Globalization, Inequality, and Development: The Big Picture

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Models of trade and factor flows based on differences in factor endowments give clear predictions as to how globalization affects inequality and development. Models in which productivity differences between countries drive trade and factor flows gave more ambiguous predictions. Unfortunately, productivity differences seem necessary to understand many, though not all, "big picture" globalization, inequality, and development outcomes. 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 centuries, accompanied by the predicted movements in land rental/wage ratios. However, productivity differences appear to be an important facet of many globalization, inequality, and development 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 toward 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 toward 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.

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I. Introduction

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] Agents such as the International Monetary Fund (IMF) and World Bank are said to be 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 claim that 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 differ if income differences are due to productivity differences rather than different factor ratios.

I do not try to answer the large 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 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 to 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.

II. How Globalization Affects Inequality and Development in Standard Models

A. Factor Movements

In the neoclassical model of factor movements, free movement of factors tends to reduce inequality between nations, while having different effects on inequality in rich

1. International Forum on Globalization (2002, p. 140).
2. International Forum on Globalization (2002, p. 52).
3. Aronowitz and Gautney (2003, p. xxv).
4. International Forum on Globalization (2002, p. 30).

and poor nations. In the neoclassical model, 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 ones, while wages will be higher in rich nations than in poor ones.

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 $y = Y_i/L_i$. 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 ("outsourcing"), 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 ones. With factor mobility, wages will fall in rich countries and rise in poor ones. 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, with the unstarred values of k_i and y_i as the initial values, 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 neoclassical model, even small differences in initial income trigger massive factor flows. If we assume a capital share of one-third, a ratio of poor to rich country income of 0.8, and a marginal product of capital (r^*) of .15, then the cumulative capital inflows into the poor country will be 108 percent of the terminal equilibrium GDP in the poor country!

Things are very different if 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 neoclassical model case. Unlike the neoclassical model 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 must 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. Pritchett (2003) argues that there may in fact be countries that could become "ghost countries" if factor mobility were unimpeded, just like the rural counties currently emptying out on the Great Plains in the United States.

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, but 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 them want to stay. However, in many countries agriculture is sufficiently important that land and natural resource availability is a potentially relevant sticky factor preventing 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 move freely 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, we 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 greater in the higher-productivity places:

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

Per capita incomes will move toward 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 neoclassical model or the productivity differences view. 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 move freely, but capital can.

Let us revert again to the model without land. 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 neoclassical model 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 the neoclassical model, 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 varies 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 (reverse outsourcing!). 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.

B. Trade Flows and Inequality

In the textbook neoclassical 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 autarky) 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 per capita incomes 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.

We can substitute "land" for "capital" in all of the above 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 is migrating from the land-scarce country to the land-abundant country.

What if the absolute level of labor-augmenting productivity differs 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 differ. 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.

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 (the Leontief-Trefler paradox).[5] In this case, trade will reduce inequality in the rich country and increase it in the poor country. If productivity differences are not so stark as to offset relative factor scarcity, the rich country will be capital abundant, and we will return 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 allow 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. 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 further the rate of return 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 gained enough expertise to produce efficiently (such as 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.

5. See Trefler (1993).

As noted by many previous authors, there are interesting interactions between trade and factor flows arising from the unconventional productivity differences view of comparative advantage. Whereas in the neoclassical 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 differences view. 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 neoclassical model, in which exports from the poor country of labor-intensive goods lower 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 the neoclassical model, but it is ambiguous with regard to productivity differences. Trade in which 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.

C. Domestic Factor Accumulation and Globalization

How do trade and factor movements affect domestic savings and factor accumulation? In the neoclassical 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 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 "outsourcing" 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 the productivity differences 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 countries).

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. The poor country with the outmigration of labor will have an 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.

D. 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 inequality 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. Previous literature covered the correlation between export growth and GDP growth. 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 a 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 (Rodríguez and Rodrik [2001]). Frankel and Romer (1999) did a regression of *levels* of per capita income on trade shares, using geographically determined "natural openness" as an instrument. As with all income level regressions, the solution to the identification problem is not very convincing. 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. It is hard to have much confidence based on the existing literature that trade has strong growth effects.

III. Empirical Evidence on Globalization, Inequality, and Development

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 the Old Globalization era from the 19th century, and the evidence on factor movements within countries. The overall pattern tends to support the productivity differences view versus the neoclassical model, with occasional exceptions.

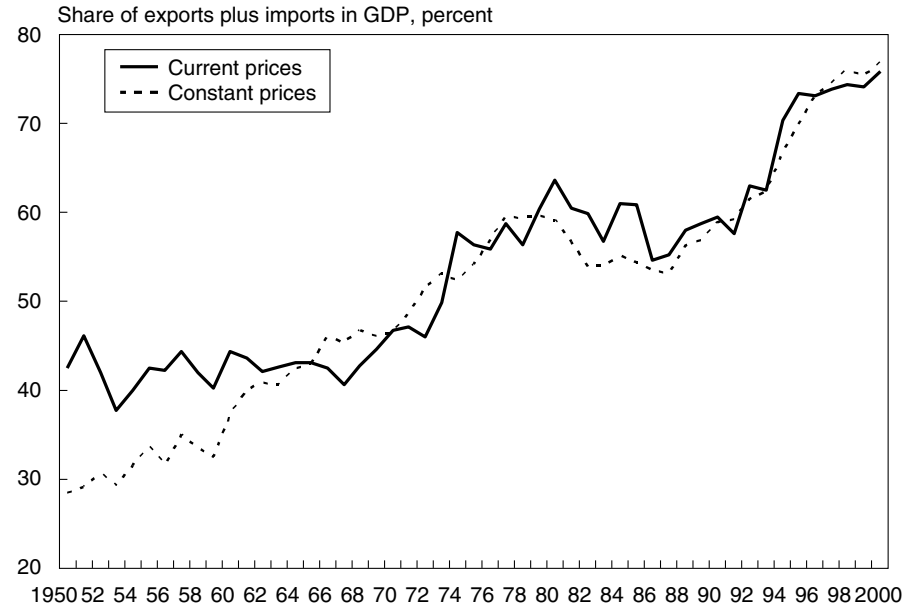
A. Empirical Evidence on Trade and Factor Flows across Countries

Supporting the conventional wisdom that recent decades have shown increasing globalization, we do see steadily rising trade/GDP ratios over 1950–2001 in Figure 1. The era of globalization has coincided with movements of millions of people from poor countries to rich ones (Figure 2).

Figure 2 shows the flows of migrants into the rich countries in absolute numbers. The migration of labor is overwhelmingly directed toward the richest countries. The three richest countries alone (the United States, 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 eight among the 90 countries in the bottom four-fifths of the sample are net recipients of migrants (Easterly and Levine [2001]).

