globalization (free capital mobility).

Of course, this is a polar case. In the real world, the poor country could have lower wages and per capita incomes because of *both* lower productivity and lower capital/labor ratios.

Assessing the degree to which productivity and factor endowments contribute to poverty is the key to assessing the predicted impact of capital mobility.

There is one other case that is possible with productivity differences, however. The poor country could have TOO MUCH capital for its level of productivity. This could happen because of high government investment, for example. Now to assess the impact of free capital mobility on poverty, we need to know the counterfactual. What would have been the ratio of k_R to k_P if capital had not been free to move across borders? This is equivalent to asking when capital controls exist in poor countries, are they binding on inward capital movements or on outward capital movements? It is also equivalent to asking whether the rate of return to capital in poor countries with capital controls is lower than the rate of return to capital in rich countries. Probably the answer to these questions is different for different poor countries.

If capital controls are binding on outward capital movements, then removing them would result in capital movements from poor to rich countries. This would lower capital-labor ratios in the poor countries and raise them in rich countries. This initial situation means free capital mobility increases the per capita income ratio between rich and poor countries, increasing poverty in the South. Free capital mobility would lower the rate of return to capital in rich countries and increase it in poor countries; it would increase wages in rich countries and lower them in poor countries. Therefore it would lower domestic inequality in rich countries and increase domestic inequality in poor countries. Capital flight from poor countries increases both world poverty and domestic inequality in the poor countries.

Trade flows and inequality

In the factor endowments model, goods mobility will have the same effect as factor mobility even if factors cannot move. The capital abundant rich nation will export capital-intensive goods, while the labor-abundant poor nation will export labor-intensive goods. The expansion of demand for labor and fall in demand for capital in the poor country (compared to autarchy) will raise wages of unskilled labor and lower capital rentals. The reverse will happen in

the rich country. If the equilibrium is for less than complete specialization, factor prices will move toward equality in the two countries just like in the factor mobility case. Increased trade will reduce poverty in the South because of the expansion in demand for labor that comes with the expansion of labor-intensive exports. Again, if the capital rental/wage ratio is positively related to inequality within the nation, trade will increase inequality in the rich country and decrease it in the poor country.

What if the absolute level of labor-augmenting productivity is different between the two countries? With productivity differences, the factor price equalization theorem still applies, but now applies to effective labor A_iL_i. The wage per unit of effective labor will be equalized between the two countries under free trade, as will the rate of return to capital in the two countries. This means that the wage per unit of physical labor in the two countries will be different. The ratio of the wage per unit of physical labor in the higher productivity (rich) country to the lower productivity (poor) country will be A_R/A_P. This will also be the ratio of per capita incomes in the two countries.

The analysis of which country is more labor abundant will also differ from the equal productivity case. If the relative scarcity of labor in the rich county is sufficiently offset by higher relative productivity, then the rich country will be "labor-abundant" and will export "labor-intensive" goods (the Leontief-Trefler paradox). Compared to autarchy, wages will increase in the rich country and decrease in the poor country. Trade increases poverty in this paradoxical example. In this case, trade will reduce inequality in the rich country and increase it in the poor country. Compared to autarchy, trade causes divergence of per capita incomes in this unusual case.

If productivity differences are not so stark as to offset relative factor scarcity, the rich country will be capital-abundant, and we will go back to the usual prediction that trade reduces poverty in the South. Trade will still increase inequality in the rich country and lower it in the poor country.

Now suppose that we allow relative productivity across the two sectors (capital-intensive and labor-intensive) to differ between countries, as well as allowing absolute productivity to differ. This will give us another way in which the simple principle of capital abundant countries producing capital intensive exports need no longer apply. If the capital abundant country has a sufficiently strong relative productivity advantage in the labor intensive sector, it could wind up exporting labor intensive goods (the Leontief-Trefler paradox again). This would raise the price of labor in the rich country and depress the rental price of capital, decreasing inequality in the rich country. Similarly, if the capital-scarce poor country has a relative productivity advantage in the capital-intensive sector, then it could wind up exporting capital-intensive products, raising the rate of return further to capital and increasing poverty in the poor nations. When we allow for productivity differences, the effect of trade on poverty in the South could go either way.

The pattern of trade driven by relative differences in productivity seems to fit the real world in which countries hyper-specialize in particular products in which they have undergone enough learning to produce efficiently (like surgical instruments in Pakistan). Hausmann and Rodrik 2002 point out how general is the phenomenon of hyper-specialization, which seems inconsistent with factor-endowment stories of trade.

As noted by many previous authors, there are interesting interactions between trade and factor flows arising from the unconventional productivity view of comparative advantage. Whereas in the factor endowments model, trade and factor flows do the same things to factor prices and are effectively substitutes, trade and factor flows can be complements in the productivity model. For example, if the rich country is perversely "labor abundant" because of productivity advantages in the labor-intensive sector, then trade will raise the wage in the rich country (relative to the poor country) and lead to more labor migration from poor to rich countries. This makes the rich country even more "labor abundant," strengthening its comparative advantage in labor-intensive products.

Analogously, trade could lead to capital inflows into the "capital abundant" poor country, if relative productivity differences lie in that direction. This is the opposite of what happens in the factor endowments model, in which exports from the poor country of labor-intensive goods lowers the rate of return to capital, eliminating the capital inflows that would have otherwise responded to the high returns to scarce capital.

The bottom line is that the effect of trade on Southern poverty depends on relative productivity levels as well as factor endowments. Which way the effect goes is an empirical matter.

Domestic factor accumulation and globalization

How do trade and factor movements affect domestic savings and factor accumulation? In the factor endowments model differences in income reflect the rich country being further along than the poor country in the transition to the (same) steady state. Capital inflows tend to crowd out domestic saving, while capital outflows crowd in domestic saving. Labor inflows crowd in domestic saving, while labor outflows crowd out domestic saving.

In the transition to the steady state, the domestic accumulation of capital per worker depends monotonically on the rate of return to capital. The rate of return to capital is in turn an inverse function of the capital-labor ratio. An inflow of foreign capital increases the capital-labor ratio (speeding the transition to the steady state, in which the rate of return to capital will be fixed by intertemporal preference parameters). In the transition in the poor country, the foreign capital inflow (holding labor migration constant) substitutes for domestic saving, in that it lowers the rate of return to capital and leads to less domestic accumulation of capital per worker. Conversely, an outflow of labor migration from the poor country raises the capital-labor ratio and lowers the rate of return to capital, which will decrease domestic capital accumulation (holding foreign capital inflows constant). Decreased domestic capital accumulation tends to increase capital rentals and lower wages, offsetting the fall in capital rentals and the rise in wages induced by capital inflows

and labor outflows. The decreased poverty in the South associated with capital inflows and labor outflows is thus offset by the domestic capital accumulation effects.

The opposite predictions apply to the rich country if it has capital outflows and labor inflows. In a mirror image to capital accumulation in the poor country, note that the negative effects of capital outflows and "cheap migrant labor" on inequality in the rich country are offset by increased domestic capital accumulation, which lowers the rate of return to capital back down and drives wages back up from where they were driven by these factor movements. This is why the "race to the bottom" story is fundamentally wrong – it is really "a race to the top," where capital is either being accumulated or being moved to propel all countries towards the long run income level given by the equating of the net marginal product of capital to the discount rate (assumed to be the same everywhere).

In the productivity model, countries are already at their steady states given by their different productivity levels. Growth of capital per worker is given by the need to maintain K/AL constant, so growth of capital per worker is simply given by productivity growth. There is no tendency for capital inflows in this steady state, since rich and poor countries will have the same K/AL (with differences in A offset by differences in K/L), and thus the same rate of return to capital (assuming the same intertemporal preferences in the rich and poor country).

There will be the same wage per unit of effective labor, but a higher wage per unit of physical labor in the rich country. Whether workers migrate from the poor country depends on whether they immediately gain access to the higher productivity in the rich country. If they are stuck with their home country productivity level, there is no incentive to migrate. However, the evidence seems to point to immigrants almost immediately getting a wage increase compared to their home country and to getting a comparable wage to the unskilled workers in the destination country. This suggests that workers do get access to the higher productivity in the destination country. In this case, labor migration induces both capital inflows to the rich country and increased domestic investment by rich country agents until K_R/A_RL_R regains its equilibrium level.

We again get the phenomenon of ALL factors of production flowing to the rich country, with the added prediction that domestic investment will also increase with in-migration of labor in the rich country. The poor country with the out-migration of labor will have a incipient increase in K_P/A_PL_P, which will be met by a combination of capital outflows and decreased domestic investment. There is no effect on relative per capita incomes in the rich and poor countries, but note that global inequality and poverty have decreased in that the migrant workers are getting higher wages without any other workers getting lower wages.

Introducing land as a third factor

Of course, there is one factor that does not move – land and natural resources. Even if productivity is higher elsewhere, land prices could adjust to retain some capital and labor in the home country. This was an important factor in the 19th century. It seems less so now in today's urbanized world. If land and capital are perfect substitutes, then an economy could substitute away from land and not drive up the return to the other factors to make to want them stay. However, there are many countries where agriculture is important enough.that land and natural resource availability is a potentially relevant sticky factor that prevents flight of all factors to high productivity places.

Land acts much like productivity in its effect on the marginal products of capital and labor. Hence a land-rich place could attract both capital and labor, just like a high productivity place does. This was a very important factor in the 19th century wave of globalization. It still seems relevant today in that natural resources may attract capital and labor into areas that otherwise have low productivity.

The relevant equations including land (T) are the following. Let the production function including land be:

$$Y_i = T_i^{\alpha} K_i^{\beta} (A_i L_i)^{1-\alpha-\beta}$$

Now let capital and labor freely move to equate rates of return to capital and wages. Let $t_i = T_i/L_i$ and $k_i = K_i/L_i$. The rate of return to capital and wage will be:

$$\frac{\partial Y_i}{\partial K_i} = \beta t_i^{\alpha} k_i^{\beta-1} A_i^{1-\alpha-\beta}$$

$$\frac{\partial Y_i}{\partial L_i} = (1-\alpha-\beta) t_i^{\alpha} k_i^{\beta} A_i^{1-\alpha-\beta}$$

Obviously, both capital and labor will be attracted to the land-abundant places as well as the places with higher productivity. Since both capital and labor can move, you can show that capital-labor ratios in the two places will be equated. Labor will move to equate wages, which reflect both land-abundance and productivity. If there were no productivity differences between places, land-labor ratios would also be equated.

The effect of globalization on poverty with different land endowments now depends on whether the poor nation is land-poor or land-rich. If the poor nation is land-rich, then the only reason it could be poor under the factor endowments model is that it lacks capital. Thus, the poor country attracts capital inflows under globalization both because capital is scarce in the poor country and because land wealth implies a higher marginal product of capital. This will increase wages and reduce poverty in the South. This is the relevant case for poor countries with rich commodity endowments.

If the poor nation is land-poor, then we would expect it to lose population under globalization until land-labor ratios are equated. There is still a catching up effect of Southern to Northern wages. In general, free factor mobility suggests a catching up of poor to rich nations in either case.

With differences in productivity, population density will be higher in the higher productivity places:

$$\frac{\frac{L_R}{T_R}}{\frac{L_P}{T_P}} = \left(\frac{A_R}{A_P}\right)^{\frac{1-\alpha-\beta}{\alpha}}$$

Per capita incomes will move towards equality as well, since labor moves in response to both relative land abundance and productivity. Hence, there will be convergence of per capita incomes if both labor and capital can move freely, in either the factor endowments or productivity models. The only remaining sign of higher productivity in the rich countries in equilibrium is that they will have attracted capital and labor away from the lower productivity poor countries. Similarly, the only effect remaining in equilibrium of higher land abundance will be that land-abundant countries will wind up with more labor and capital.

Obviously these are extreme predictions that only apply under special circumstances. Free capital mobility seems more likely than free labor mobility, so rates of return across countries are more likely to be equalized than wages. An interesting intermediate case that may be more realistic is that labor cannot freely move, but capital can.

As far as trade predictions, we can substitute "land" for "capital" in all of the above trade statements and derive the same conclusions. A land-abundant nation opening to international trade will see rising land-rental to wage ratios, which probably implies increasing inequality. A land-scarce nation opening up will see falling land rent/wage ratios and decreasing inequality. The effects are as if labor was migrating from the land-scarce country to the land-abundant country.

