

Channels from Globalization to Inequality:
Productivity World Vs. Factor World

William Easterly

New York University

And

Center for Global Development

Prepared for Brookings Trade Forum, May 13-14, 2004

Abstract: Models of trade and factor flows based on differences in factor endowments (Factor World) give clear predictions as to how globalization affects inequality. Models in which productivity differences between countries drive trade and factor flows (Productivity World) gave more ambiguous predictions. Unfortunately, productivity differences seem necessary to understand many, though not all, globalization and inequality episodes. The factor endowment predictions help give us insight into how the North Atlantic economy achieved decreasing inequality between 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, accompanied by the predicted movements in land rental/wage ratios. The factor endowment view of an earlier movement of Europeans to the colonies of the New World and southern Africa help us understand the origins of different levels of country inequality based on land/labor ratios. However, productivity differences appear to be an important facet of many globalization and inequality episodes. 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.

Globalization and inequality is on the minds of many. To anti-globalization protesters, “transnational corporations ...expand, invest and grow, concentrating ever more wealth in a limited number of hands.”¹ Sinister agents such as the IMF and World Bank are aiming at an outcome “in which all productive assets are owned by foreign corporations producing for export.”² Recently, “globalization from above” has shifted “towards a more destructive phase, marked by increased militarization, worldwide recession, and increased economic inequality.”³ The protesters usually believe globalization is a disaster for the workers, throwing them into “downward wage spirals in both the North and the South.” They point out that the total income of the poorest half of humanity is less than the worth of just 475 billionaires.⁴

Apart from such extreme rhetoric, what are the facts on globalization and inequality? Through what channels does globalization affect inequality between and within countries? Globalization is the movement across international borders of goods and factors of production. The conventional analysis of the effects of globalization on inequality looks at the effect of trade and factor flows on returns to factors, on factor accumulation, and on national income. I examine how the predictions of globalization’s effect on inequality are different if income differences are due to productivity differences (Productivity World) than if income differences are due to different factor ratios (Factor World).

I do not try to answer the big question of whether globalization raises or lowers inequality. Instead, I follow many previous authors in setting out textbook alternatives and then discussing whether factor endowments or productivity channels are consistent with particular outcomes. I thus examine the actual behavior of inequality and trade, trends in trade and factor

¹ A Report of the International Forum on Globalization, *Alternatives to Economic Globalization: A Better World is Possible*, Berrett-Koehler Publishers, Inc.: San Francisco, 2002 p. 140

² A Report of the International Forum on Globalization, p. 52

³ Stanley Aronowitz and Heather Gautney, “The Debate About Globalization, An Introduction”, in Stanley Aronowitz and Heather Gautney, editors, *Implicating Empire: Globalization and Resistance in the 21st century*, Basic Books: New York. 2003, p. xxv

⁴ A Report of the International Forum on Globalization, p. 30

flows, factor returns, and relative incomes to assess which model is more relevant in particular cases.

I conclude that the clear theoretical channels between globalization and inequality featured by factor endowment models help us understand some important globalization and inequality 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 inequality 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 World is defined as equal productivity levels across nations, while Productivity World 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 World model of factor movements, free movement of factors tends to reduce inequality between nations, while having different effect on inequality in rich and poor nations. In Factor World, international inequality -- income differences between countries -- is 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-augmenting 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 $y_i = Y_i/L_i$. the rate of return to capital r and wage w in country i is:

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

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

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 international inequality). 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. 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 Factor World, 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 equilibrium GDP in the poor country!

In Productivity World, things are very different. Suppose that income differences between nations are due to productivity differences rather than differences in capital per worker. Suppose first of all that relative productivity is the same in the two sectors in both nations, but the rich country has an absolute productivity advantage in both sectors. Now both capital and labor will want to move to the rich country, unlike the prediction of opposite flows in the Factor World case. Unlike the Factor World 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 Productivity World, 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 there are capital inflows into the poor country because of factor imbalances, they can be of much smaller size compared to the strict Factor World prediction, because the differences in capital-labor ratios between rich and poor countries are nearly offset by the differences in productivity. It follows also that the (transitional) growth effects of capital inflows must be small.

The poor country will thus have lower wages and per capita incomes both because of lower productivity and lower capital/labor ratios. Unlike the predictions of Factor World, globalization (in the form of capital flows) does not eliminate large degrees of international inequality. Inequality is a function of productivity differences rather than factor intensity differences.

To assess the impact of this particular kind of globalization (free capital mobility) on inequality, 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 international inequality. 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 international inequality and domestic inequality in the poor countries.

Trade flows and inequality

In textbook Factor World, 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 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. Trade will reduce inequality between nations since the ratio of incomes per capita is proportional to the ratio of wages. 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? In Productivity World, the factor price equalization theorem still applies, but now applies to effective labor $A_i L_i$. 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 country is sufficiently offset by higher relative productivity, then the rich country will be “labor-abundant” and will export “labor-intensive” goods. Compared to autarchy, wages will increase in the rich country and decrease in the poor country. In this case, trade will reduce inequality in the rich country and increase it in the poor country. Compared to autarchy, international inequality will increase – 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 increases inequality in the rich country and lowers 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). 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 inequality in the poor nations. When we allow for productivity differences, the effect of trade on domestic inequality 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 World view of comparative advantage. Whereas in Factor World, trade and factor flows do the same things to factor prices and are effectively substitutes, trade and factor flows can be complements in Productivity World. 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 Factor World, 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 inequality in the poor and rich countries depends on relative productivity levels as well as factor endowments. Which way the effect goes is an empirical matter. What all these simple models predict, however, is that trade usually has opposite effects on rich and poor countries.

The effect of trade is to clearly reduce international inequality in Factor World, but ambiguous in Productivity World. Trade where the rich country is exporting (effective) labor-intensive goods and the poor country capital-intensive ones, as is possible with different productivity levels, could wind up raising rich country wages relative to poor country wages.

Domestic factor accumulation and globalization

How do trade and factor movements affect domestic savings and factor accumulation? In Factor World, 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 inequality 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.

In Productivity World, 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 $K_R/A_R L_R$ 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. The poor country with the out-migration of labor will have a incipient increase in $K_P/A_P L_P$, 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 according 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. 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 Factor World or Productivity World. 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

The open economy version of the factor accumulation model by Barro, Mankiw, and Sala-i-Martin (BMS) 1995 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. 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, we calculate 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.

In Productivity World, we do not have these extreme predictions. If the income difference between India and the US are explained largely by productivity, then lower productivity has an offsetting effect to the scarcity of skills in India in their effects on the return to skill in India.