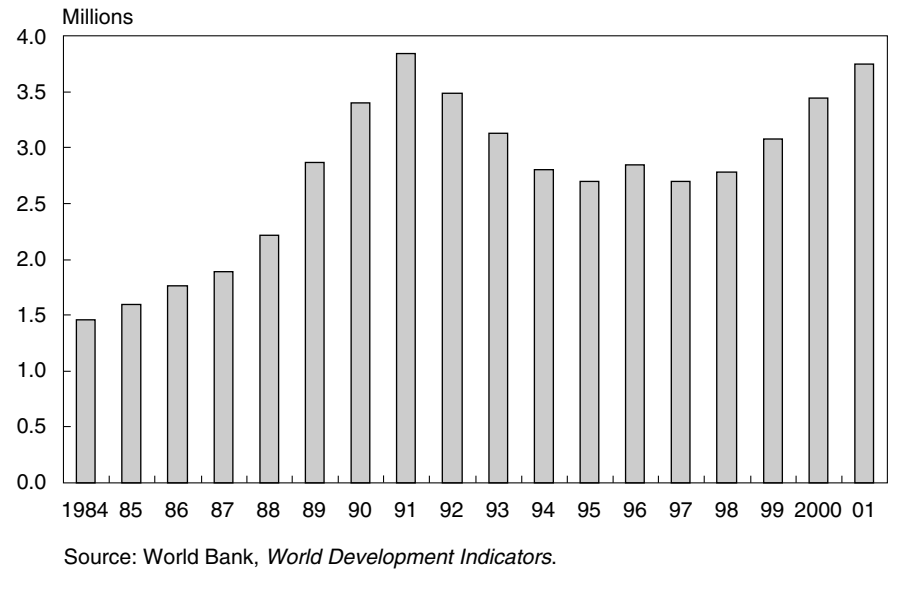
Embodied in this flow of labor are flows of human capital toward the rich countries, the famous "brain drain." In terms of the simple models above, human capital movements are governed by the same predictions as physical capital movements.

Figure 1 Fifty Years of Openness: Median Trade to GDP Ratio for All Countries, 1950–2001



Source: Summers and Heston (1993) and online updates.

Figure 2 Migrants into Rich Countries, 1984–2001



Source: World Bank, *World Development Indicators*.

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

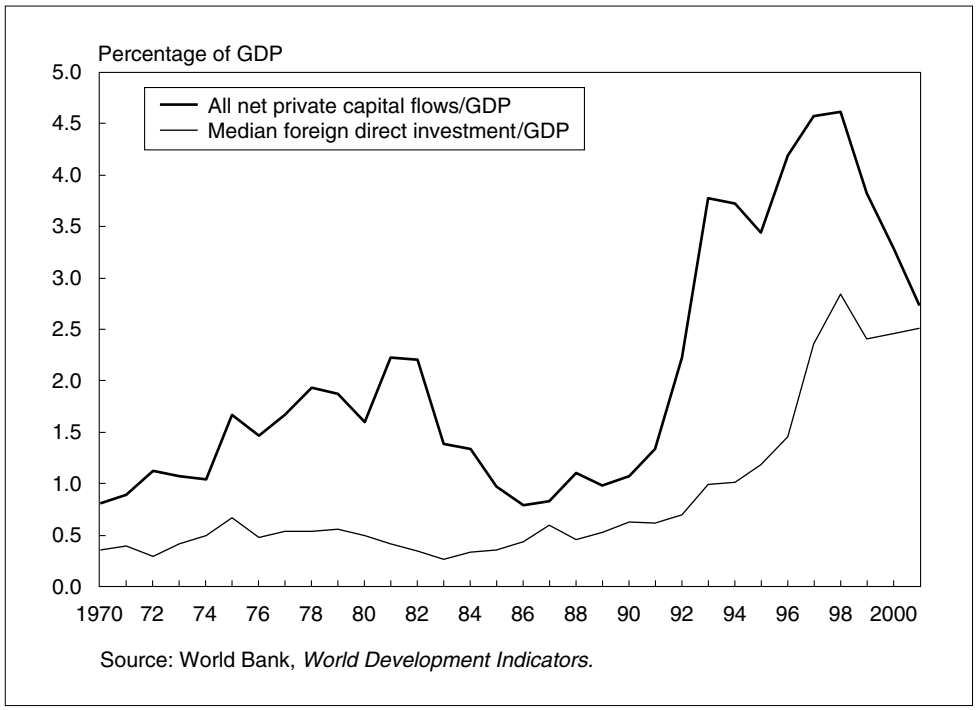
Capital also flows mainly to areas that are already rich, as famously pointed out by Lucas (1990). In 1990, the richest 20 percent of the world's population received 92 percent of portfolio capital gross inflows; the poorest 20 percent received 0.1 percent. The richest 20 percent of the world's population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

The developing countries do receive net inflows of private capital, as shown in Figure 3. However, the amounts of net capital flow are small relative to their GDP, not at all the huge numbers predicted by the neoclassical model. Moreover, the importance of capital inflows rises with the per capita income of the developing country, counter to the prediction of the neoclassical model (Figure 4).

Capital inflows to the poorest countries are primarily made up of FDI, as shown above. Even so, private FDI into the poorest region, Africa, is low and is directed mostly to natural resource exploitation (such as oil, gold, diamonds, copper, cobalt, manganese, bauxite, chromium, and platinum). The correlation coefficient between FDI and natural resource endowment across African countries is .94 (Morriset [1999]).

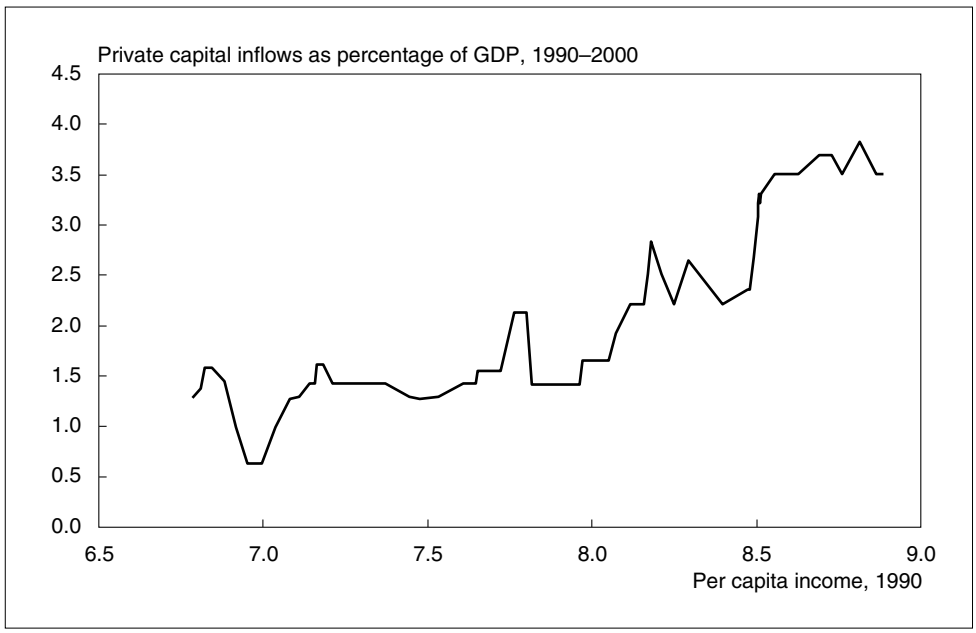
6. Note these are all small countries. Carrington and Detragiache (1998) point out that U.S. immigration quotas are less binding for small countries, since with some exceptions the legal immigration quota is 20,000 per country regardless of a country's population size.
7. Casual observation suggests "brain drain" within countries. The best lawyers and doctors congregate within a few metropolitan areas such as New York City, where skilled doctors and lawyers are abundant, while poorer areas where skilled doctors and lawyers are scarce have difficulty attracting the best professionals.