Mobile physical capital and immobile human capital

So far I have not considered human capital. An interesting case with human capital is the open economy version of the factor accumulation model by Barro, Mankiw, and Sala-i-Martin (BMS) 1995. BMS allows capital flows to equalize the rate of return to physical capital across

countries, while human capital is immobile. Immobile human capital explains the difference in per worker income across nations in BMS.

The poor countries' marginal product of capital is low because of scarce human capital, which offsets its normal elevation by abundant labor. Whether scarce human capital outweighs abundant labor is ambiguous for poor countries. Hence, globalization does not necessarily lead to physical capital inflows for the South, and thus does not necessarily raise wages of unskilled workers. This could be another reason why globalization does not always lead to capital flows from rich to poor nations, and thus capital mobility does not necessarily lower poverty. Here we have the unwelcome appearance of ambiguity even in the factor endowments model.

However, there are problems with the BMS model that explains income differences solely by human capital, problems so severe as to make it now really a viable factor endowments model. As pointed out by Romer 1995, this implies that both the skilled wage and the skill premium should be much higher in poor countries than in rich countries. To illustrate this, we specify a standard production function for country i as

$$Y_i = AK_i^{\alpha} L_i^{\beta} H_i^{1-\alpha-\beta}$$

Assuming technology (A) is the same across countries and that rates of return to physical capital are equated across countries, we can solve for the ratio of the skilled wage in country i to that in country j, as a function of their per capita incomes, as follows:

$$\frac{\frac{\partial Y_i}{\partial H_i}}{\frac{\partial Y_j}{\partial H_j}} = \left[\frac{Y_i / L_i}{Y_j / L_j} \right]^{\frac{-\beta}{1-\alpha-\beta}}$$

Using the physical and human capital shares (.3 and .5 respectively) suggested by Mankiw 1995, the model implies that skilled wages should be five times greater in India than the US (to correspond to a fourteen-fold difference in per capita income). In general, the equation above

shows that skilled wages differences across countries should be inversely related to per capita income if human capital abundance explains income differences across countries, a la BMS.

The skill premium should be seventy times higher in India than the US. If the ratio of skilled to unskilled wage is about 2 in the US, then the skilled to unskilled wage ratio in India should be 140. This would imply a fantastic rate of return to education in India, seventy times larger than the return to education in the US.

If we relaxed the restriction of immobility of human capital in this case, we would get a reverse brain drain from rich to poor countries. If we broaden globalization to include mobility of human capital, this would be yet another reason why poor countries should catch up to rich in the factor endowments model – because they attract both physical and human capital.

With productivity differences, we do not have these extreme predictions. If the income difference between the South and the North are explained largely by productivity, then lower productivity has an offsetting effect to the scarcity of skills in the South in their effects on the return to skill in the South. This would cancel the counterfactual prediction of reverse brain drain. The predicted effect on physical capital inflows to the South is ambiguous as it was before, and hence the effect on Southern poverty. If we allow human capital to move with lower productivity in poor countries, there could be a tendency for both physical and human capital to flee from poor countries, depressing wages and worsening poverty. If we allow all three factors – physical and human capital and unskilled labor -- to move, we return to the extreme prediction of poor countries emptying out.

The central message of this section has been that globalization reduces world poverty if income differences are due to differences in factor endowments, while the effects of globalization are null or ambiguous if income differences are due to productivity differences. I summarize the different predictions in the attached table. Different globalization episodes or different groups of

countries could fall into either case, or somewhere in between. Hence, I now turn to the examination of stylized facts on globalization and poverty.

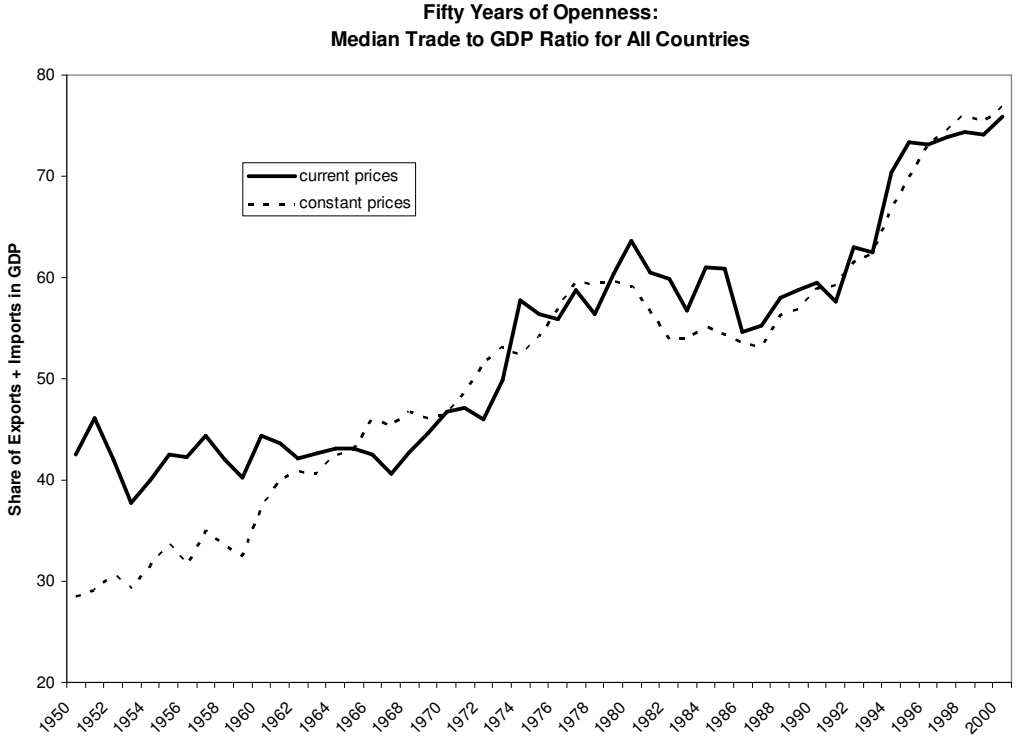
Predictions of theoretical models of globalization	*Income differences due to factor endowments*	*Income differences due to factor endowments*
Neoclassical model with free mobility of capital and labor	Capital moves from rich to poor nations; labor moves from poor to rich nations; equal capital-labor ratios between rich and poor; factor price equalization; higher unskilled wages and reduced poverty in the South; increased inequality in rich countries, reduced inequality in poor countries.	Both capital and labor move from poor to rich countries. Ratio of capital-labor ratios in rich to poor countries is the same as ratio of relative productivity. In frictionless world, corner solution of rich country with all capital and labor, poor country emptying out ("Ghost countries")
Neoclassical model with free trade in goods	Rich nations export capital-intensive goods, poor nations will export labor intensive goods; factor price equalization; higher unskilled wages and reduced poverty in the South; trade increases inequality in rich nation and reduces it in poor nation.	Ratio of wages in rich to poor countries will be given by the productivity ratio. 2 cases: (1) Rich nation could export labor-intensive goods if productivity advantage offsets labor scarcity; then trade would reduce inequality in rich country and decrease wages in poor country, and trade would increase Southern poverty. (2) If productivity advantage not so extreme, then trade still increases inequality in rich country, increases it in poor country, reduces poverty in South
Domestic capital accumulation and globalization	In poor countries, capital inflows crowd out domestic saving along the transition path to steady state; in rich countries, capital outflows crowd in domestic capital accumulation	No tendency for capital flows in steady state determined by relative productivity levels.
Neoclassical model including land with free mobility of factors	Land-rich place attracts both capital and labor; in the limit, land-labor ratios are equated across countries; convergence of per capita incomes.	Population density higher in high productivity places; still have convergence of per capita incomes.
Neoclassical model with mobile physical capital and immobile human capital (Barro-Mankiw-Sala-i-Martin)	Physical capital may not flow to poor countries if human capital scarcity more than offsets unskilled labor abundance; however model implies counterfactually high returns to skills in human-capital-scarce poor countries than in human-capital-abundant rich countries.	Returns to skills determined by relative productivity levels. High productivity rich countries will have higher returns to skills than low productivity poor countries. Physical capital flows ambiguous.

Part II: Empirical Evidence on Globalization and Poverty

In this section, I review the evidence on globalization and poverty. My method is to look for stylized facts that provide direct or indirect evidence for whether factor endowment differences or productivity differences explain poverty. I look first at the overall patterns of trade and factor flows, then at the behavior of relative international incomes and factor prices, and finally at the effect of globalization on domestic inequality. I then adduce evidence from two other sources: the experience with "old" globalization from the 19th century, and the evidence on factor movements within countries. The overall pattern tends to support the productivity differences view instead of the factor endowments view, with occasional exceptions. Hence, while there are some globalization episodes that have reduced poverty, the overall effects of globalization on poverty look likes it falls short of the expectations of the standard textbook models.

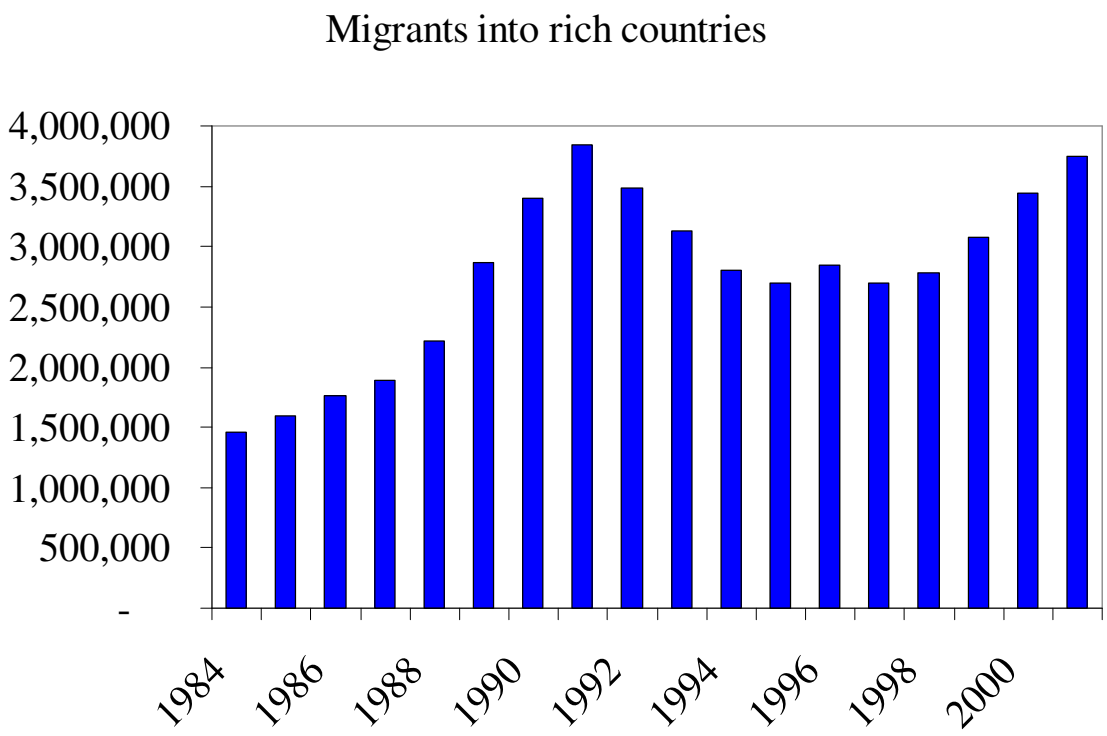
Empirical evidence on trade and factor flows across countries

Supporting the conventional wisdom that recent decades have shown increasing "globalization", we do see steadily rising trade/GDP ratios over 1950-2001:



Source: Summers and Heston

The era of globalization has coincided with movements of millions of people from poor countries to rich countries.



The figure shows the flows of migrants into the rich countries in absolute numbers.

The migration of labor is overwhelmingly directed towards the richest countries. The three richest countries alone (the US, Canada, and Switzerland) receive half of the net immigration of all countries reporting net immigration. Countries in the richest quintile are all net recipients of migrants. Only 8 countries in the 90 countries in the bottom four-fifths of the sample are net recipients of migrants (Easterly and Levine 2001).

Embodied in this flow of labor are flows of human capital towards the rich countries, the famous "brain drain." In terms of the simple models above, human capital movements are governed by the same predictions as physical capital movements.