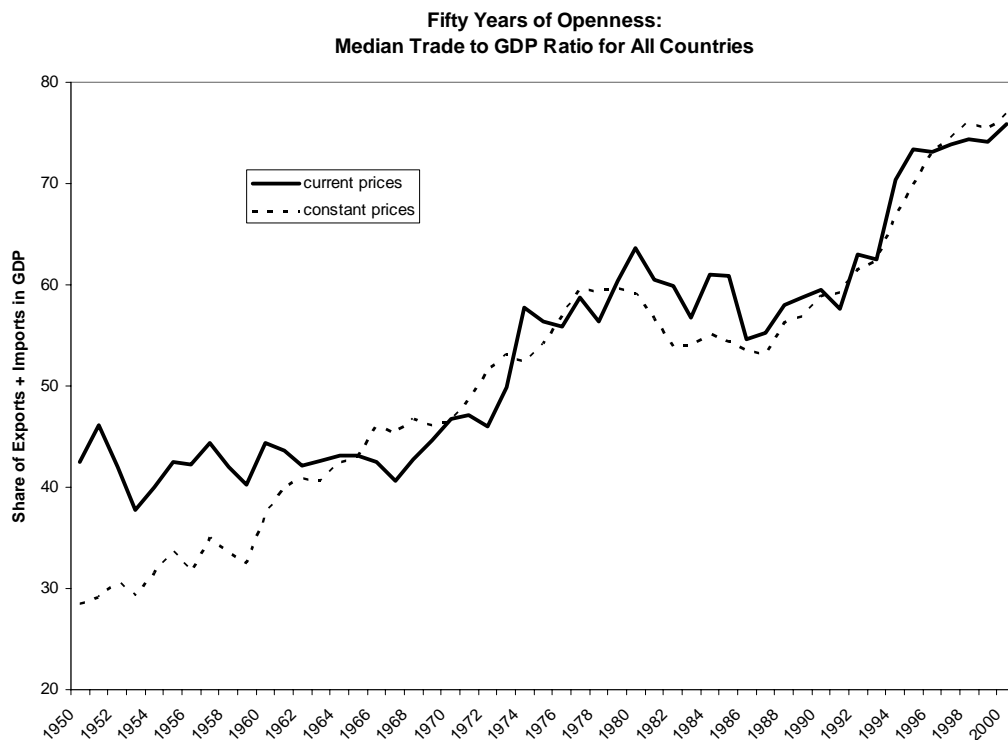
<i>Predictions of theoretical models of globalization</i>	<i>Factor World</i>	<i>Productivity World</i>
Neoclassical model with free mobility of capital and labor	Capital moves from rich to poor nations; labor moves from poor to rich nations; equal capital-labor ratios between rich and poor; factor price equalization; reduced international inequality; 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; reduced international inequality; 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 increase it in poor country, and trade would increase international inequality. (2) If productivity advantage not so extreme, then trade still increases inequality in rich country, increases it in poor country, reduces international inequality
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)	Much higher 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

Part II: Empirical Evidence on Globalization and Inequality

In this section, I review the evidence on globalization and both international and domestic inequality. 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 World versus Factor World, with occasional exceptions.

Empirical evidence on trade and factor flows across countries

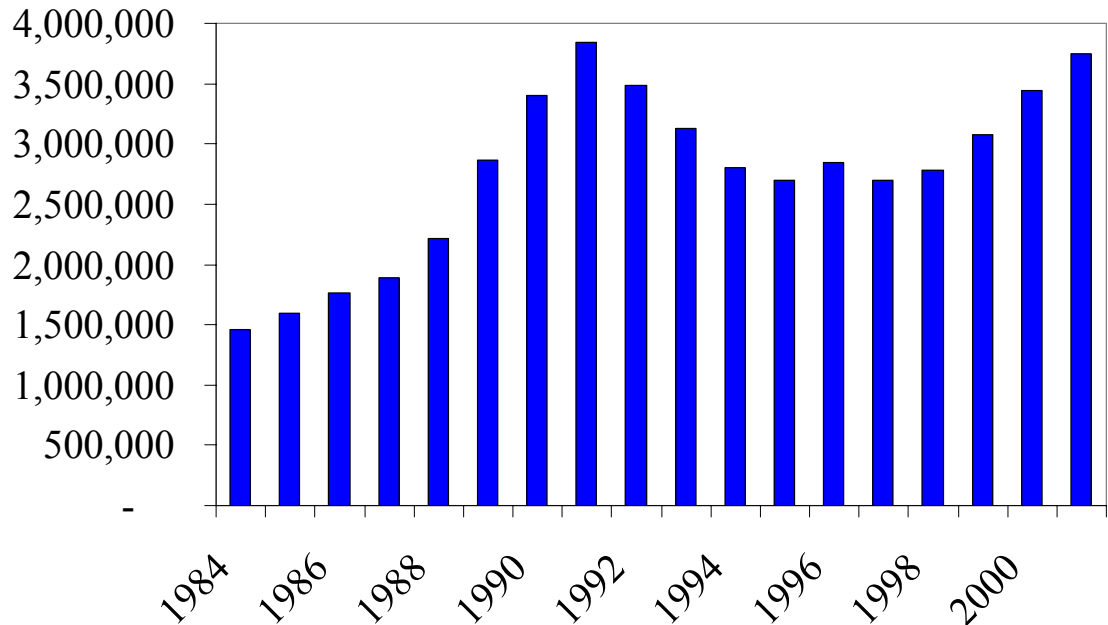
Supporting the conventional wisdom that recent decades have shown increasing “globalization”, we do see steadily rising trade/GDP ratios over 1950-2001:



Source: Summers and Heston

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

Migrants into 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).⁵ 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.⁶