Figure 3 All Developing Countries' Private Capital Inflows as a Percentage of GDP, 1970–2000



Source: World Bank, *World Development Indicators.*

Figure 4 Private Capital Inflows to Developing Countries and Per Capita Income, 1990–2001 (Moving Median of 20 Observations)



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 Pattillo (1999) estimate that capital flight accounts for 39 percent of private wealth in both Sub-Saharan Africa and the Middle East (Table 1). It is also important in Latin America (10 percent of wealth), but less so in South and East Asia.

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 (Table 2). As a percentage of GDP, the outflow of capital is very significant in the African countries. This tends to confirm the findings of Collier, Hoeffler, and Pattillo (1999) 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 Collier, Hoeffler, and Pattillo (1999) found earlier.

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

Table 1 Wealth and Capital Flight by Region

US$

Region	Public capital per worker	Private wealth per worker	Private capital per worker	Capital flight per worker	Capital flight ratio
Sub-Saharan Africa	1,271	1,752	1,069	683	0.39
Latin America	6,653	19,361	17,424	1,936	0.10
South Asia	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

Source: Collier, Hoeffler, and Pattillo (1999).

Table 2 "Top 10" Countries in Cumulative Negative Errors and Omissions

	Absolute amounts, sum 1970–2002 (US$ billions)		Percentage of GDP, sum 1970–2002/ GDP 2002 (percent)
China	–142	Liberia	–129
Russian Federation	–68	Mozambique	–82
Mexico	–27	Guinea-Bissau	–66
Venezuela	–17	Eritrea	–63
Korea, Rep. of	–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 Bank, *World Development Indicators*.

poor countries *all* factors of production tend to move toward the rich countries. This supports the productivity differences view of globalization instead of the neoclassical view. The attractive force of higher productivity in the rich countries overturns the neoclassical model's predictions of convergence through capital flows and trade. The productivity differentials among sectors could actually lead to divergence.

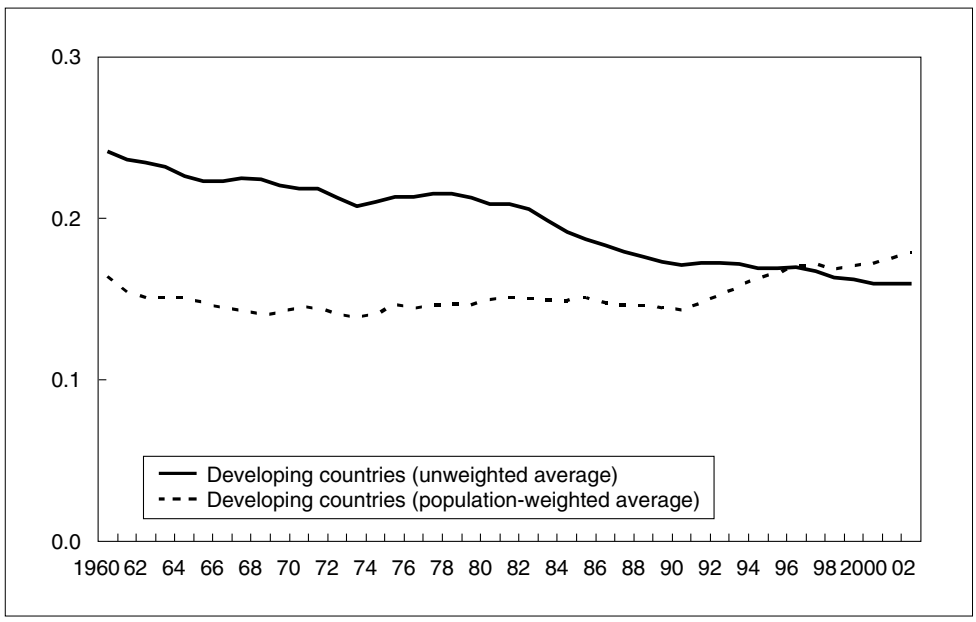
However, the flows of migrants are still relatively small out of the entire poor country population (three million out of five billion), so we should not jump to the conclusion that the poor countries are virtually emptying out, or that there is free labor mobility. The flows involved are actually too 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.

B. Behavior of Cross-Country Per Capita Income Ratios

The overall record of international inequality during recent globalization is controversial. Figure 5 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 inequality between countries. This is the right number if we take each poor country, no matter how small or large, as an independent experiment for 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 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 Figure 5 is how high international inequality is—the average poor country by either

Figure 5 Ratio of Poor Countries' Income to Rich Countries' Income, 1960–2002

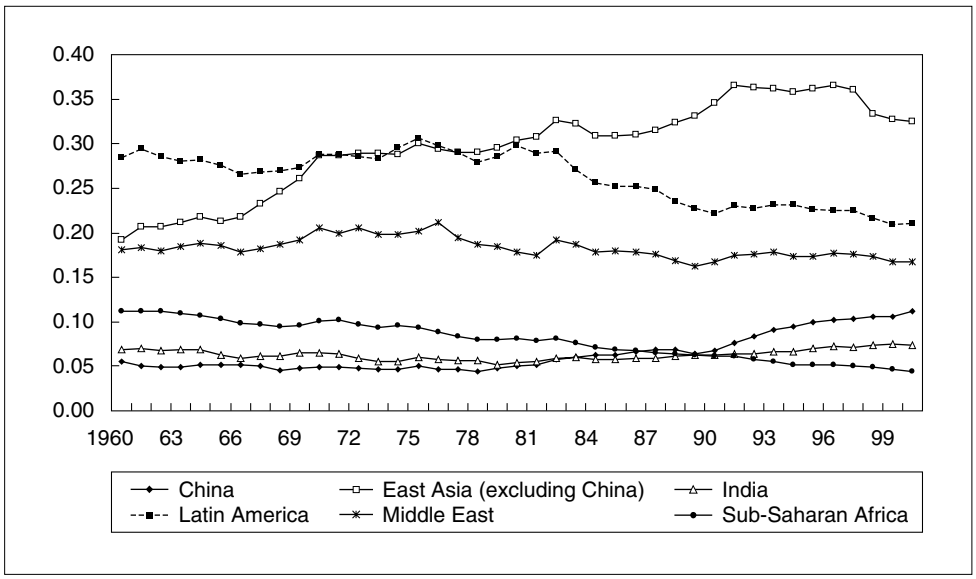


measure has a per capita income that is only one-fifth the average for the member countries of the Organisation for Economic Co-operation and Development (OECD). Even the population-weighted average slows excruciatingly slow convergence. Figure 6 breaks this out explicitly by developing country region, as well as treating India and China separately.

The regions that have the worst trends are Latin America, the Middle East, and Sub-Saharan Africa, all of which are diverging from the United States. 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 toward the rich countries. In this same category would be the former Soviet Union, for which there is only a decade of data.