We used Grubel and Scott's (1977) data to calculate that in the poorest fifth of nations, the probability that an educated person will immigrate to the US is 3.4 times higher than that for an uneducated person. Since we know that education and income are strongly and positively correlated, human capital is flowing to where it is already abundant—the rich countries.

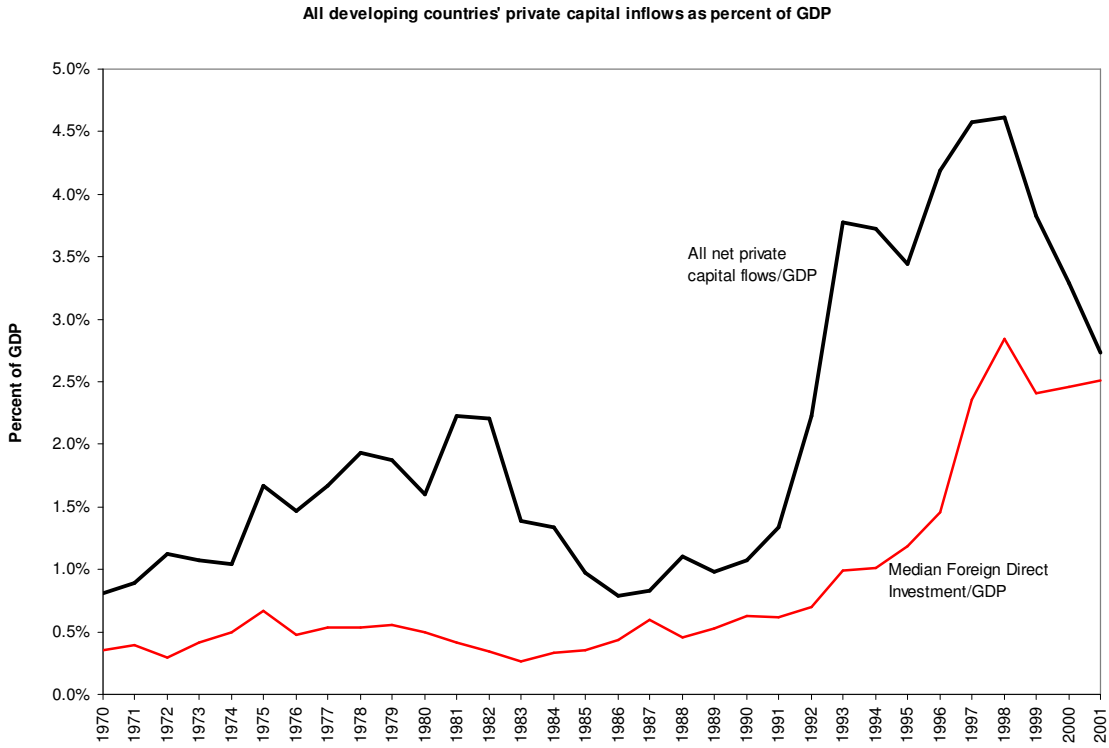
A more recent study by Carrington and Detragiache (1998) found that those with tertiary education were more likely to migrate to the US than those with a secondary education in 51 out of the 61 developing countries in their sample. Migration rates for primary or less educated to the US were less than migration rates for either secondary or tertiary in all 61 countries. Lower bound estimates for the highest rates of migration by those with tertiary education from their data range as high as 77 percent (Guyana). Other exceptionally high rates of migration among the tertiary educated are Gambia (59 percent), Jamaica (67 percent), and Trinidad and Tobago (57 percent).[6] None of the migration rates for the primary or less educated exceed 2 percent. The disproportionate weight of the skilled population in US immigration may reflect US policy. However, Borjas 1999 notes that US immigration policy has tended to favor unskilled labor with family connections in the US rather than skilled labor. In the richest fifth of nations, moreover, the probability is roughly the same that educated and uneducated will emigrate to the U.S. Borjas, Bronars, and Trejo (1992) also find that the more highly educated are more likely to migrate within the US than the less educated. [7]

Capital also flows mainly to areas that are already rich, as famously pointed out by Lucas 1990. In 1990, the richest 20 percent of world population received 92 percent of portfolio capital gross inflows; the poorest 20 percent received 0.1 percent of portfolio capital inflows. The richest 20 percent of the world population received 79 percent of foreign direct investment; the poorest 20 percent received 0.7 percent of foreign direct investment. Altogether, the richest 20 percent of the world population received 88 percent of private capital gross inflows; the poorest 20 percent received 1 percent of private capital gross inflows.

[6] Note these are all small countries. Carrington and Detragiache 1998 point out that US immigration quotas are less binding for small countries, since with some exceptions the legal immigration quota is 20,000 per country regardless of a country's population size.

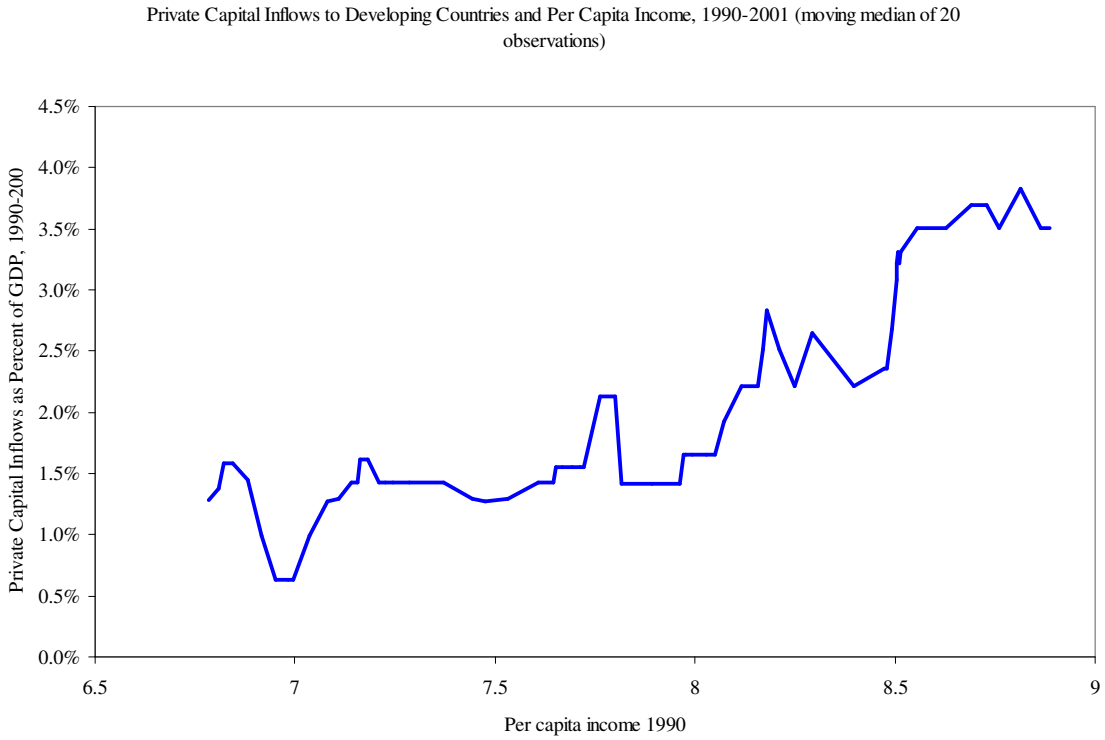
[7] Casual observation suggests "brain drain" within countries. The best lawyers and doctors congregate within a few metropolitan areas like New York, where skilled doctors and lawyers are abundant, while poorer areas where skilled doctors and lawyers are scarce have difficulty attracting the top-drawer professionals.

The developing countries do receive net inflows of private capital, as shown in the figure below. However, the amounts of net capital flow are small relative to their GDP, not at all the huge numbers predicted by the factor differences viewpoint.



Source: World Development Indicators

Moreover, the importance of capital inflows rises with the per capita income of the developing country, counter to the prediction of factor endowment models.



Capital inflows to the poorest countries are primarily made up of foreign direct investment, as shown above. Even so, private foreign direct investment into the poorest region, Africa, is low and is mostly directed to natural resource exploitation (such as oil, gold, diamonds, copper, cobalt, manganese, bauxite, chromium, platinum). The correlation coefficient between FDI and natural resource endowment across African countries is .94 (Morriset). This tends to confirm the prediction for capital flows of the model including land and natural resources.

Moreover, these numbers do not reflect the movements of private capital out of developing countries outside of official channels, i.e. capital flight. Fragmentary evidence suggests that capital flight is very important for poor regions. Collier, Hoeffler and Patillo 2001 estimate that capital flight accounts for 39 percent of private wealth in both sub-Saharan Africa and the Middle East. It is also important in Latin America (10 percent of wealth), but less so in South Asia and East Asia.

Wealth and Capital Flight by Region
(reproduced from Collier Hoeffler and Patillo 2001)

Region	Public capital per worker	Private wealth per worker	Private capital per worker	Capital flight per worker	Capital flight ratio
SS Africa	1,271	1,752	1,069	683	0.39
L.America	6,653	19,361	17,424	1,936	0.10
SouthAsia	2,135	2,500	2,425	75	0.03
East Asia	3,878	10,331	9,711	620	0.06
Middle-East	8,693	6,030	3,678	2,352	0.39

One measure often used to estimate capital flight is to cumulate the net errors and omissions data in the Balance of Payments accounts. There one finds evidence of large scale outmigration of capital in absolute terms in East Asia, Russia, and Latin America (see table below). As percent of GDP, the outflow of capital is very significant in the African countries. This tends to confirm the findings of Collier, Hoeffler, and Pattiloo 2001 for Latin America and Africa. The availability of more recent data since the East Asian crisis in my findings suggests that recent capital outflows out of East Asia are more dramatic than what those authors found earlier.

Top ten in cumulative negative errors and omissions

Absolute amounts (US$ billion)	*sum 1970-2002*	*Percent of GDP*	*sum 1970-2002/ gdp2002*
China	-142	Liberia	-129%
Russian Federation	-68	Mozambique	-82%
Mexico	-27	Guinea-Bissau	-66%
Venezuela, RB	-17	Eritrea	-63%
Korea, Rep.	-16	Gambia, The	-45%
Philippines	-16	Ethiopia	-41%
Argentina	-14	Zambia	-41%
Brazil	-11	Bolivia	-35%
Indonesia	-8	Burundi	-31%
Malaysia	-8	Angola	-29%

Source: World Development Indicators

What does this picture of factor flows between rich and poor countries tell us? Although there are some poor country exceptions that attract capital inflows, in most poor countries ALL factors of production tend to move towards the rich countries. This supports the productivity differences view of globalization instead of the factor endowments view. The attractive force of higher productivity in the rich countries overturns the factor endowments predictions of convergence through capital flows and trade. Hence, we should not look for great things from globalization for reducing world poverty.

However, the flows of migrants are still relatively small out of the entire poor country population (3 million out of 5 billion), so we should not jump to the conclusion that the poor countries are just emptying out, or that there is free labor mobility. The flows involved are actually too small to make much difference to either rich country or poor country incomes, hence

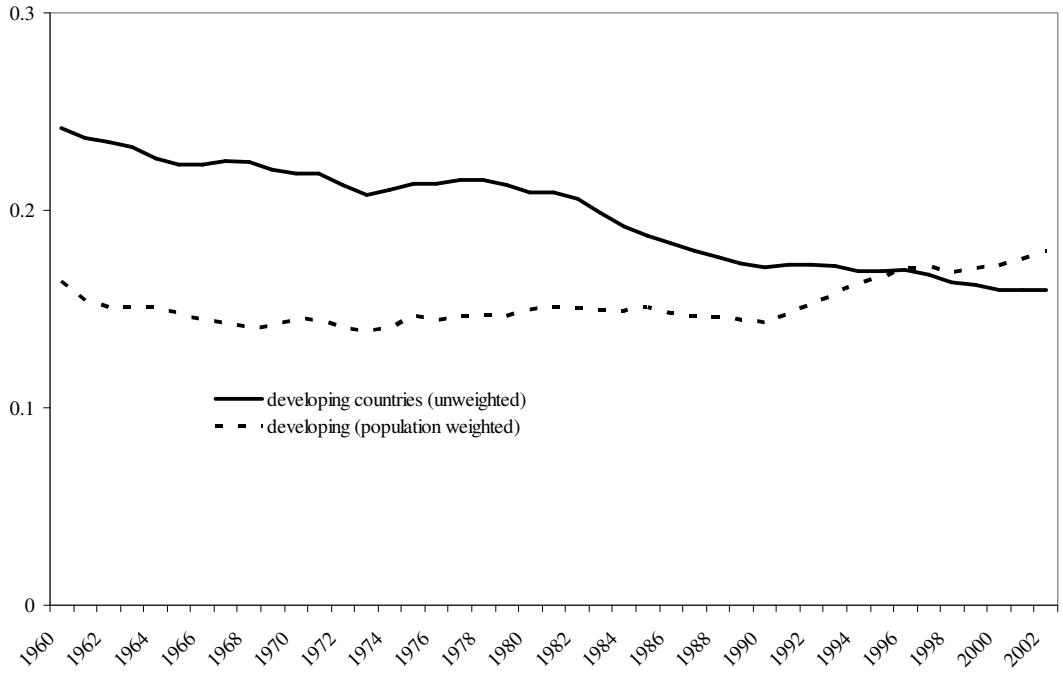
the fact we will examine next: the relative stability of the poor country/rich country relative income ratio in the era of globalization.