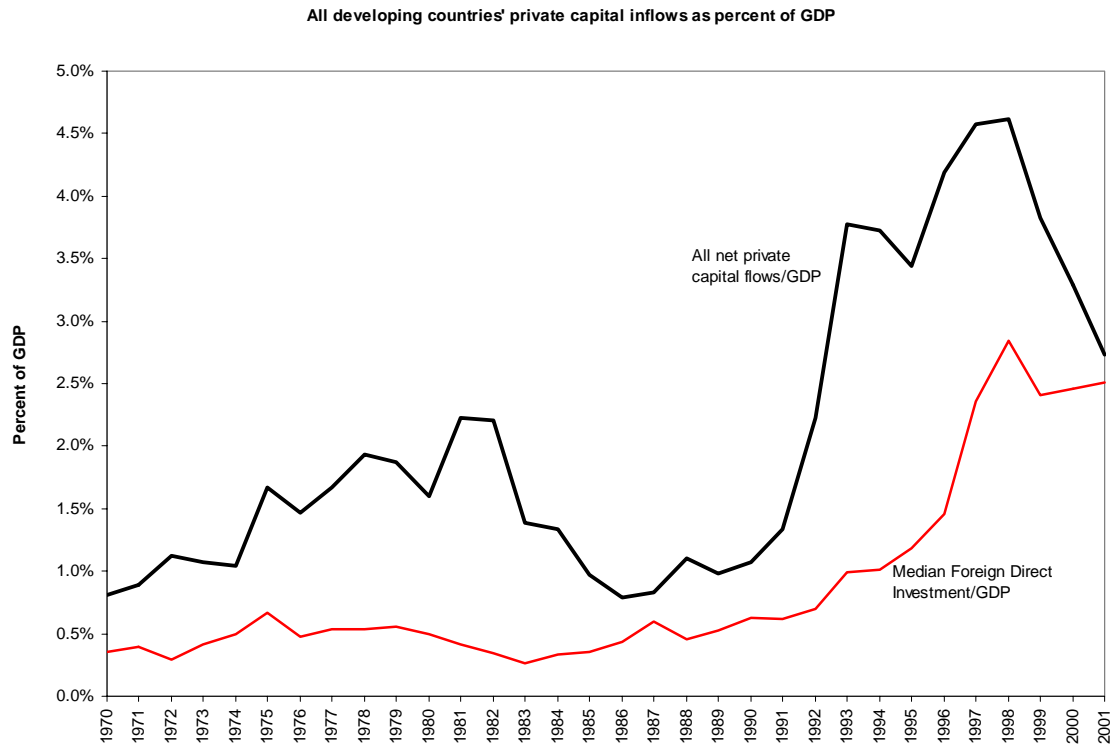
Capital also flows mainly to areas that are already rich, as famously pointed out by Lucas 1990. In 1990, the richest 20 percent of world population received 92 percent of portfolio capital gross inflows; the poorest 20 percent received 0.1 percent of portfolio capital inflows. The richest 20 percent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

⁵ 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.

⁶ 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 world population received 88 percent of private capital gross inflows; the poorest 20 percent received 1 percent of private capital gross inflows.

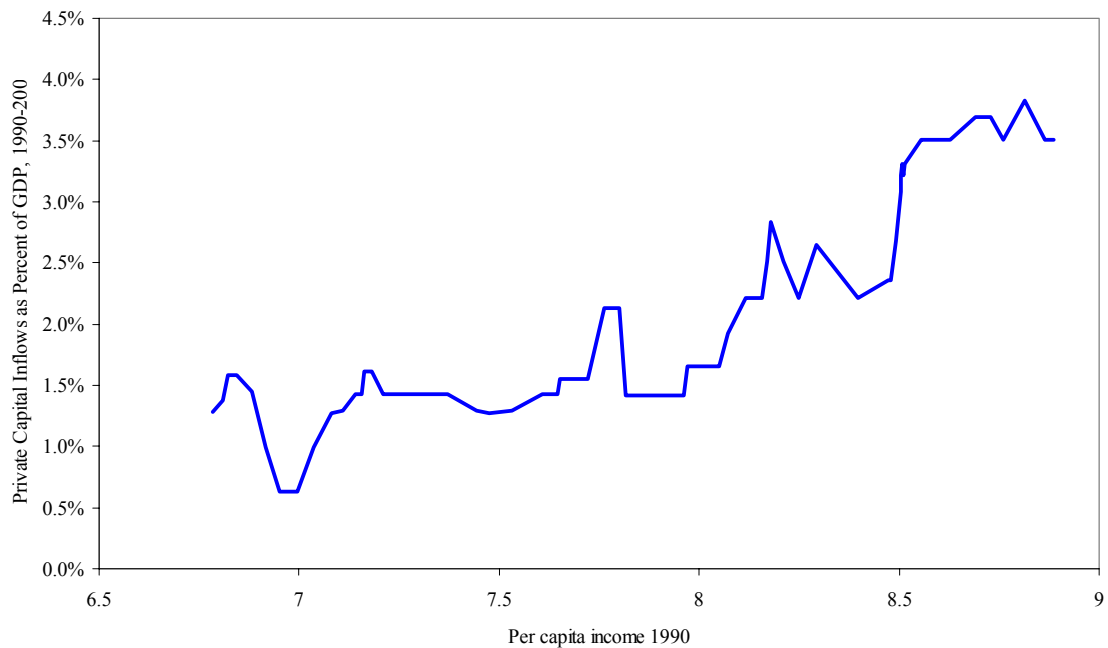
The developing countries do receive net inflows of private capital, as shown in the figure below. However, the amounts of net capital flow are small relative to their GDP, not at all the huge numbers predicted by the Factor World viewpoint.



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 World.

Private Capital Inflows to Developing Countries and Per Capita Income, 1990-2001 (moving median of 20 observations)



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)

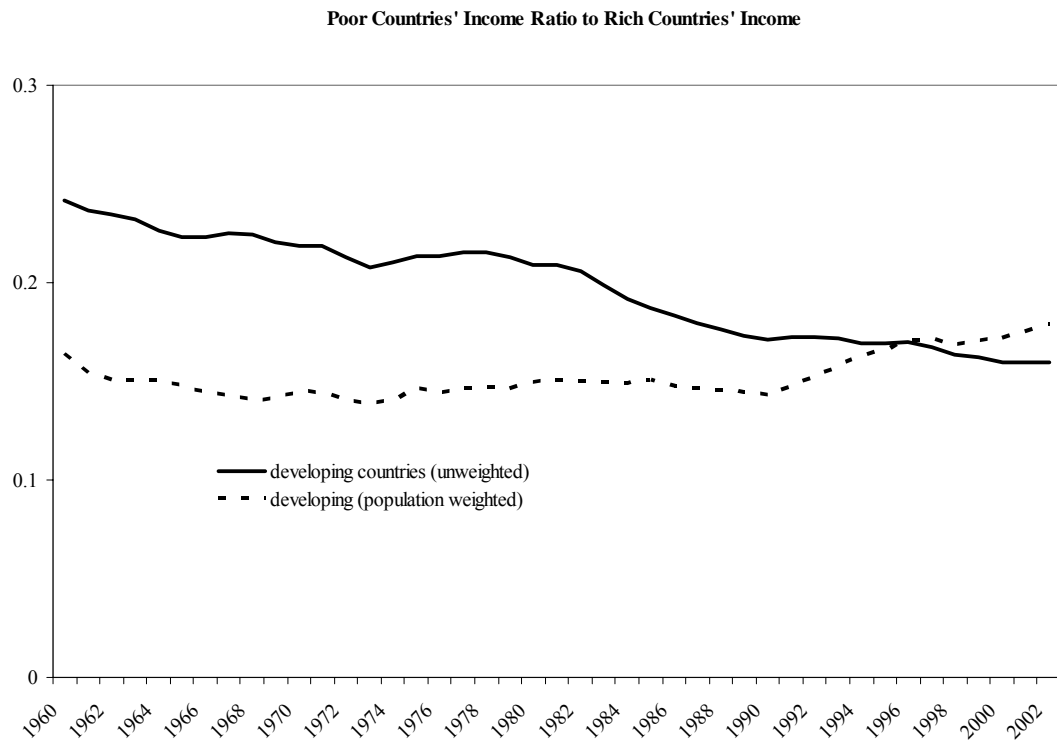
Region	Public capital per worker	Private wealth per worker	Private capital per worker	Capital flight per worker	Capital flight ratio
SS Africa	1,271	1,752	1,069	683	0.39
L.America	6,653	19,361	17,424	1,936	0.10
SouthAsia	2,135	2,500	2,425	75	0.03
East Asia	3,878	10,331	9,711	620	0.06
Middle- East	8,693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