The counter-examples are China, East Asia (excluding China), and India (although Figure 6 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 neoclassical 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 [2003], and Bils and Klenow [2000]). Hence, there seem 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 no clear theory underlies these correlations.

Figure 6 Ratio of Regions to U.S. Per Capita Income 1960–2000



C. 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) are 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 five decades. Figure 7 shows the convergence of these economies from 1950 to 2001. A measure of inequality among these countries is the standard deviation of log per capita incomes. This has declined at a nearly constant rate over the last five decades (Figure 8).

This seems to suggest convergence among one highly globalized group of countries. If there was no free labor mobility between these countries, then the predictions of capital movements and trade in the neoclassical model are borne out by the data for this group. Several caveats apply. One must always be careful that one is not selecting countries by 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 geographic regions (North America and Western Europe) that have recorded intensive capital and trade flows. Second, part of the dispersion in 1950 is artificially induced

Figure 7 Per Capita Income in Europe and North America, 1950–2001

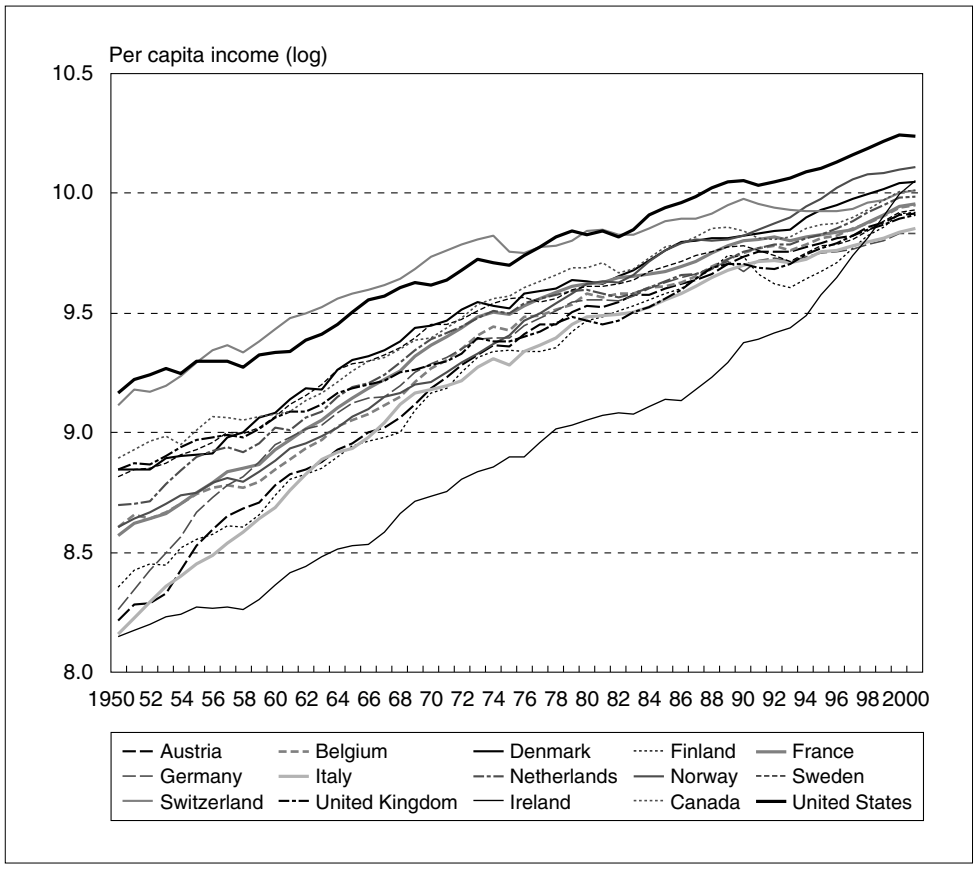
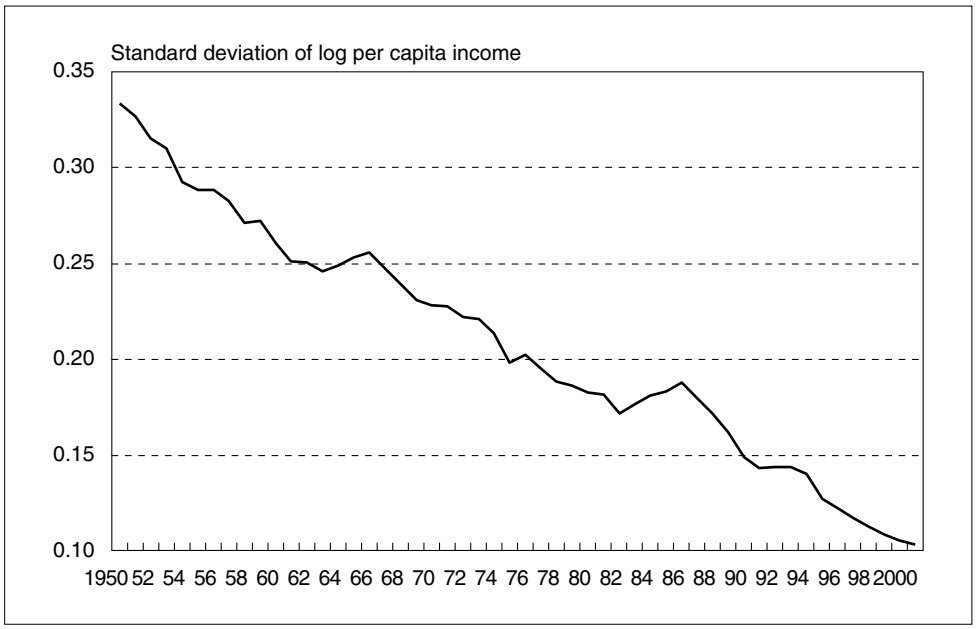


Figure 8 Standard Deviation of Log Per Capita Income in Western Europe and North America



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 income 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 the neoclassical model would predict. Third, the convergence could have come from technological dissemination rather than neoclassical effects. This is hard to test, although one would think that the core countries in this group (the United States, the United Kingdom, France, and Germany) would have had fairly similar technologies, since they had all industrialized by about the same extent as of the early 20th century.

D. Evidence on Factor Returns within Countries

We have some evidence on the behavior of returns to skill and returns to physical capital within countries. Easterly and Levine (2001) noted that skilled workers earn less, rather than more, in poor countries. This seems inconsistent with the open-economy version of the factor accumulation model by Barro, Mankiw, and Sala-i-Martin (BMS) (1995). In the BMS model, capital flows 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 ones. 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:

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

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 in the United States (to correspond to a 14-fold difference in per capita income). In general, the equation above shows that skilled wage differences across countries should be inversely related to per capita income if human capital abundance explains income differences across countries, *à la* BMS.

The skill premium should be 70 times higher in India than in the United States. If the ratio of skilled to unskilled wages is about two in the United States, then the skilled to unskilled wage ratio in India should be 140. This would imply a fantastic rate of return to education in India, 70 times larger than the return to education in the United States.