Behavior of cross-country per capita income ratios

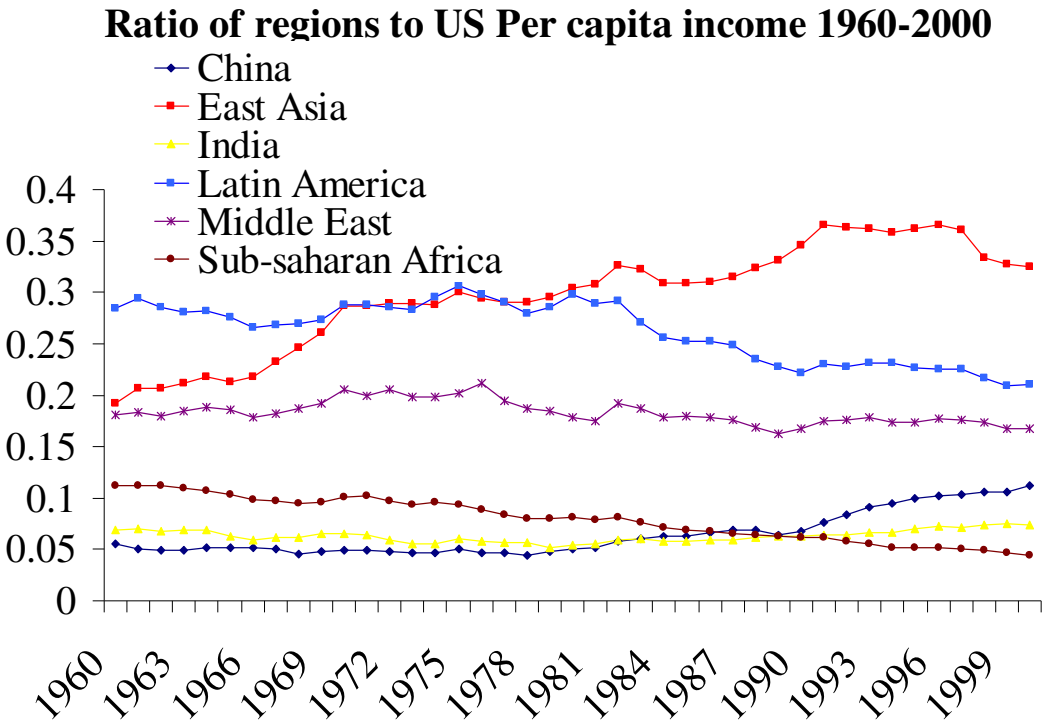
The overall record of world poverty during recent globalization is controversial. The figure below shows why different authors reach different conclusions. If we take the unweighted average of developing countries' income ratios to the rich countries, there has been increasing income gaps between countries. This is the right number if we take each poor country, no matter how small or large, as an independent experiment of increased globalization and all the other factors affecting relative country growth.

Other authors stress the population weighted average of poor countries' income ratios to rich countries. This shows decreasing international income gaps between countries. The different result represents the catching up over the last two decades of the large populations in India and China. Of course, the more striking aspect of the graph is how high international inequality is – the average poor country by either measure has a per capita income that is only one-fifth of average OECD income. Even the population-weighted average slows excruciatingly slow convergence.

Poor Countries' Income Ratio to Rich Countries' Income



The next figure breaks this out explicitly by developing country region, as well as treating India and China separately.



The regions that have the worse trends are Latin America, the Middle East, and sub-Saharan Africa, all of whom are diverging from the US. Recall that these are the same regions with significant capital flight, and they also account for large shares of the population migration to rich countries. In these cases, the relative productivity advantage of the rich countries is apparently increasing, attracting all factors of production towards the rich countries. In this same category would be the former Soviet Union, who have only a decade of data. The poor productivity of these regions does not necessarily have anything to do with globalization, but globalization inadvertently could worsen the consequences of poor productivity through physical and human capital flight. Note that these are income levels relative to the US. All regions have positive per capita income growth since 1960, except for Africa, which has approximately zero. Hence, while the

optimistic Factor Endowments view of Globalization fails for these regions, there is nothing like the downward spiral suggested by the Globalization alarmists.

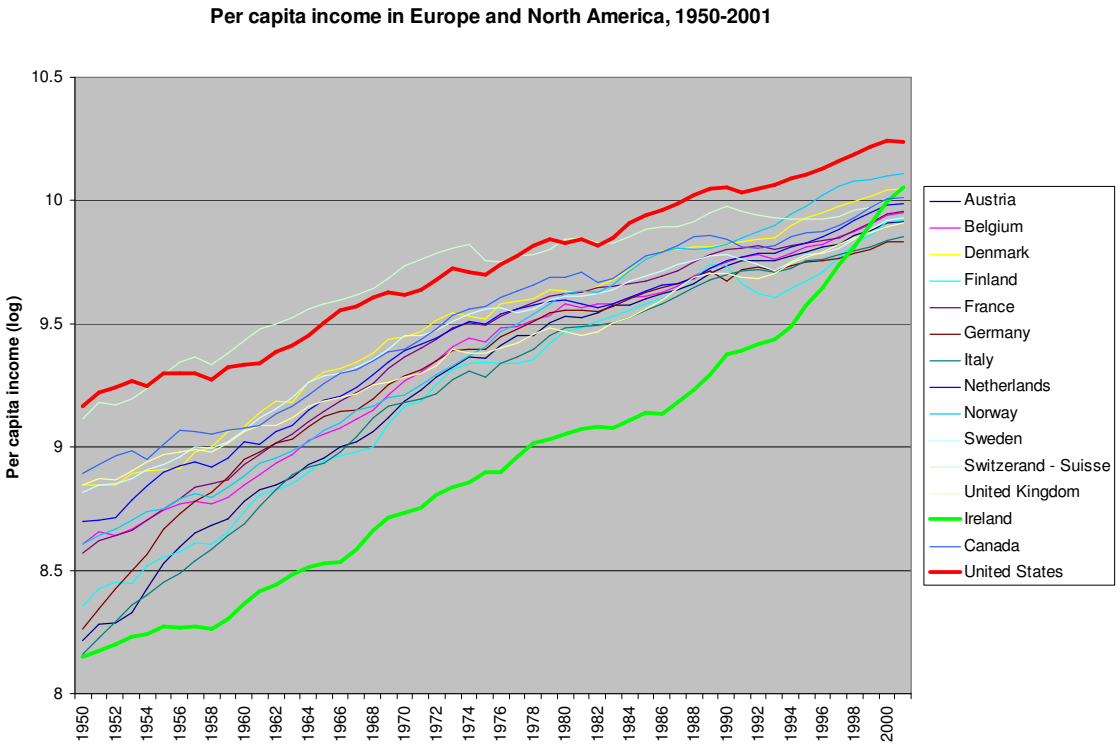
The more positive examples are China, East Asia (shown above without China), and India (although the above graph makes clear that the recent catch-up in India is still a blip). It is these regions that seem to be obeying the predictions of the factor endowments view.

This different behavior of regions could suggest that productivity differences are not so dominant for the Asian cases, while they are very important for the other poor regions. For the rapid growers of East Asia, there has been a debate about how much of their growth could be explained by factor accumulation and how much by productivity growth. Even in these cases, the consensus now seems to be that their growth cannot be mostly explained by factor accumulation without generating some counterfactual predictions for initial returns to physical and human capital (Klenow and Rodriguez-Clare 1997, Hsieh 1999, Bils and Klenow 2000). Hence, there seems to be large differences in productivity levels and growth across developing countries, for which we have no clear theoretical story. The large cross-country empirical literature on growth suggests the importance of such factors as macroeconomic stability and institutions, but there is not a clear theory underlying these correlations.

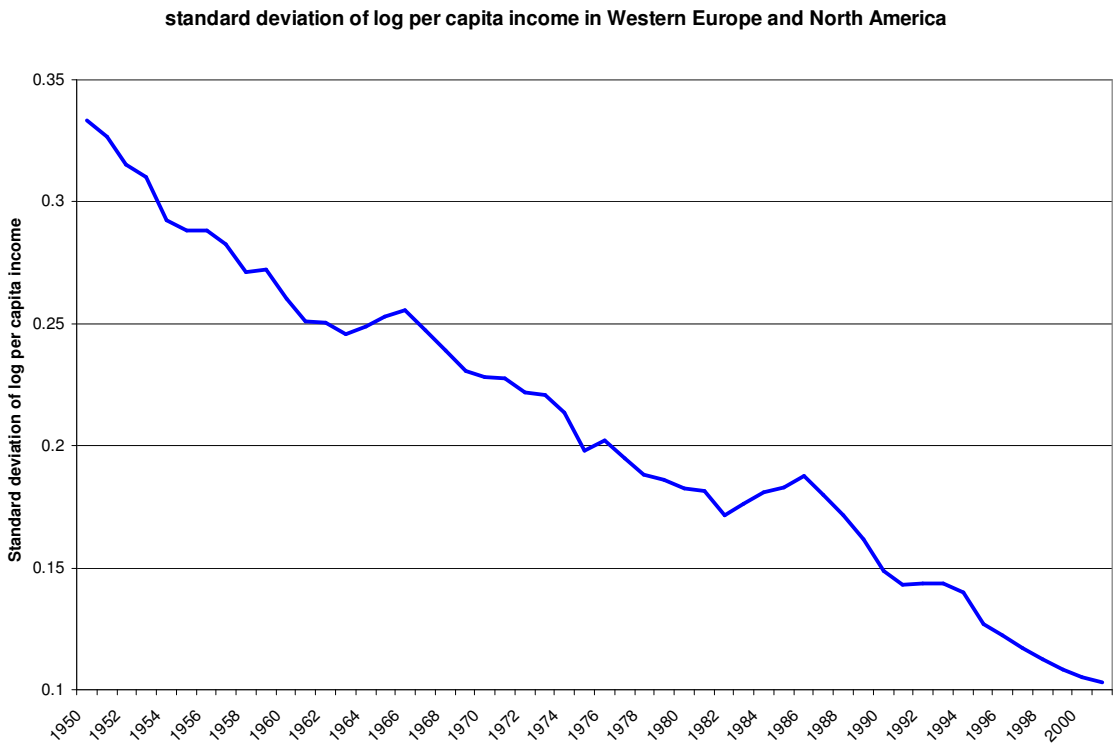
Western Europe and North America as a Globalization Experiment

Another interesting experiment is to examine the trends in countries within Western Europe and North America, where we have already seen that most capital flows (and most trade) is concentrated. Also, the case of free labor mobility could be somewhat closer to reality in this region than for the world as a whole. The North Atlantic economy

has seen decreasing inequality between countries over the last 5 decades. The figure belows shows the covergence of these economies from 1950 to 2001:



A measure of inequality among these countries is the standard deviation of log incomes. This has declined at a nearly constant rate over the last 5 decades:



This seems to suggest convergence amongst one highly globalized group of countries.[8] If there was no free labor mobility between these countries, we have the predictions of capital movements and trade in the factor endowments view borne out by the data for this group. It is plausible that productivity levels were similar enough amongst this group of countries that the factor endowments view would have considerable predictive power. Globalization reduced poverty in the North Atlantic, in that it helped the previously poor nations of Greece, Ireland, Portugal and Spain to catch up to the rest.