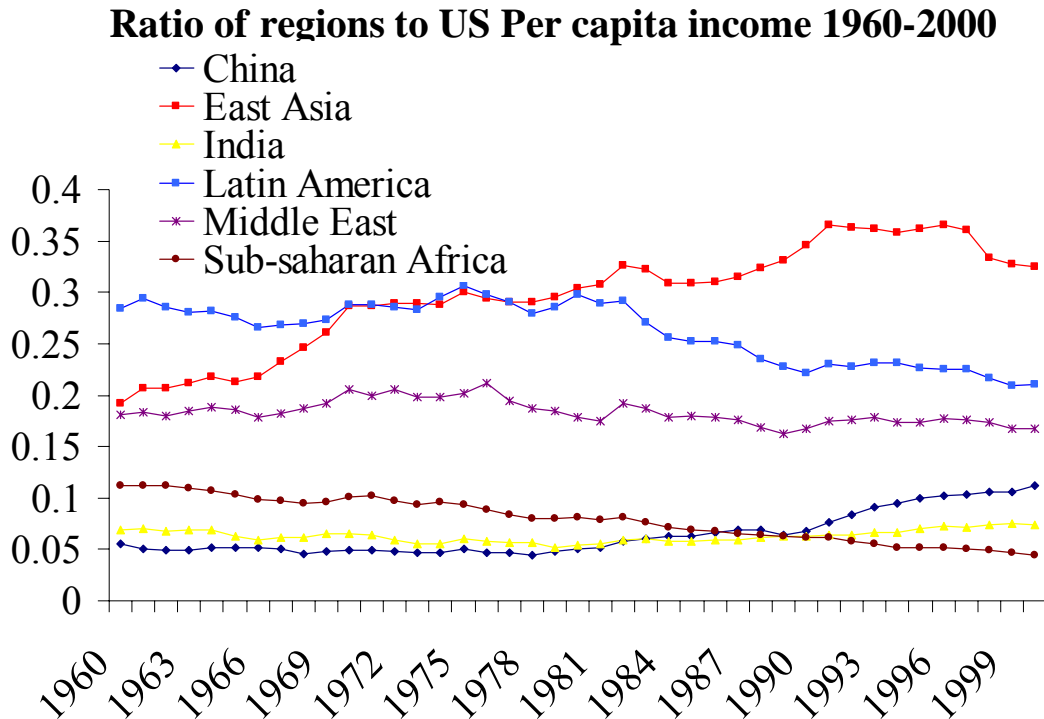
Top ten in cumulative negative errors and omissions

<i>Absolute amounts (US\$ billion)</i>	<i>sum 1970-2002</i>	<i>Percent of GDP</i>	<i>sum 1970-2002/ gdp2002</i>
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%

Other authors stress the population weighted average of poor countries' income ratios to rich countries. This shows decreasing international inequality 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 shows excruciatingly slow convergence.



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.

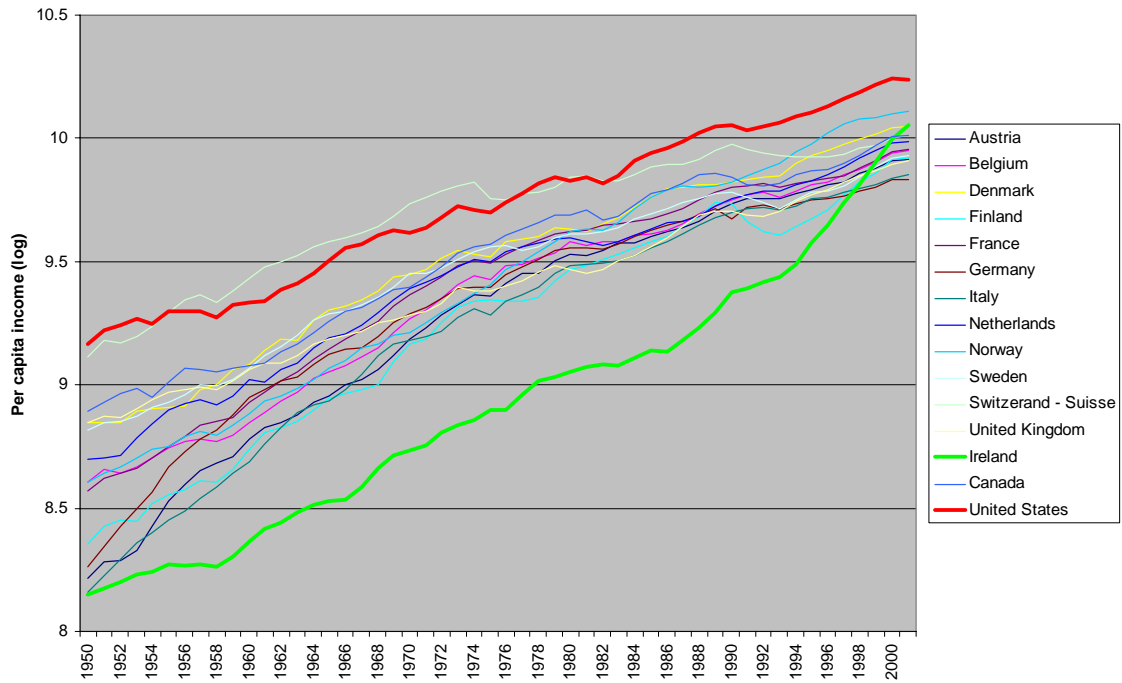
The counter-examples are China, East Asia (shown above without China), and India (although the above graph makes clear that the recent catch-up in India is still a blip). The very different performance of developing country regions does not have any obvious Factor World explanation. For the rapid growers of East Asia, the consensus now

seems to be that their growth cannot be largely explained by factor accumulation without generating some counterfactual predictions for 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 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