The facts do not support these predictions: skilled workers earn more in rich countries. Fragmentary data from wage surveys indicate that engineers earn an average of US$55,000 in New York City compared to US$2,300 in Bombay (Union Bank of Switzerland [1994]). Instead of skilled wages being five times higher in India than in the United States, skilled wages are 24 times higher in the latter than in the former. The higher wages across all occupational groups is consistent with a higher A in the United States 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 differences 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 three times the wage of building laborers. Rates of return to education are also only about twice as high in poor countries—about 11 percent versus 6 percent from low-income to high-income ones (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 (2003) 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 total factor productivity [TFP] residuals).

E. Empirical Evidence on Trade, Capital Flows, and Domestic Inequality

To test the effects of trade on inequality, I regress Gini coefficients on trade shares in GDP for a pooled cross-country, cross-time sample of decade averages for the 1960s, 1970s, 1980s, and 1990s, for all countries (developed and developing) with available data. The source of my data for inequality is the Deininger and Squire (1998) inequality database, updated with World Development Indicators (WDI) data from the World Bank. The source of the data on trade shares is the WDI. Since the theory predicts different signs on the inequality and trade relationship in rich and poor countries, I use an interaction term that allows the slope to differ for developing countries (Table 3).

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 neoclassical model. However, the developing country slope dummy is robust to this control. I also checked robustness to a time trend for the Gini coefficient; although it is significant and negative, it does not 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 drop as the capital rental/wage ratio (or as a decline 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

Table 3 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*-statistic	Coefficient	*t*-statistic	Coefficient	*t*-statistic
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 observations	312		312		312	
Number of groups	112		112		112	
R-squared	0.2142		0.2509		0.2261	

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 sees 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 a percentage of GDP. Data on FDI and total net private capital flows are from the WDI over 1970–2002. Inequality data are from the same sources as before, but are only available through 1999, so the effective sample is 1970–99.

FDI has a positive effect on inequality in the rich countries, with a significantly less positive effect on inequality in the poor countries (Table 4). 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.

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 (Table 5). There is no significant relationship of domestic saving to total private capital flows. The positive correlation of domestic saving with FDI is inconsistent with the transitional dynamics of the

Table 4 Fixed Effects (Within) Regressions for Change in Log(Gini) as Function of Capital Flows

Regression	Constant	FDI/GDP	FDI•LDC dummy	FDI• commodity-exporting dummy	All private net capital inflows/ GDP	All private net capital inflows• commodity-exporting dummy	Number of observations	Number of countries	R-squared within
Coefficient	–0.065	0.027					195	88	0.0516
t-statistic	–3.65	2.40							
Coefficient	–0.069	0.090	–0.081				195	88	0.1365
t-statistic	–4.03	4.02	–3.21						
Coefficient	–0.069	0.087	–0.092	0.032			195	88	0.1520
t-statistic	–4.00	3.89	–3.49	1.38					
Coefficient	–0.036				0.716		130	63	0.0079
t-statistic	–1.30				0.73				
Coefficient	–0.037				0.521	0.684	130	63	0.0094
t-statistic	–1.31				0.44	0.31			

Table 5 Fixed Effects (Within) Regressions of Gross Domestic Saving/ GDP on Private Capital Flows/GDP

	Constant	FDI	FDI• developing country dummy	FDI• commodity-exporting dummy	Private net capital inflows	Private net capital inflows• developing country dummy	Number of observations	Number of countries	R-squared within
Coefficient	16.827	0.294					297	111	0.0093
t-statistic	39.41	1.31							
Coefficient	16.818	0.353	–0.065				297	111	0.0093
t-statistic	38.13	0.48	–0.08						
Coefficient	16.612	0.836		–1.068			297	111	0.0397
t-statistic	38.56	2.65		–2.41					
Coefficient	16.664	0.428	0.496	–1.150			297	111	0.0417
t-statistic	37.93	0.59	0.63	–2.49					
Coefficient	15.059				34.497		246	85	0.0156
t-statistic	25.44				1.59				
Coefficient	14.984				50.272	–29.788	246	85	0.0185
t-statistic	24.86				1.59	–0.68			

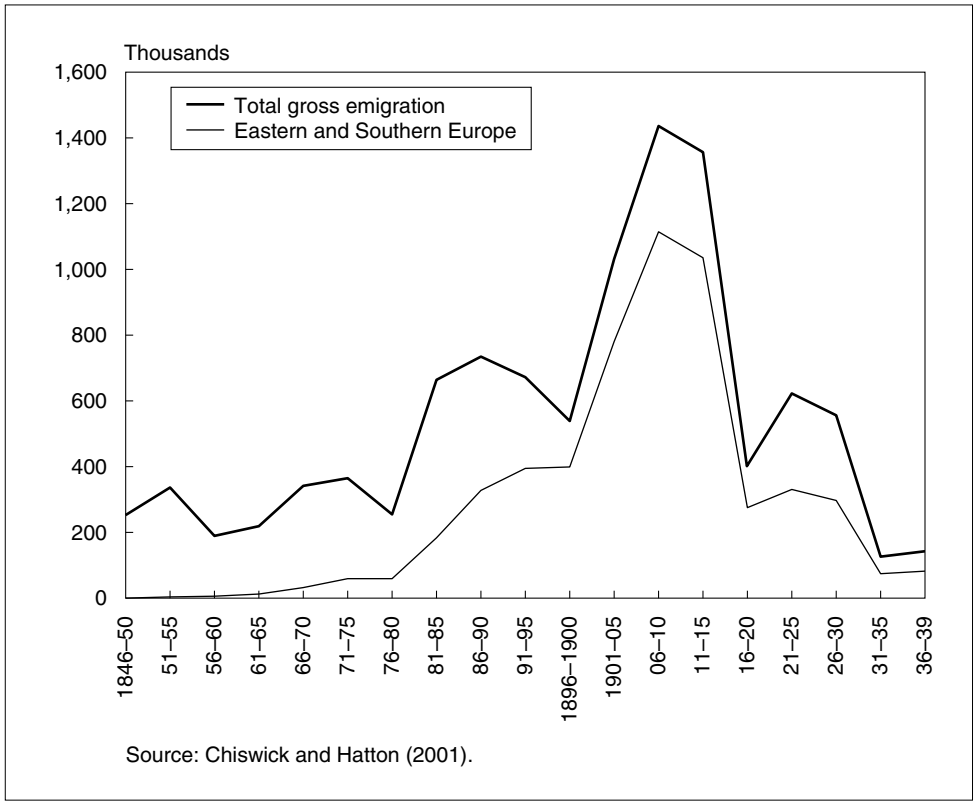
neoclassical model. A productivity increase could induce both higher domestic saving and higher FDI. Commodity exporters may be more subject to factor endowment effects of capital inflows.

F. Evidence from Historical Globalization

The first wave of globalization during the late 19th and early 20th centuries (the Old Globalization era) 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 Bordo, Taylor, and Williamson [2001]), but I look at it from the viewpoint of the productivity differences versus neoclassical worldviews.

The most obvious event during this globalization was the movement of 60 million Europeans from the Old World to the New (Figure 9). As pointed out by many authors, this migration supports a neoclassical prediction. Labor was moving from the land-scarce Old World to the land-abundant New World.