Several caveats apply. One has always to be careful that one is not selecting countries of their income at the end of the period, which would create a spurious finding of convergence (the De Long effect). I have tried to deal with this by choosing regions geographically (North America and Western Europe) who have had intensive capital and trade flows amongst them. Second, part of the dispersion in 1950 is artificially induced by wartime destruction, and rapid growth after

[8] There is of course a huge literature on convergence among this group, such as Kuznets, Abramowitz, Baumol, De Long, Barro and Sala-i-Martin, to name a few contributors.

that is mainly reconstruction for the initial period. However, it is notable that among this group of countries, the rate of α-convergence did not slow down, even after we would have expected wartime reconstruction to be complete. Also, if wartime destruction eliminated more capital than labor, then the pattern above is exactly what factor endowments models would predict. Third, the convergence could have come out from technological dissemination rather than factor endowment effects. This is hard to test, although one would think the core countries in this group (US, UK, France, Germany) to have had fairly similar technologies since they had all industrialized by about the same extent as of the early 20th century.

Evidence on factor returns within countries

We have some evidence on the behavior of returns to skill and returns to physical capital within countries. Ross Levine and I (2001) noted that skilled workers earn less, rather than more, in poor countries.

We saw above that the BMS model of income differences due to human capital differences predicts that returns to skill would be much higher in poor countries. The facts do not support these predictions: skilled workers earn more in rich countries. Fragmentary data from wage surveys say that engineers earn an average of $55,000 in New York compared to $2,300 in Bombay (Union Bank of Switzerland 1994). Instead of skilled wages being five times higher in India than in the US, skilled wages are 24 times higher in the US than in India. The higher wages across all occupational groups is consistent with a higher "A" in the US than in India. The skilled wage (proxied by salaries of engineers, adjusted for purchasing power) is positively associated with per capita income across countries, as a productivity explanation of income differences would imply, and not negatively correlated, as a BMS human capital explanation of income differences would imply. The correlation between skilled wages and per capita income across 44 countries is .81.

Within India, the wage of engineers is only about 3 times the wage of building laborers. Rates of return to education are also only about twice as high in poor countries – about eleven percent versus six percent from low income to high income (Psacharopolous 1994, p. 1332) – not 42 times higher. Consistent with this evidence, we have also seen that the incipient flow of human capital, despite barriers to immigration, is toward the rich countries.

Returns to physical capital are much more difficult to observe across countries. Devarajan, Easterly, and Pack 2001 show some indirect evidence that private investment does not have high returns in Africa. They find that there is no robust correlation within Africa between private investment rates and per capita GDP growth. There is no correlation between growth of output per worker and growth of capital per worker. They also find with micro evidence for Tanzanian industry that private capital accumulation did not lead to the predicted growth response (as shown by strongly negative TFP residuals). This evidence makes it easier to understand why there would be capital flight in Africa.

Empirical evidence on trade, capital flows, and domestic inequality

The evidence on globalization and poverty in India and East Asia is not decisive because even when globalization appears to increase per capita income, it may do so in a way that is accruing to the highest income groups. Does globalization increase inequality within poor countries, offsetting any positive income effect for the poor (or worsening a zero or negative income effect)? To test the effects of trade and capital flows on inequality, I perform some stylized regressions. I do not attempt a full cross-country explanation of variations in domestic inequality, I also refrain from trying to establish causality, which is a massive task in itself. I stick to the more modest goal of assessing whether the bivariate associations go in the direction predicted by factor endowments or productivity differences. These results should be seen as additional stylized facts, not definitive findings of causal effects robust to third factors.

I regress Gini coefficients on trade shares in GDP for a pooled cross-country, cross-time sample of decade averages for the 60s, 70s, 80s, and 90s, for all countries (developed and

developing) with available data. The source of my data for inequality is the Deininger and Squire inequality database, updated with World Development Indicator data from the World Bank. The source of the data on trade shares is the World Development Indicators. Since the theory predicts different signs on the inequality and trade relationship in rich and poor countries, I put an interaction term that allows the slope to differ for developing countries.

Regression of log Gini coefficient on trade/GDP shares and interaction terms and time trend, decade averages, 1960s through 1990s

Fixed-effects (within) regression

	Coefficient	T-stat	Coefficient	T-stat	Coefficient	T-stat
log of trade share	-0.407	-4.90	-0.407	-4.93	-0.256	-2.77
log of trade share interacted with developing country dummy	0.400	4.47	0.364	3.99	0.324	3.59
log of trade share interacted with commodity exporting dummy			0.137	1.82		
time trend					-0.030	-3.36
constant	4.103	31.85	4.069	31.42	3.966	30.04
Number of obs =	312		312		312	
Number of groups =	112		112		112	
R-squared	0.2142		0.2509		0.2261	

The results suggest that trade reduces inequality in rich countries. The slope dummy on trade for developing countries is highly significant and of the predicted opposite sign. However, the net effect of trade in poor countries (the sum of the two coefficients) is to leave inequality unchanged. I checked whether the developing country effect reflected commodity exporting, which is often associated with higher inequality, and also reflects the role of "land" in the Factor endowment models. However, the developing country slope dummy is robust to this control. I also check robustness to a time trend for the Gini coefficient; although it is significant and negative, it doesn't change the results.

The pattern of results for rich countries suggests that some of the productivity-driven models of trade may be relevant. If we interpret the falling inequality as a fall as the capital rental/wage ratio (or as a fall in the skilled wage/unskilled ratio for human capital), then more trade is actually good for the workers in rich countries. We could have the paradox that labor-

augmenting productivity is so much higher in rich countries than in poor countries that rich countries are actually (effective) labor-abundant. Trade then decreases the capital rental/wage ratio. If this is true, then we might expect trade to increase inequality in the poor countries. While there is a significant positive shift in the effect of trade on inequality in poor countries, the net effect turns out to be close to zero. These stylized facts do not support the alarmist stories of the globalization protesters about impoverishment of workers in both rich and poor countries – in fact trade seems to make rich country workers richers, while not altering the relative position of poor country workers.

There is a marginally significant slope dummy for commodity-exporting poor countries, in which more trade does increase inequality. These countries may reflect the effect of earnings from natural resources (what I called land in the models above), in which a land-abundant country has an increase in the land rental/wage ratio from opening up to trade. Thus, we could understand the increase in inequality with trade in commodity exporters, if inequality is driven by the land rental/wage ratio.

I next test the effect of international capital flows on within-country inequality. I do fixed effect regressions for the change in the log of the Gini coefficient regressed on capital inflows as percent of GDP. Data on foreign direct investment and total net private capital flows are from World Development Indicators over 1970-2002. Inequality data is the same sources as before, but is only available through 1999, so the effective sample is 1970-1999.

Fixed-effects (within) regressions for change in log(Gini) as function of capital flows

Regression	Constant	Foreign Direct Investment/ GDP	Foreign Direct Investment* LDC dummy	Foreign Direct Investment * Commodity exporting dummy	All private net capital inflows/ GDP	All private net capital inflows* Commodity exporting dummy	Number of obs =	Number of countries =	R-squared within
Coefficient	-0.065	0.027					195	88	0.0516
T-stat	-3.65	2.40							
Coefficient	-0.069	0.090	-0.081				195	88	0.1365
T-stat	-4.03	4.02	-3.21						
Coefficient	-0.069	0.087	-0.092	0.032			195	88	0.152
T-stat	-4.00	3.89	-3.49	1.38					
Coefficient	-0.036				0.716		130	63	0.0079
T-stat	-1.30				0.73				
Coefficient	-0.037				0.521	0.684	130	63	0.0094
T-stat	-1.31				0.44	0.31			

Foreign direct investment has a positive effect on inequality in the rich countries, with a significantly less positive effect on inequality in the poor countries. The net effect on inequality in the poor countries is not significantly different from zero – again failing to confirm the fears of globalization protesters. This result is robust to including a slope dummy for commodity exporting, which is not significant. The paradox of capital inflows increasing inequality does not fit the simple factor endowment predictions. The unequalizing inflow of FDI capital in rich countries could be complementary to an expansion of capital-intensive exports, which would be associated with an increased capital rental relative to wages.[9]

I next test the effect of capital flows on domestic saving. The results are not very strong, but we see an interesting hint that FDI tends to crowd in domestic saving in countries that are not commodity exporters, while there is modest crowding out of domestic saving in commodity exporters. There is no significant relationship of domestic saving with total private capital flows. The positive correlation of domestic saving with FDI is inconsistent with the transitional dynamics of the factor endowments model. A productivity increase could induce both higher domestic saving and higher FDI. Commodity exporters may be more subject to factor endowment effects of capital inflows.

[9] An alternative explanation is that foreign direct investment makes possible the outsourcing of the least-skilled goods in the rich countries to the poor countries, where they are the most-skilled goods. This would increase the demand for skills in both rich and poor countries, raising inequality in both places. For an exposition of this story and some empirical evidence see Feenstra and Hanson 1996 and Zhu and Trefler 2003.

Fixed-effects (within) regressions of Gross Domestic Saving/GDP on Private Capital Flows/GDP

	Constant	Foreign Direct Investment	FDI* Developing Country Dummy	FDI* Commodity Exporting Dummy	Private net capital inflows	Private net capital inflows* Developing Country Dummy	# obser-vations	# of countries	R-squared within
Coefficient	16.827	0.294					297	111	0.0093
T-stat	39.41	1.31							
Coefficient	16.818	0.353	-0.065				297	111	0.0093
T-stat	38.13	0.48	-0.08						
Coefficient	16.612	0.836		-1.068			297	111	0.0397
T-stat	38.56	2.65		-2.41					
Coefficient	16.664	0.428	0.496	-1.150			297	111	0.0417
T-stat	37.93	0.59	0.63	-2.49					
Coefficient	15.059				34.497		246	85	0.0156
T-stat	25.44				1.59				
Coefficient	14.984				50.272	-29.788	246	85	0.0185
T-stat	24.86				1.59	-0.68			

Trade and growth

What if trade has an effect on productivity growth? The theory here is not very clear, but some argue that trade carries with it access to technology. In this case, we would expect the poor countries to gain access to the superior technologies in the rich countries by trading with them, and hence trade could be a vehicle that reduces international income differences through convergence in productivity levels.

There is a huge empirical literature on trade and growth investigating this possibility, which has failed to establish a consensus for growth effects of trade. An old literature covered the correlation between export growth and GDP growth (Feder, Ram etc.). That literature eventually failed to make the case for growth effects of trade because of the difficulty of establishing causality from export growth to GDP – after all they both will grow at the equilibrium productivity growth rate plus population growth in steady state. If productivity growth differs across countries, for whatever reason, there will be a spurious cross-section correlation.

The cross-country literature has revived the trade-growth debate with regressions of per capita growth on trade shares (usually insignificant), or some broad measure of trade policy (highly significant in Sachs and Warner 1995). However, the latter has been criticized as a *trade* argument for really being a general measure of bad policies and institutions (Rodrik and Rodriguez 1999).

Recently Dollar and Kraay 2004 have proposed the testing of a relationship between per capita growth and the CHANGE in the trade share. This takes us back almost to where we started – they regress GDP growth implicitly on trade growth (the latter interacted with trade share), and again causality is unconvincing. Moreover, Rodrik 2000 shows that the result is not robust to a "clean" selection of the most "globalizing" countries. It is hard to have much confidence based on the existing literature that trade has strong growth effects

Stronger evidence for beneficial effects of trade comes from Frankel and Romer 1999, who did a regression of LEVELS of per capita income on trade shares, using geographically

determined "natural openness" as an instrument. The level effect could be be consistent with a factor endowments view in which labor-intensive poor countries (who dominate the sample) benefit from higher trade through increased unskilled wages (which are proportional to per capita income, remember). It could also reflect a productivity effect, which would be common to both rich and poor countries.

As with all income level regressions, the solution to the identification problem is not very convincing. One has to believe that the instrument does not affect income directly (doesn't everything affect income?) Also the bivariate regression with income and trade does not consider competing determinants of income, such as institutions or education, which would then set up an even more complicated identification problem. Frankel and Romer's result is another useful stylized fact, in the same spirit as the stylized fact regressions presented here. It affects our priors about the beneficial effects of trade on long-run development, but it is not as convincing as establishing a causal relationship.