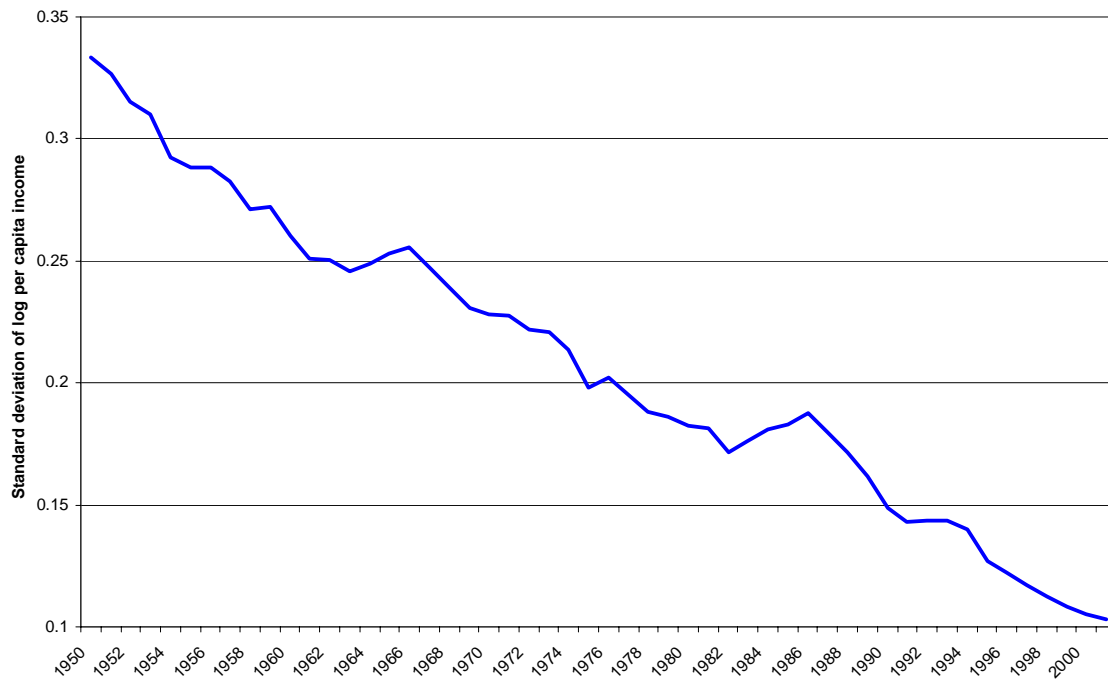
Another interesting experiment is to examine the trends in countries within Western Europe and North America, where we have already seen that most capital flows (and most trade) is concentrated. Also, the case of free labor mobility could be somewhat closer to reality in this region than for the world as a whole. The North Atlantic economy has seen decreasing inequality between countries over the last 5 decades. The figure belows shows the convergence of these economies from 1950 to 2001:

Per capita income in Europe and North America, 1950-2001



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:

standard deviation of log per capita income in Western Europe and North America



This seems to suggest convergence amongst one highly globalized group of countries.⁷ If there was no free labor mobility between these countries, so we have the predictions of capital movements and trade in Factor World borne out by the data for this group. 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 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 World would predict. Third, the convergence could have come out from

⁷ 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.

technological dissemination rather than Factor World 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 (Psacharopoulos 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).

Empirical evidence on trade, capital flows, and domestic inequality

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 World or Productivity World. 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 World 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. 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. 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.⁸

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 Factor World. 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.

⁸ 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			

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 inequality 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 vs Factor worldviews.

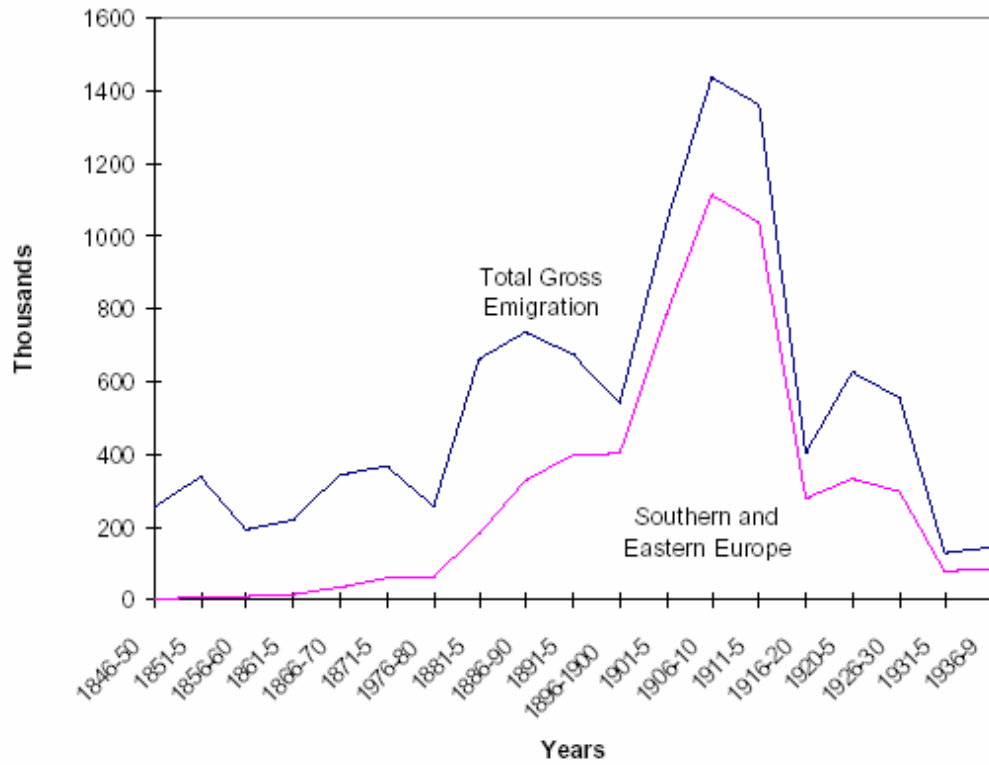
The most obvious event during this globalization was the movement of 60 million Europeans from the Old World to the New (see figure). As pointed out by many authors, this migration strongly supports a Factor World prediction. Labor was moving from the land-scarce Old World to the land-abundant New World.