Figure 9 Gross Intercontinental Emigration from Europe, 1846–1939 (Annual Averages)

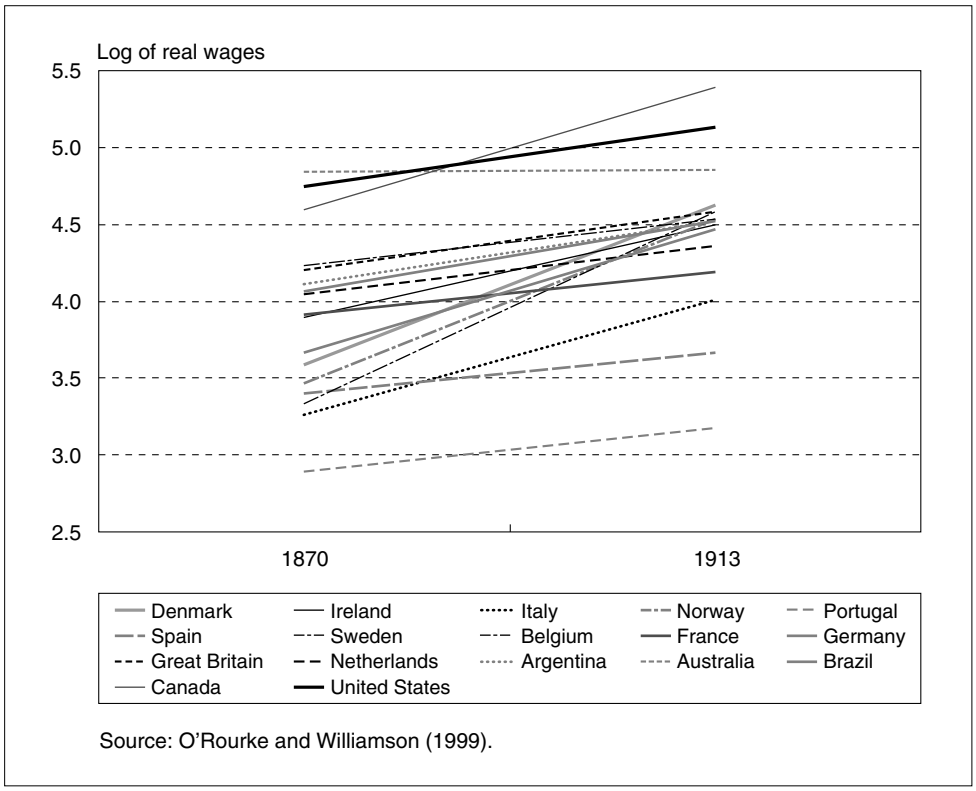


Source: Chiswick and Hatton (2001).

O'Rourke and Williamson (1999, pp. 60–63) and Lindert and Williamson (2001) 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 the neoclassical model. The evidence on wage convergence is less clear. For all countries in the North Atlantic, there is no overall tendency toward convergence of wages (Figure 10). 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 (Figure 11).

O'Rourke and Williamson (1999, p. 179) and Lindert and Williamson (2001) also present some interesting evidence on inequality trends within countries. Inequality fell between 1870 and 1913 in the countries that were the heaviest senders of migrants, while it rose among 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 neoclassical model prediction.

Figure 10 Real Wages in the Atlantic Economy, 1870–1913



Source: O'Rourke and Williamson (1999).

Figure 11 Real Wages in Important Source Countries for Immigrants to the United States Compared to Real Wage in the United States, 1870–1913

Capital was also flowing from the Old World to the New. We can think of this as also supporting the neoclassical model (augmented by land) thesis. Both capital and labor were flowing to the countries rich in land and natural resources (Table 6).

However, capital was not flowing everywhere according to the predictions of the neoclassical model. The labor-abundant low-wage economies in Eastern and Southern Europe and Africa and Asia did not attract much British capital (Figure 12). 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 Americas (see Figure 9).

Africa and Asia were left out like Eastern and Southern Europe, as they failed to attract capital, and for them it was even worse because migration was not an option. The majority of British capital went to the land-rich and plausibly higher-productivity countries of Canada, the United States, Australia, New Zealand, and Argentina. Clemens and Williamson (2004) point out that capital inflows were correlated with per

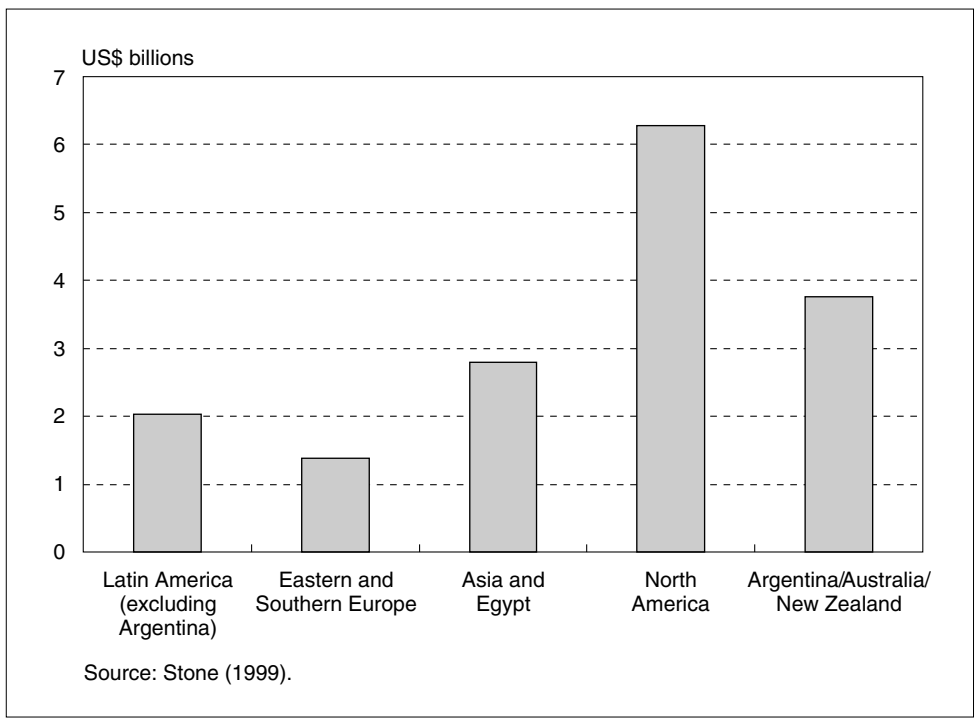
Table 6 Capital Flows from Europe to North America

Current US$ billions

	1900	14	38
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).

Figure 12 Cumulative British Capital Outflows, 1865–1914



Source: Stone (1999).

capita income in the Old Globalization era, just as Lucas (1990) pointed out they were in the New Globalization era. This suggests a productivity differences view of global capital flow rather than a factor endowments view.

The Old Globalization era is also associated with high trade flows between the Old World and the New. Canada, the United States, 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.

Looking at relative per capita incomes in the migrant-sending regions relative to the United States may suggest an additional role for productivity differences. All of the sending regions saw a fall in their relative per capita incomes (Figure 13). The United States 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 differential productivity stories play an important role even in those Old Globalization episodes that support some neoclassical model predictions.