Evidence from historical globalization

The first wave of globalization during the late 19th and early 20th century (Old Globalization) is another important historical experiment to inform our priors about the relationship between poverty and globalization. This has been well-covered by economic historians (see the papers in Bordo, Taylor and Williamson 2003), but I look at it from the viewpoint of the productivity differences vs factor endowment worldviews.

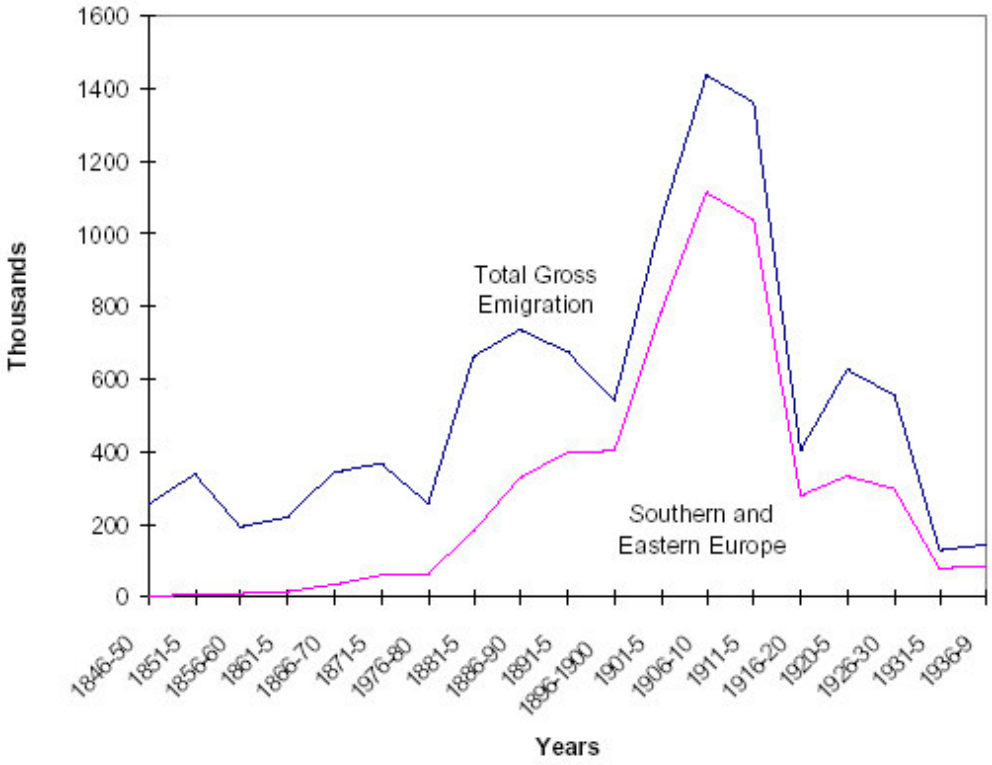
The most obvious event during this globalization was the movement of 60 million Europeans from the Old World to the New (see figure). As pointed out by many authors, this migration strongly supports a factor endowments prediction. Labor was moving from the land-scarce Old World to the land-abundant New World.

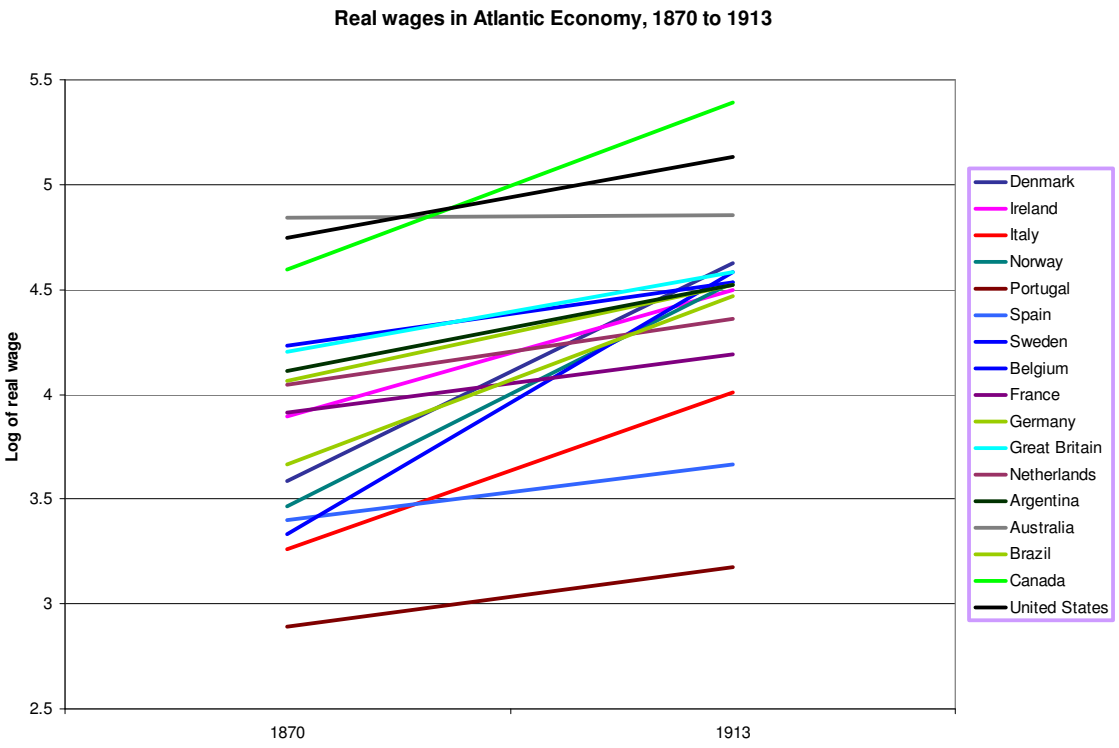
The evidence on wage convergence is less clear. For all countries in the North Atlantic, there was no overall tendency towards α-convergence of wages. However, if

we pick out those countries that were the heaviest senders of migrants (Norway, Sweden, and Italy) and compare them to wages in the main destination (the United States), there is more evidence that wages were converging.

Reproduced from Chiswick and Hatton 2001:

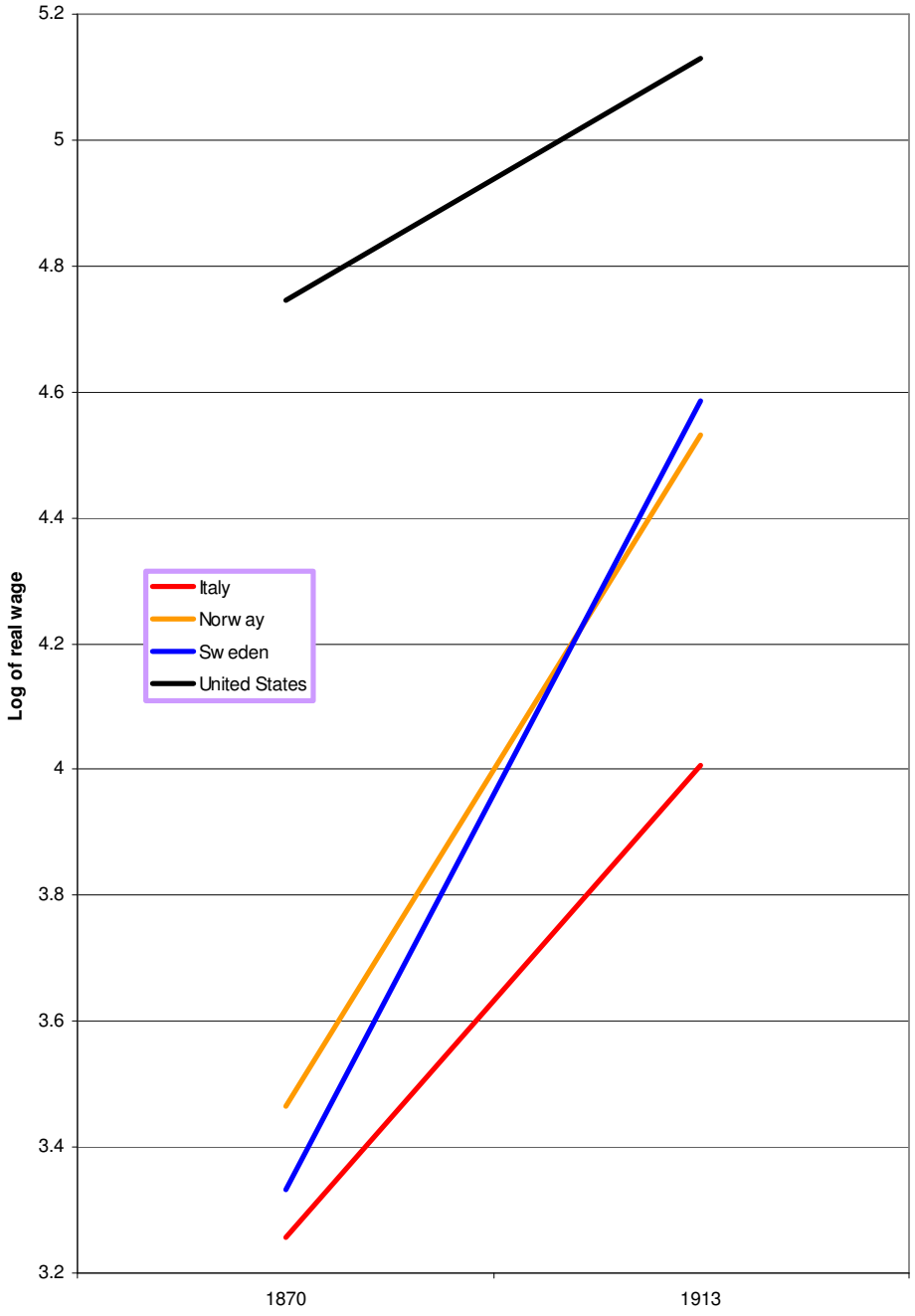
Figure 1
Gross Intercontinental Emigration from Europe, 1846-1939
(annual averages)





Source: O'Rourke and Williamson, Globalization and History, 1999

Real wages in Important Source Countries for Immigrants to US compared to real wage in US, 1870 to 1913



Capital was also flowing from the Old World to the New. We can think as also supporting the Factor endowment (augmented by land) thesis. Both capital and labor were flowing to the countries rich in land and natural resources.

Capital flows from Europe to North America (billions of current US$)

	1900	1914	1938
Europe net foreign capital assets	17.8	23.1	22.0
North America net foreign capital assets	-2.5	-10.9	-9.0

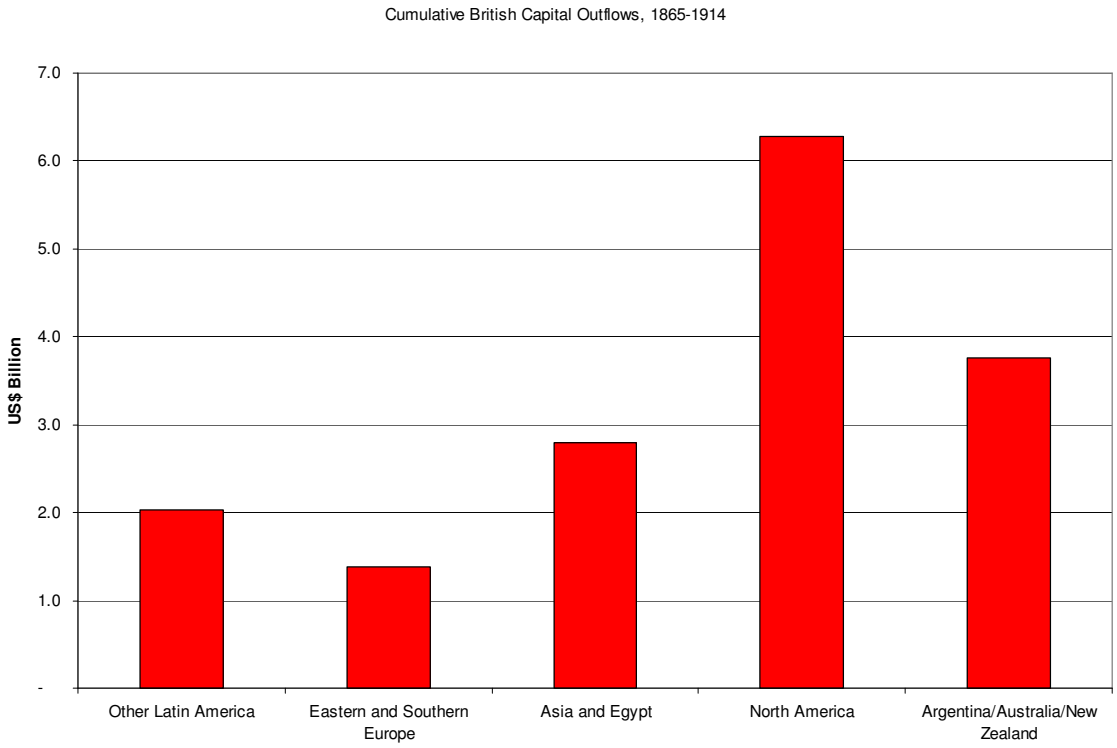
Source: Obstfeld and Taylor 2001

However, capital was not flowing everywhere according to the predictions of the factor endowment model. The labor-abundant low wage places in Eastern and Southern Europe and Africa and Asia did not attract much British capital (see graph below). The failure of Eastern and Southern Europe to attract capital despite their much lower wages compared to the New World may suggest that productivity was lower in that region. This would provide another reason for the huge outflow of migrants from Eastern and Southern Europe to the United States (see migration chart above).