O'Rourke and Williamson 1999 (pp. 60-63) and Lindert and Williamson 2004 present evidence that wage /land rental ratios fell in the migrant-recipient countries of the New World and rose in the migrant-sending countries of the Old World, as predicted by Factor World.

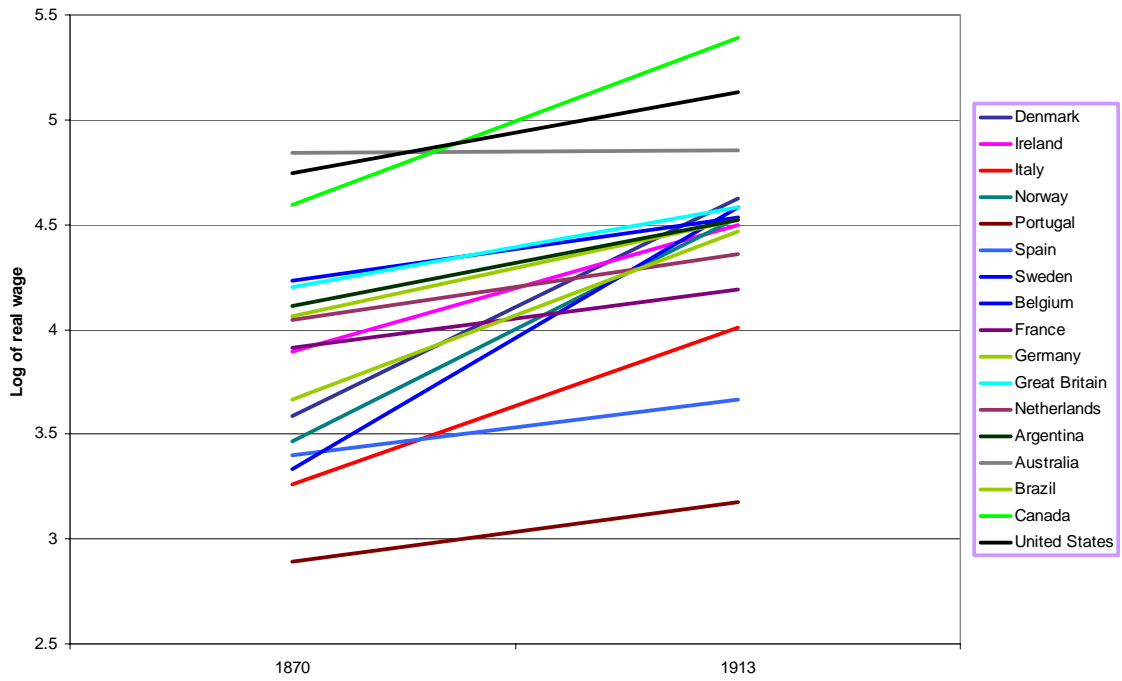
The evidence on wage convergence is less clear. For all countries in the North Atlantic, there is no overall tendency towards α -convergence of wages. However, if we pick out those countries that were the heaviest senders of migrants (Norway, Sweden, and Italy) and compare them to wages in the main destination (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)