During the first wave of globalization, there was no strong movement toward convergence in the North Atlantic economy (Figure 14), in contrast to the convergence we have seen among these countries in the New Globalization era. The United States rose from the middle of the pack to be the world leader. The neoclassical model prediction of convergence among countries heavily integrated by trade and

Figure 13 Ratio to U.S. Per Capita Income of Migrant-Sending Countries, 1820, 1870, and 1913

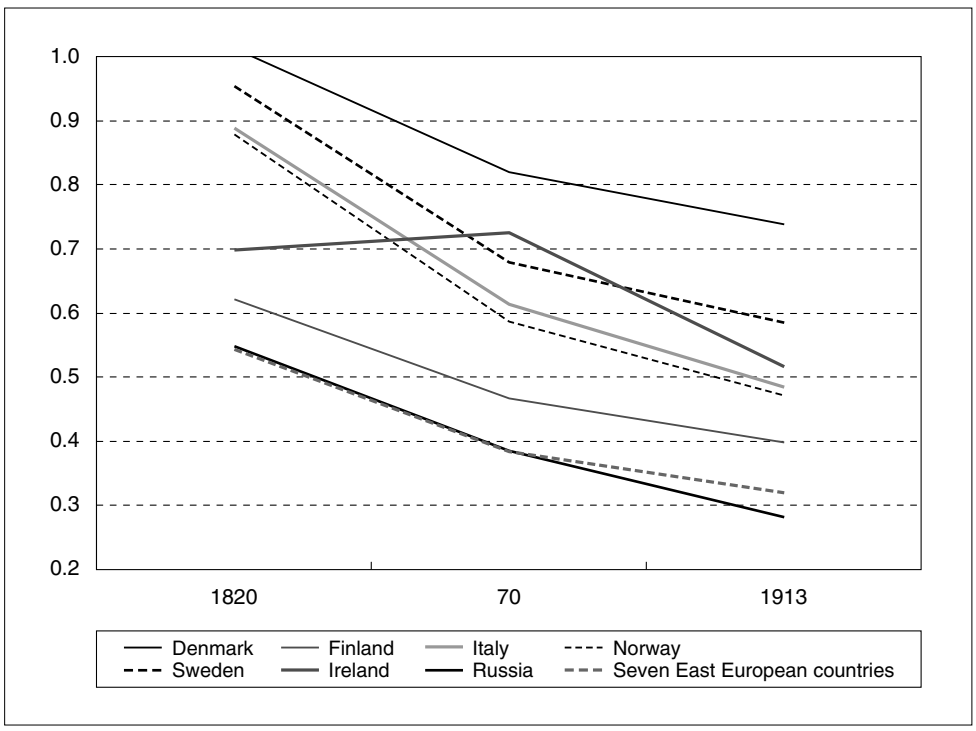
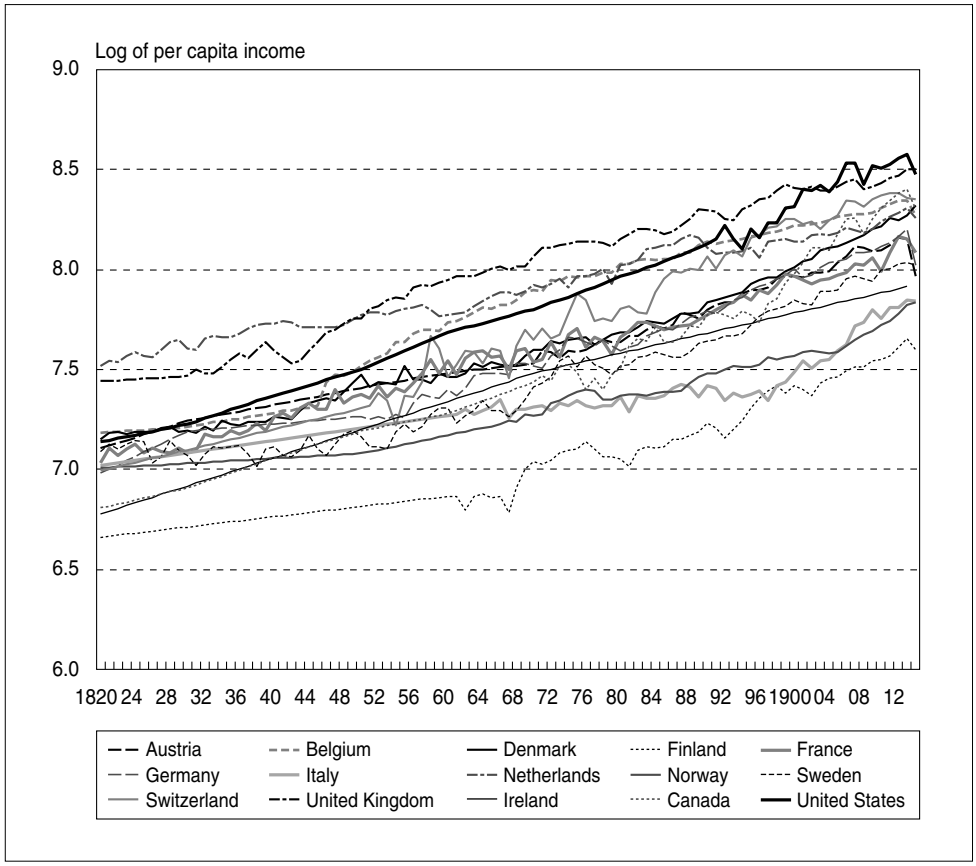


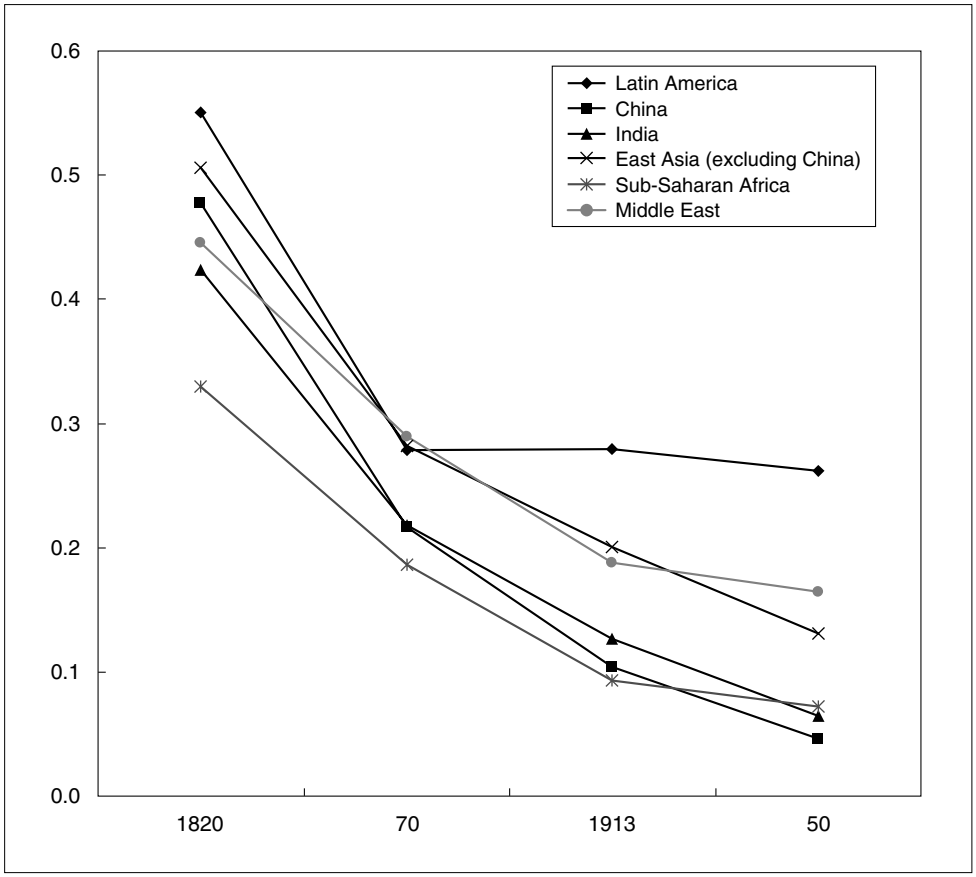
Figure 14 Per Capita Income in Europe and North America, 1820–1914