Africa and Asia were left out like Southern and Eastern Europe, as they failed to attract capital (even with the security against expropriation provided by colonial rulers), and for them it was even worse because migration was not an option. Most of British capital went to the land-rich and plausibly higher productivity countries of Canada, the US, Australia, New Zealand, and Argentina. Clemens and Williamson (2003) point out that capital inflows were correlated with per capita income in the Old Globalization, just as Lucas pointed out they were in the New Globalization.

Clemens and Williamson find that this wealth bias is explained by higher human capital in the rich countries. This suggests a Barro-Mankiw-Sala-i-Martin view of capital

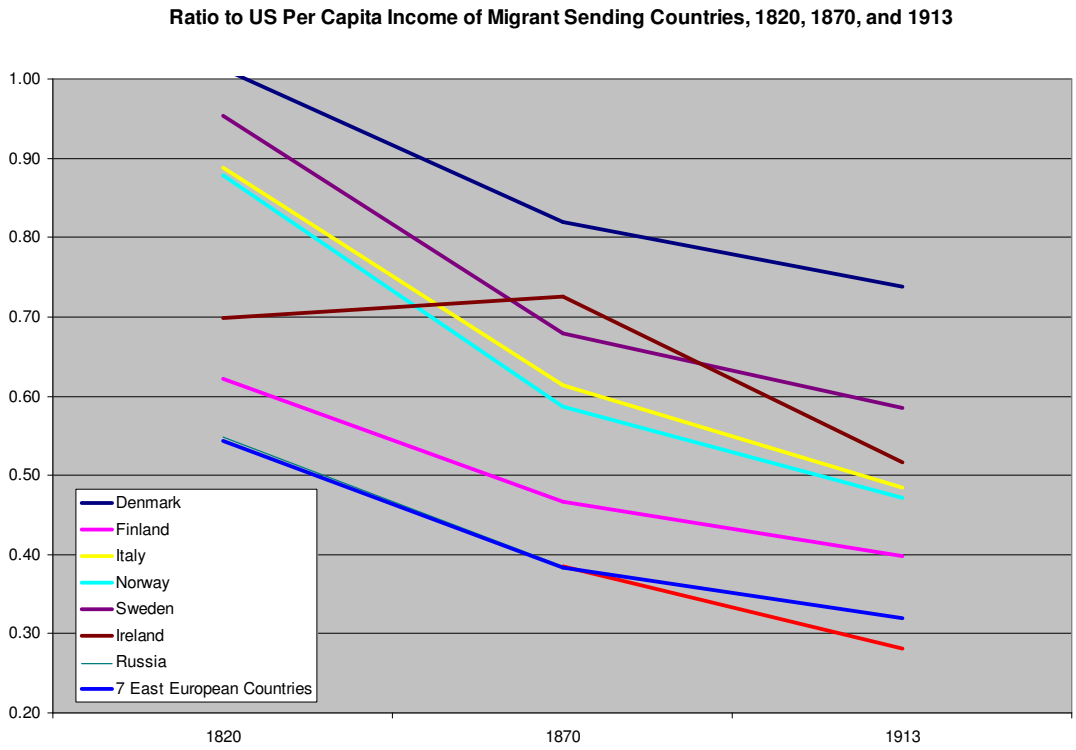
flows in the Old Globalization era. However, we have to wonder whether a human capital explanation for capital flows to rich countries in Old Globalization would generate the same counterfactual predictions for returns to skill in rich vs. poor countries that we saw was a problem for modern data.



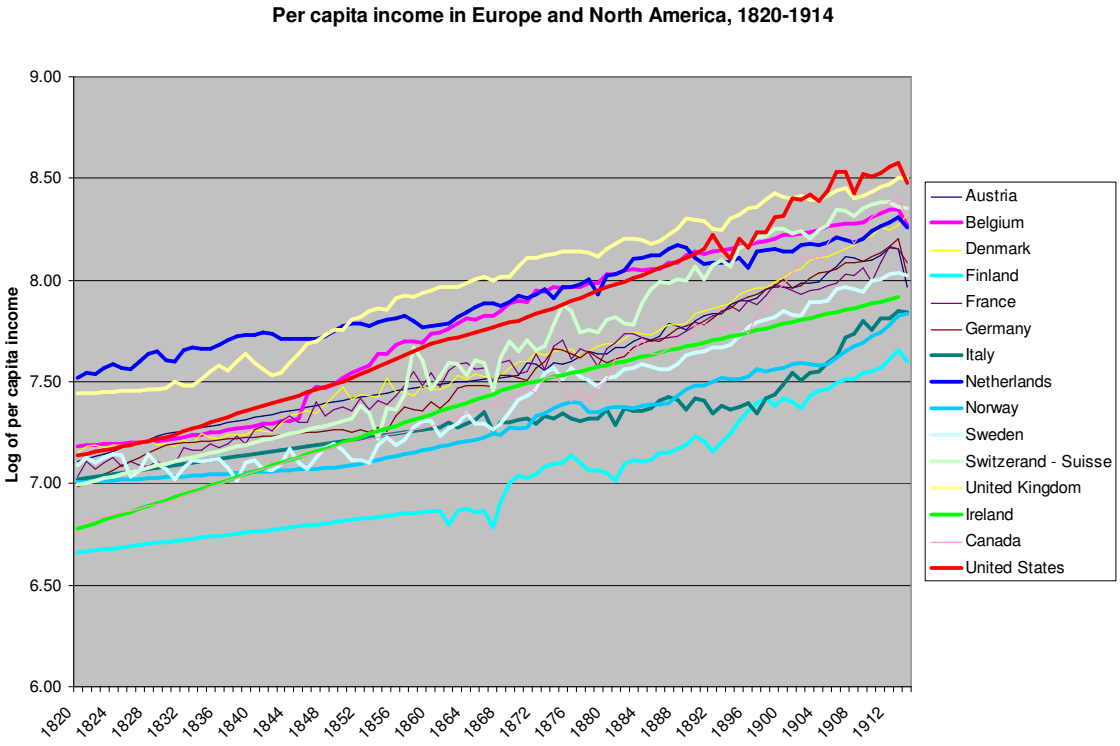
Source: Stone 1999

Looking at relative per capita incomes in the migrant-sending regions relative to the US may suggest an additional role for productivity differences. All of the sending regions had a fall in their relative per capita income (see graph below). The US industrialized much faster than the sending regions. If we associate rising total productivity with industrialization, then the combination of migrant flows, capital flows, and relative per capita incomes suggests that productivity difference stories play an

important role even in those Old Globalization episodes that support some factor endowments predictions.



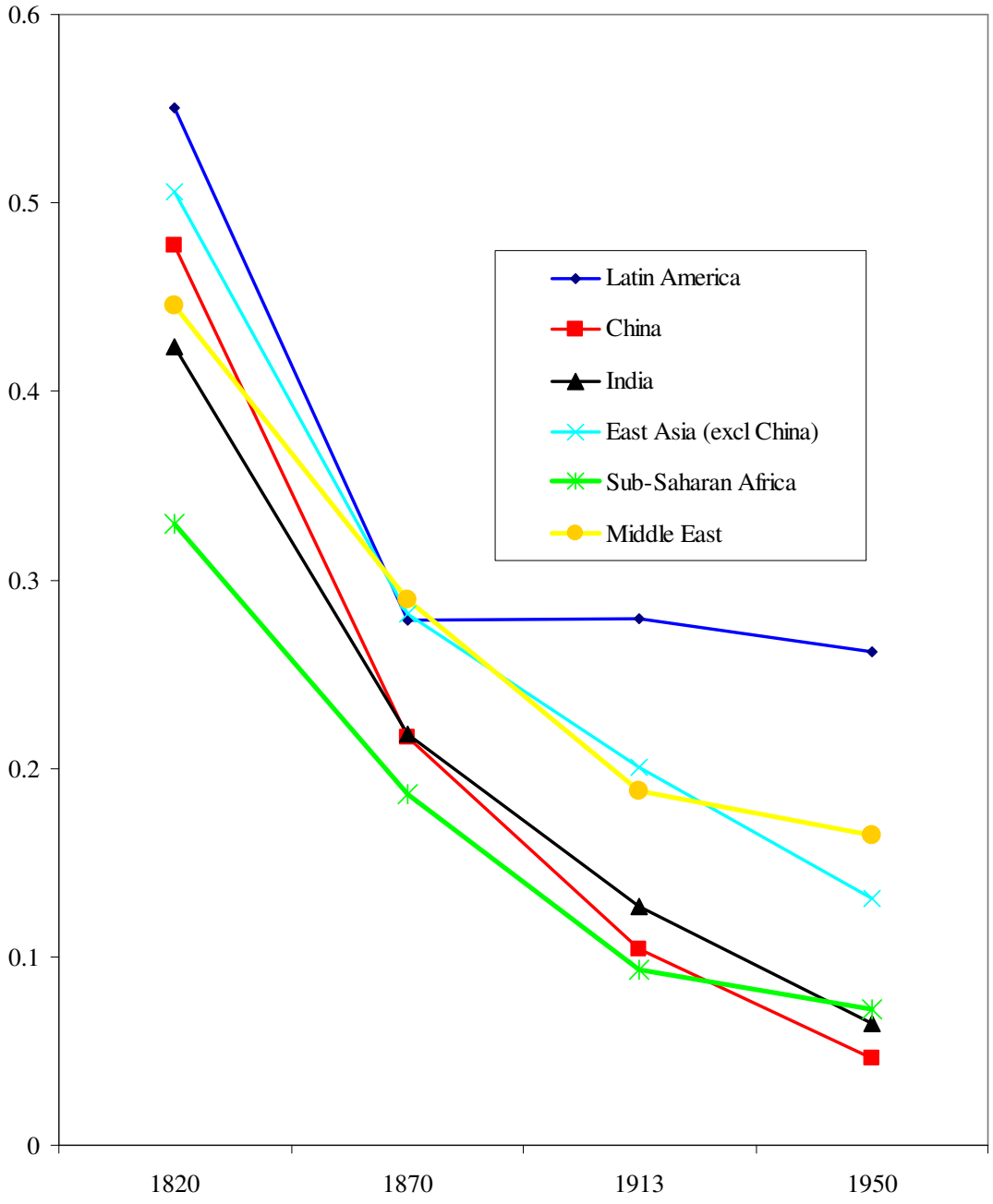
During the first wave of globalization, there was no strong movement towards convergence in the North Atlantic economy (see graph below), in contrast to the convergence we have seen amongst these countries in New Globalization. The US rose from the middle of the pack to be the world leader. The factor endowments prediction of convergence among countries heavily integrated by trade and capital flows fails. Thus, while some the land/labor and land/capital predictions of the factor endowments view are consistent with the direction of flows and factor prices, the factor endowments view of Old Globalization among rich countries ultimately fails to tell the whole story. Old Globalization failed to reduce poverty in lagging regions, just like New Globalization.