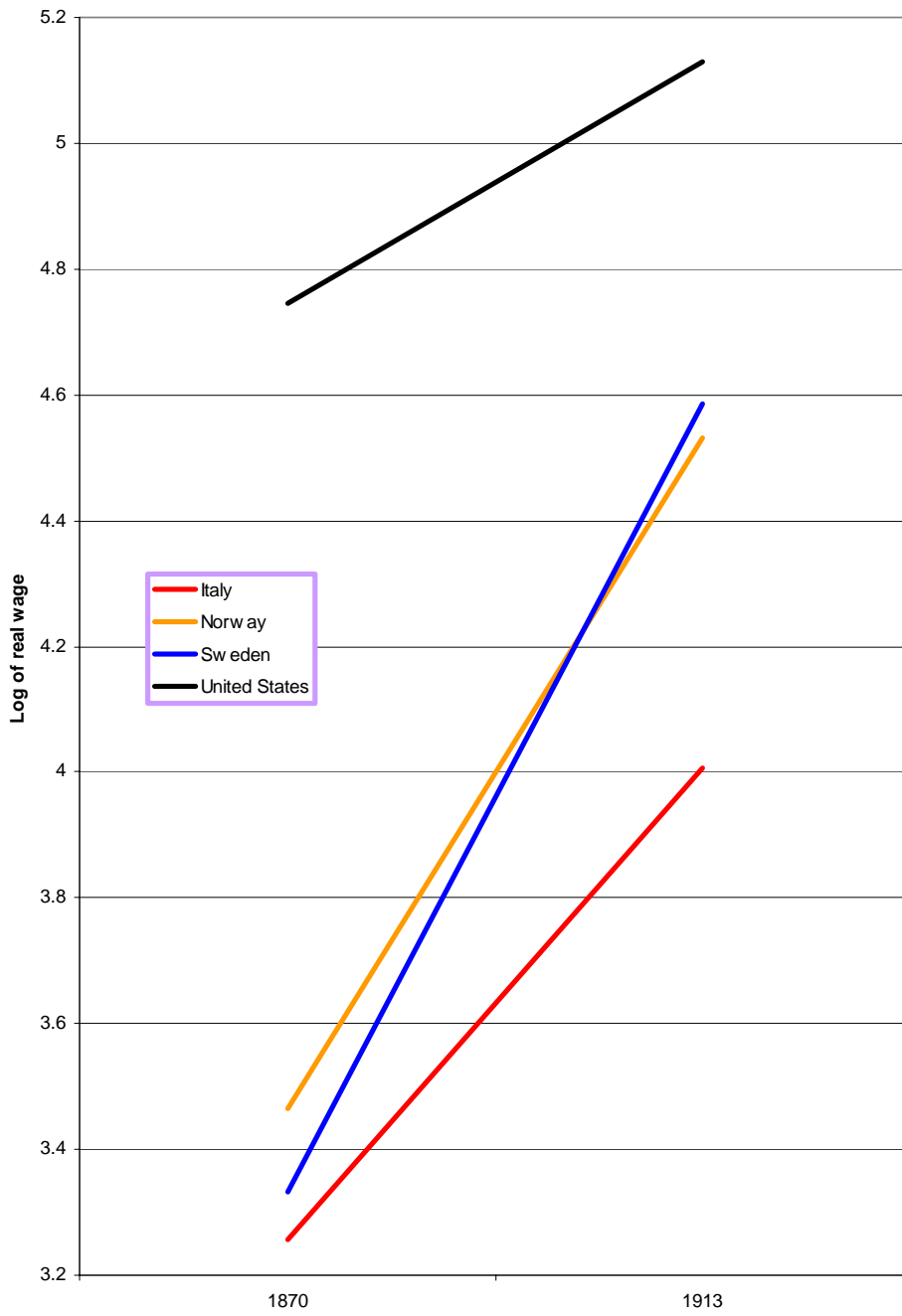


Real wages in Atlantic Economy, 1870 to 1913



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



O'Rourke and Williamson (1999, p. 179) and Lindert and Williamson 2002 also present some interesting evidence on inequality trends within countries. Inequality fell 1870-1913 in the countries that were the heaviest senders of migrants, while it rose amongst the highest recipients of migrants (relative to the respective labor forces). If the land rental/wage ratio is one of the main determinants of inequality in the 19th century, then this outcome would nicely follow the Factor World prediction.

Old Globalization is also associated with high trade flows between the Old World and the New. Canada, the US, Australia, and Argentina became exporters of land-intensive agricultural products to the land-scarce Old World, which presumably helped the convergence of land prices described earlier.

Another historical experiment: European colonial settlement

One more historical perspective on globalization and inequality is given by the experience with European settlement of the places outside Europe. We cannot know what inequality was like before Europeans arrived, but we can use the cross-section pattern of the extent of European settlement to test some predictions of Factor World and Productivity World.

Among places settled by Europeans there is an interesting negative relationship between the share of Europeans in the population after settlement and inequality today. This cross-section relationship is highly significant for the sample of places outside Europe with a share of European population in 1900 greater than .05. (I exclude places with smaller European shares than .05 in the belief that they may be colonial administrators, soldiers, or traders. The relationship is still significant but less strong if I include all places with positive European shares.)

Regression of Gini coefficient averaged 1960-99 on share of Europeans in 1900, with robust standard errors

	Coefficient	T-statistic
European Share in 1900	-14.83	-4.50
_cons	52.20	26.03
Number of obs	31	
R-squared	0.3105	

Unfortunately, our historical data is patchy. We only have European shares of population as of 1900 and we have virtually no historical data on inequality in the colonies. I have to make some heroic assumptions to make this an interesting historical case study.

First, I make the assumption that the European share in 1900 is a good reflection of the extent of European settlement in earlier decades and centuries. In the southern Africa examples, the European share in 1900 is probably not too bad an approximation of the historical reality. In the New World, the European share of population mainly reflects two things: (1) how densely settled were the different parts of the New World, and (2) whether settlers imported slaves from Africa on a large scale. In the sparsely settled colonies of Canada, America, Argentina, Australia, New Zealand, and Uruguay, Europeans made up a majority of the population after most of the native inhabitants died from European diseases and warfare. Brazil was like these cases, except that it imported large amounts of African slaves. A majority of the population became black or of mixed race. In the more densely settled areas in tropical Latin America, a large indigenous or mestizo population survived despite horrific attrition from disease and maltreatment by the conquistadores.

Second, I make the assumption that inequality today reflects historical inequality. Qualitative description by historians suggests that the very unequal societies of Latin America and southern Africa have been unequal for a long time. With these two assumptions, the table captures a long-standing pattern of inequality and the extent of European settlement.

European Settlement Outside Europe and Inequality

	Share of Europeans in Population in 1900	Gini Coefficient Today (Average 1960-1999)
--	--	--

Minority European Settlement

South Africa	22%	61
Rhodesia/Zimbabwe	7%	59
Lesotho	22%	58
Brazil	40%	57
Nicaragua	20%	52
Guatemala	20%	51
El Salvador	20%	51
Colombia	20%	50
Mexico	15%	50
<i>median</i>	<i>20%</i>	<i>52</i>

Majority European Settlement

Argentina	60%	43
Uruguay	60%	42
USA	88%	38
Australia	98%	38
New Zealand	93%	35
Canada	99%	33
<i>median</i>	<i>91%</i>	<i>38</i>

Source for European Settlement in 1900: Acemoglu, Johnson, and Robinson 2001

What predictions does this case confirm or refute? Historically, whites grabbed a large share of the existing land and natural resources away from the indigenous inhabitants. Indeed the attraction of land and natural resources was a big reason why the European settlers came, so this is another example of the relationship between the land/labor ratio and migration. The areas of majority European settlement were more land-abundant and so attracted more settlers. Inequality was low since the land rental/wage ratio was low and because land was relatively equally distributed. In the areas of minority European settlement, the land/labor ratio was probably lower because of the dense indigenous population or because of the widescale importation of slaves. The latter is of course endogenous, but likely depends on exogenous factors like suitability of

different lands for sugarcane (which has a tight relationship with establishment of slavery). The land rental/wage ratio was thus probably higher in the minority-European than in the majority-European settlements. Land ownership was likely more concentrated in the former cases since Europeans asserted claims on the land after conquest and Europeans were a minority. Both these factors make for higher inequality in the European-minority areas. Hence the Factor World story, plus European dominance of land ownership, does reasonably well explaining cross-country differences in inequality amongst overseas settlements of Europeans. Here is an even earlier type of “globalization” that created high inequality in most of Latin America and southern Africa. The same globalization created low inequality in temperate South and North America, Australia and New Zealand.

Part III: 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 World or Productivity World as the correct view of the channels from globalization to inequality. 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 Factor World	Supports Productivity World
Stylized fact or episode:		
<i>Recent decades</i>		
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
<i>Historical experience, 1870-1913</i>		
Great Migration from Old World to New World	X	
Fall in wage ratio/land rental in land-abundant countries, rise in land-scarce countries	X	
Inequality falling within land-scarce countries, rising in land-abundant countries	X	
Wage convergence for heaviest senders of migrants	X	
Divergence between US and migrant-sending countries		X
<i>Miscellaneous</i>		
European Share of Population in 1900 inversely related to domestic inequality today	X	

These mixed results are not a surprise. Factor World and Productivity World 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 inequality between 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,

accompanied by the predicted movements in land rental/wage ratios. The factor endowment view of an earlier movement of Europeans to the colonies of the New World and southern Africa help us understand the origins of different levels of country inequality based on land/labor ratios.

However, productivity differences appear to be an important facet of many globalization and inequality 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.