This conclusion is even stronger if we include the poor countries in the analysis of Old Globalization. The behavior of income differences between rich and poor countries

in Old Globalization was even worse than in New Globalization (see figure below). As Pritchett 1997 says, there was "Divergence, Big Time." It seems obvious that the big story was that there was an industrial revolution in Europe and its offshoots, and none in the rest of the world. In other words, technological productivity took off in Greater Europe, while little happened technologically in the poor countries. Thus we can understand the lack of capital flows to the rest of the world as a consequence of their low and falling relative productivity levels. (Latin America is an interesting intermediate case, where perhaps land and natural resources attracted enough capital in the Golden Age of 1870-1913 to prevent further divergence.) Although I have noted some interesting exceptions, the big story in Old Globalization is more in line with the productivity differences story than the factor endowments story.

Ratio of Developing Country Regions to US per capita income, 1820-1950



Migration, income, and population density within countries

The internal markets of countries are examples of "globalized" areas where there is free mobility of goods, capital, and labor. They are another interesting example of what we can expect from complete globalization.

Ross Levine and I (2001) used the database of 3141 counties in the US to examine income concentration, population density, and migration within the US. Migration goes from sparsely populated areas to densely populated areas. We find with county data for the US that there is a statistically significant correlation of .20 between the in-migration rate of counties from 1980 to 1990 and the population density in 1980. Hence, labor is flowing to land areas where it is already abundant. In the model above, this is consistent with the high density places being the high productivity places. It is inconsistent with the simple factor endowment view in which labor would flow to where the labor/land ratio is low.

There is a strong correlation between per capita income of US counties and their population density (correlation coefficient of .48 for the log of both concepts, with a t-statistic of 30 on the bivariate association).[10] This again is consistent with productivity differences between areas and inconsistent with income differences across regions being mainly determined by factor endowments. High productivity places (which are the same as the high income places) attract more labor relative to land. Of course, this income dispersion reflects either other factors or the incomplete transition of the migration process, since the equilibrium with free factor mobility is for equal regional incomes.

Sorting counties by GDP per square mile, we found a 50 and 2 rule: 50 percent of GDP is produced in counties that account for only 2 percent of the land, while the least dense counties that account for 50 percent of the land produce only 2 percent of GDP. Nor is this result just a consequence of the large unsettled areas of the West and Alaska. If we do the same calculation

[10] Ciccone and Hall 1996 have a related finding for US states.

for land east of the Mississippi, we still have extreme concentration: 50 percent of GDP is produced on 4 percent of the land. The densest county is New York NY, which has a GDP per square mile of $1.5 billion. This is about 55,000 times more than the least dense county east of the Mississippi ($27 thousand per square mile in Keweenaw MI).

Obviously, another name for these concentrations is "cities." But even if we restrict the sample to metropolitan counties we see concentration: 50 percent of metropolitan GDP is produced in counties accounting for only 6 percent of metropolitan land area.[11] There are also regional income differences between metropolitan areas. Metropolitan areas in the densely populated Boston-to-Washington corridor have a per capita income that is $5874 higher on average than other metropolitan areas. This is a huge difference: it is equal to 2.4 standard deviations in the metropolitan area sample. Although there may be differences in the cost of living, they are unlikely to be so large as to explain this difference. (The rent component of the cost of living may reflect either the productivity or the amenity advantages of the area – it seems unlikely that amenities are different enough among areas to explain these differences).

This concentration is explained by the fact that most economic activity takes place in densely populated metropolitan areas. Urban economics is all about the productivity advantages of cities, which can reap the gains of economies of scale and externalities between people and businesses.

We also confirm the Barro and Sala-i-Martin 2003 finding for US states: income per capita and in-migration are correlated. We do so with data on US counties. Migration goes from poor counties to rich counties, with a statistically significant correlation of .21 between initial income and the in-migration rate. This makes sense if income differences reflect productivity differences, but not if they reflect different factor endowments. A regression of the in-migration

[11] Metropolitan counties are those that belong to a PMSA or MSA in the census classification of counties.

rate 1980-90 by county on population density in 1980 and income per capita in 1980 finds both to be highly significant.[12]

The transitional behavior of migration flows suggests a view that productivity differences between US regions are important. However, they fail to illuminate why regional differences in income are still large after a long period of a "globalized" internal economy in the US. We need different models, such as sorting of individuals and ethnic groups across regions, externalities within ethnic groups, and other types of poverty trap models I will not attempt to cover here.

Poor areas

Not only riches are concentrated, so is poverty. Poverty is regionally concentrated in the US; these concentrations have an ethnic dimension as well. As Map 1 shows, there are four ethnic-geographic clusters of counties with poverty rates above 35 percent:

(1) Counties in the West that have large proportions (>35%) of native Americans;

(2) Counties along the Mexican border that have large proportions (>35%) of Hispanics;

(3) Counties adjacent to the lower Mississippi River in Arkansas, Mississippi, and Louisiana and in the "black belt" of Alabama, all of which have large proportions of African-Americans (>35%);

(4) Virtually all-white counties in the mountains of eastern Kentucky.

The county data did not pick up the well-known inner-city form of poverty, mainly among blacks, because counties that include inner cities also include rich suburbs. (An isolated example of an all-black city is East St. Louis IL which is 98 percent black and has a poverty rate of 44 percent). Of course, poverty is concentrated in the inner city as well. An inner city zip code in Washington DC, College Heights in Anacostia, has only one-fifth of the income of a rich zip code (20816) in Bethesda MD. This has an ethnic dimension again since College Heights is 96 percent black and the rich zip code in Bethesda is 96 percent white. In the Washington

[12] The t-statistics are 8.2 for the log of population density in 1980 and 8.9 for the log of per capita income in 1979. The equation has an R-squared of .065 and 3133 observations. The county data are from Alesina, Baqir, and Easterly 1999.

metropolitan area as a whole, there is a striking East-West divide between poor and rich zip codes (which again roughly corresponds to the black-white ethnic divide).[13] Borjas (1995, 1999) suggests there are strong neighborhood and ethnic externalities that may help explain poverty and ethnic clusters within cities. Sorting 1990 census tracts by percent of blacks, the census tracts with the highest shares of blacks account for fifty percent of the black population but contain only one percent of the white population.[14] While this segregation by race and class could simply reflect the preferences of rich white people to live next to each other, economists usually prefer to offer economic motivations rather than exogenous preferences as explanations of economic phenomena. Benabou (1993, 1996) stresses the endogenous sorting between rich and poor for the rich to take advantage of externalities like locally funded schools.

Poverty areas exist in many countries: northeast Brazil, southern Italy, Chiapas in Mexico, Balochistan in Pakistan, and the Atlantic Provinces in Canada. Researchers have found externalities to be part of the explanation of these poverty clusters. Bouillon, Legovini and Lustig 1999 find that there is a negative Chiapas effect in Mexican household income data, and that this effect has gotten worse over time. Households in the poor region of Tangail/Jamalpur in Bangladesh earned less than identical households in the better off region of Dhaka (Ravallion and Wodon 1998). Jalan and Ravallion (2002) likewise found that households in poor counties in southwest China earned less than households with identical human capital and other characteristics in rich Guangdong Province. Rauch 1993 likewise found with US data that individuals with identical characteristics earn less in low human capital cities than in high human capital cities. All these examples represent the failure of almost complete "globalization" within countries to eliminate poverty.

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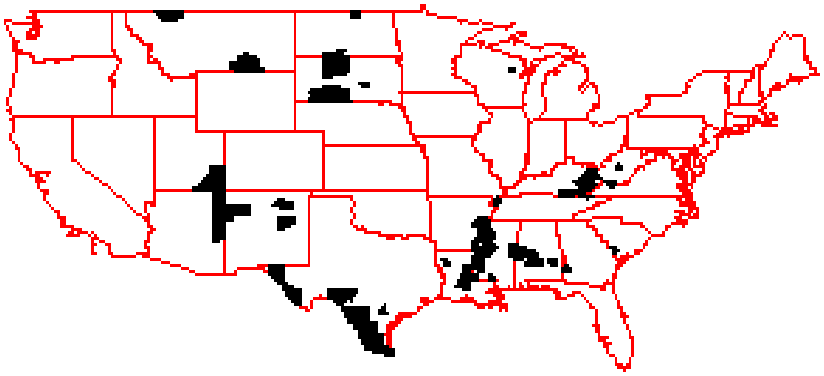
[13] Brookings 1999 notes this East-West geographic divide of the Washington area shows up in many socioeconomic variables like poverty rates, free and reduced price school lunches, road spending, etc.

[14] From the Urban Institute's Underclass Database, which contains data on white, black, and "other" population numbers for 43, 052 census tracts in the US.

This is NOT to say that poor areas would be better off without factor and goods mobility – after all many former inhabitants of those areas have escaped thanks to free mobility. The point of this exercise is that even complete globalization is no panacea for poverty.

Map 1: Poverty in the "globalized" internal economy: counties with a more than 35



percent poverty rate

Part IV: Conclusions

I sum up the stylized facts on Globalization and Inequality in the table below. The purpose of the table is not so much to anoint Factor Endowments or Productivity Differences as the correct view of the channels from globalization to poverty. Rather it is to show that productivity differences are more relevant than differences in factor endowments in some circumstances, while factor endowments dominate in others.

A Scorecard	Supports the view that income differences are due to:	
Stylized fact or episode:	factor endowments	productivity differences
Recent decades		
All factors of production flow to richest countries		X
Unweighted between country inequality increasing		X
Population-weighted between country inequality decreasing	X	
Latin America, Middle East, Africa, former Soviet Union falling behind		X
China, India, East Asia catching up	X	
Between-country inequality in Western Europe and North America falling	X	
Higher skilled wages in rich countries compared to poor countries		X
Low returns to investment in Africa		X
Trade reduces within-country inequality in rich countries		X
FDI inflows increase inequality in rich countries		X
FDI crowds in domestic saving in non-commodity exporters		X
Historical experience, 1870-1913		
Great Migration from Old World to New World	X	
Capital flows to land-abundant countries	X	
Divergence between US and migrant-sending countries		X
Lack of Capital Flows to cheap labor countries in SE Europe		X
Failure of Between-Country Inequality in North Atlantic economy to decline		X
Lack of capital flows to poor countries outside North Atlantic		X
Divergence Big Time between rich and poor countries		X
Miscellaneous		
Migration flows within US go towards high-density and high income areas		X
Still have persistent pockets of poverty even in fully globalized US economy		X

These mixed results are not a surprise. Factor endowments and productivity differences are not mutually exclusive, because different situations will involve varying mixtures of factor endowment differences and productivity differences. The factor endowment predictions help give

us insight into how the North Atlantic economy achieved decreasing poverty amongst this group of countries in the last five decades. They also give us insight into the Great Migration of Europeans from the land-scarce Old World to the land-abundant New World in the late 19th and early 20th century.

However, productivity differences appear to be an important facet of many globalization and poverty episodes. In the Old Globalization era, they seem to be crucial to understand the lack of convergence between North Atlantic economies, the Great Divergence between rich and poor countries in that same era, and the bias of capital flows towards rich countries. In the New Globalization era, productivity differences are important to capture the very different performance of poor country regions in recent decades, the flow of all factors of production towards the rich countries, the low returns to physical and human capital in many poor countries, and the "perverse" behavior of within-country inequality in reaction to trade and capital flows. Even within the "globalized" economy of the US, productivity differences seem necessary to comprehend the pattern of labor migration and persistent pockets of poverty.

Productivity differences to explain patterns of globalization and poverty are a nuisance! The factor endowment models specify very clear channels by which globalization would affect poverty (generally to reduce it). We have no such off-the-shelf models of productivity differences that would allow us to identify the channels by which globalization affects poverty. We need new models to understand the productivity channels that seem to be so important for so many globalization and poverty outcomes (often disappointing outcomes).

Globalization can penalize low productivity countries by making it easier for physical and human capital to flee from such countries, worsening poverty of those left behind. This may be a part of the story of Africa's dismal performance. However, the owners of the physical and human capital leaving low productivity areas are also better off, and those left behind are arguably no worse off if the returns to such capital at home were so low. Hence it is really low productivity that is to blame for bad outcomes and not globalization. . Perhaps the discipline of

globalization could actually increase incentives to do the things that improve productivity (although we don't understand very well what they are)?

Low productivity also hampers the potential for trade to increase wages of unskilled workers in poor labor-abundant countries. This still falls well short of the alarmist stories portrayed by globalization protesters. Autarchy is certainly not an appealing alternative to globalization, since even low productivity places can realize gains from trade. Perhaps the best description of globalization is that it helped reduce poverty in areas that had competititve productivity, while doing little for those that did not.

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