Productivity differences to explain patterns of globalization and inequality are a nuisance! The factor endowment models specify very clear channels by which globalization would affect inequality within and between countries (usually 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 inequality. We need new models to understand the productivity channels that seem to be so important for so many globalization and inequality outcomes (often disappointing outcomes). As Hamlet’s friend Horatio, with a Factor World viewpoint, would say:

HORATIO

O day and night, but this is wondrous strange!

HAMLET

And therefore as a stranger give it welcome.
There are more things in heaven and earth, Horatio,
Than are dreamt of in your philosophy.

Bibliography

- Acemoglu, Daron (2002) "Technical Change, Inequality, and the Labor Market," *Journal of Economic Literature*, 40 (1), 7–72.
- Acemoglu, Daron, Simon Johnson and James Robinson, The Colonial Origins of Comparative Development: An Empirical Investigation, *American Economic Review*, December, 2001, volume 91, pp. 1369-1401.
- Alberto Alesina, Reza Baqir, and William Easterly, "Public Goods and Ethnic Divisions," *Quarterly Journal of Economics*, November 1999, Volume CXIV, Issue 4, pp. 1243-1284.
- Barro, Robert J. and Xavier Sala-i-Martin, *Economic Growth*, 2nd Edition, MIT Press, 2003
- Robert J. Barro, N. Gregory Mankiw, and Xavier Sala-i-Martin, "Capital Mobility in Neoclassical Models of Economic Growth", *American Economic Review*, vol. 85, #1, pp. 103-115, March 1995.
- Bils, Mark and P. Klenow "Does Schooling Cause Growth?," *American Economic Review*, December 2000, 90(5), pp. 1160-1183.
- Bordo, Michael D., Alan M. Taylor and Jeffrey G. Williamson, editors, *Globalization in Historical Perspective*, The University of Chicago Press, 2003
- Borjas, George J. (1999). *Heaven's Door: Immigration Policy and the American Economy*, Princeton: Princeton University Press, 1999.
- Borjas, George J., Stephen G. Bronars, and Stephen J. Trejo (1992). "Self Selection and Internal Migration in the United States," *Journal of Urban Economics*, No. 32, pp. 159-85, September.
- Carrington, William J. and Enrica Detragiache (1998). "How Big is the Brain Drain?" *International Monetary Fund Working Paper* 98/102, July.
- Chiswick, Barry R. and Timothy J. Hatton International Migration and the Integration of Labor Markets, In Michael D. Bordo, Alan M. Taylor and Jeffrey G. Williamson, editors, *Globalization in Historical Perspective*, The University of Chicago Press, 2003
- Ciccone, Antonio and Robert E. Hall (1996). "Productivity and the Density of Economic Activity," *American Economic Review*, Vol 86, No. 1, March, pp. 54-70.
- Clemens, Michael A. and Jeffrey G. Williamson (2004), "Wealth Bias in the First Global Capital Market Boom, 1870-1913," *Economic Journal*, 114 (April): 304-337.

- Collier, Paul, Anke Hoeffler, and Catherine Pattillo, Flight Capital as a Portfolio Choice), 2001, *The World Bank Economic Review* 15: 55-80
- Deininger, Klaus and Lyn Squire (1998), "New ways of looking at old issues: inequality and growth," *Journal of Development Economics*;57(2), 259-87
- Devarajan Shanta, William Easterly, and Howard Pack) "Low Investment is not the Constraint on African Development" *Economic Development and Cultural Change*, April 2003, Volume 51, No. 3
- Easterly, William and Ross Levine "It's not factor accumulation: stylized facts and growth models" *World Bank Economic Review*, Volume 15, Number 2, 2001
- Feenstra, Robert and Gordon H. Hanson (1996) "Foreign Investment, Outsourcing, and Relative Wages," in Robert C. Feenstra, Gene M. Grossman, and Douglas A. Irwin, eds., *The Political Economy of Trade Policy: Papers in Honor of Jagdish Bhagwati*, Cambridge MA: MIT Press.
- Grubel, Herbert G. and Anthony Scott (1977). *The Brain Drain: Determinants, Measurement and Welfare Effects*. Wilfrid Laurier University Press: Waterloo, Ontario, Canada.
- Hausmann, Ricardo and Dani Rodrik, Economic Development as Self-Discovery, Harvard Kennedy School of Government, March 2002
- Hsieh, Chang Tai. What Explains the Industrial Revolution in East Asia? Evidence from the Factor Markets. *American Economic Review*, June 2002.
- Lindert, Peter H. and Jeffrey G. Williamson. Does Globalization Make the World More Unequal? In Michael D. Bordo, Alan M. Taylor and Jeffrey G. Williamson, editors, *Globalization in Historical Perspective*, The University of Chicago Press, 2003
- Klenow, Peter and Andres Rodriguez-Clare (1997). "The Neoclassical Revival in Growth Economics: Has It Gone Too Far?" *NBER Macroeconomics Annual 1997*, Volume 12, 73-103.
- Lucas, Robert E., Jr. (1990). Why Doesn't Capital Flow from Rich to Poor Countries? *American Economic Review, Papers And Proceedings*, 80:92-96 May.
- Mankiw, N. Gregory (1995). "The Growth of Nations," *Brookings Papers on Economic Activity* 1, pp. 275-326.
- Obstfeld, Maurice and Alan M. Taylor, "Globalization and Capital Markets" in Michael D. Bordo, Alan M. Taylor and Jeffrey G. Williamson, editors, *Globalization in Historical Perspective*, The University of Chicago Press, 2003

- O'Rourke, Kevin and Jeffrey G. Williamson. *GLOBALIZATION AND HISTORY: THE EVOLUTION OF A 19th CENTURY ATLANTIC ECONOMY*, (MIT Press, 1999)
- Lant Pritchett, Boomtowns and Ghost Countries: Geography, Agglomeration and Population Mobility, Harvard Kennedy School of Government mimeo (November 2003).
- Lant Pritchett, "Divergence, Big Time." *Journal of Economic Perspectives*, 1997
- Psacharopoulos, George (1994). "Returns to Investment in Education: A Global Update," *World Development*, Vol. 22, No. pp. 1325-1343.
- Romer, Paul (1995). Comment on N. Gregory Mankiw, "The Growth of Nations," *Brookings Papers on Economic Activity* 1, pp. 313-320.
- Trefler, Daniel (1993) International Factor Price Differentials: Leontief was Right!, *Journal of Political Economy*, Volume 101, No. 6
- Union Bank of Switzerland (1994). *Prices and Earnings Around the Globe*, Zurich.
- Zu, Susan Chun and Daniel Trefler (2003), Trade and Inequality in Developing Countries: A General Equilibrium Analysis, forthcoming *Journal of International Economics*