capital flows fails. Thus, while some the land/labor and land/capital predictions of the neoclassical model are consistent with the direction of flows and factor prices, the neoclassical view of the Old Globalization era among rich countries ultimately fails to tell the whole story.

This conclusion is even stronger if we include the poor countries in the analysis of the Old Globalization era. The behavior of income differences between rich and poor countries in that era was even worse than in the New Globalization era (Figure 15). 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 the Old Globalization era is more in line with productivity differences than the neoclassical model.

Figure 15 Ratio of Developing Country Regions to U.S. Per Capita Income, 1820–1950



IV. Conclusions

I sum up the stylized facts on globalization and inequality in Table 7. The purpose of the table is not so much to anoint the neoclassical model or productivity differences 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.

These mixed results are not a surprise. The neoclassical model 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 inequality among 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 centuries, accompanied by the predicted movements in land rental/wage ratios.

Table 7 A Scorecard

Stylized fact or episode	Supports the neoclassical model	Supports 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, and former Soviet Union falling behind		X
China, India, and East Asia catching up	X?	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	
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	
Capital flows to land-abundant countries	X	
Divergence between United States and migrant-sending countries		X
Lack of capital flows to cheap-labor countries in Eastern and Southern Europe, Africa, and Asia		X
Failure of between-country inequality in North Atlantic economy to decline		X
"Divergence, big time" between rich and poor countries		X

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 among North Atlantic economies, the great divergence between rich and poor countries in that same era, and the bias of capital flows toward 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 toward 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.

Productivity differences to explain patterns of globalization and inequality are a nuisance! The factor endowment model specifies 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 ones).

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Comment

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This paper explores the implications of observed patterns of factor flows and trade on the effects of globalization on inequality. It considers two candidates for the major determinant of inequality: relative factor endowments and productivity differences. Using data from the Old Globalization and the New Globalization eras, it concludes that productivity differences seem to be the more important of the two.

I think it is a very good idea to look at factor flows and trade patterns to investigate this difficult issue, as any attempt to test those two competing hypotheses directly is bound to be marred by endogeneity biases and measurement error problems. I especially like the sections where the author uses data from the Old Globalization era. I also believe that the conclusion makes intuitive sense. Below, let me express some of my concerns about the paper, regarding (1) the need to distinguish the "technology level" and "labor quality," (2) the potentially complex role of human capital, (3) the literature on migration, (4) inequality due to "returns" versus "distortion," and (5) the need to check robustness of empirical results; at the end, I will summarize (6) some relatively minor comments on the author's regression analysis.

I. "Technology Level" versus "Labor Quality"

In the paper, the author frequently makes statements like the following: "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 (the Leontief-Trefler paradox)."[8] That is to say, when productivity, A, enters into the production function in a labor-augmenting way, an increase in this A would induce a country to export more labor-intensive goods (or export fewer capital-intensive goods) (let me call this "statement X"). This is incorrect. It would be correct if A in the production function were to be interpreted as the quality of workers: that is how trade economists have tried to reconcile the apparently perverse observed trade patterns with theory.[9] However, in this paper, A is not labor quality but is interpreted as the level of technology. In such a case, a higher A would not necessarily mean that the country would be exporting more labor-intensive goods. To see why, let me use the simple example of the Cobb-Douglas production function, $Y = AK^{\alpha}L^{1-\alpha}$, to illustrate my point. It is well known that, with that type of production function, an increase in A is both labor augmenting (Harrod-neutral) and capital augmenting (Solow-neutral) at the same time. Suppose for the moment that the above statement X is correct. Then, an increase in A should induce this country to export more labor-intensive goods, because this is a labor-augmenting technological improvement (call this "conclusion X-1"). However, *by the same logic as statement X*, an increase in A should induce this country to export more capital-intensive goods, because this is also a capital-augmenting technological improvement (call this "conclusion X-2"). But conclusion X-1 and conclusion X-2 are incompatible. It therefore follows that statement X cannot be right.

II. The Role of Human Capital Might Be More Complex

The author reports a very interesting finding that skilled workers tend to flow from poor countries to rich ones. He argues that this is due to productivity differences. That might well be the case, but before coming to this conclusion let me offer two alternative explanations. The first is capital-skill complementarity (Griliches [1969]). If capital and skilled labor are sufficiently complementary in production, then the marginal product of skilled labor might actually be higher in advanced countries with more capital stock than in developing countries, even if the level of technology is the same. In such a case, it would be natural to observe skilled workers flowing from poor countries to rich ones. The second possible explanation is agglomeration economies. It seems likely that skilled workers employed in knowledge-intensive sectors would benefit more from the presence of other skilled workers in geographical proximity, due to knowledge spillovers. In such a case, again, we would observe skilled workers flowing into rich countries where there are already more of them.

8. Easterly (2004, p. 63).
9. I would like to thank Akira Otani of the Bank of Japan and Morihiro Yomogida of Hitotsubashi University for their discussion and information on the trade literature.

III. Literature on Skilled Migration

Continuing my discussion on the pattern of skilled migration, the underlying assumption of the author's argument is that the observed pattern of factor flows largely reflects return differentials to factors of production. However, in the literature on migration, there are other arguments. It is often said that more educated workers tend to move more frequently because they can gather more information about other parts of the world and recognize new opportunities. Others have argued that richer workers are more likely to move because they are more capable of paying the fixed costs of migration.

IV. Inequality Due to Returns or Distortions?

An important underlying assumption of the author's entire analysis is that inequality within countries largely reflects differential returns to production factors, as would be the case in a perfectly competitive world. It is not clear to me how realistic this assumption is. Could it not be the case that, in the real world, especially in developing countries, inequality is due more to the ability of some powerful people to distort the market mechanism in their own favor and extract rents? If that is the case, political and institutional determinants of inequality would have to be the priority of our study. At least, it would be nice to get an approximate sense of what proportion of inequality within countries around the world is due to the economic reasons on which the author focuses.

V. Robustness of the Regression Analysis

Toward the end of the paper, the author performs regression analysis on the effects of trade on inequality. In the literature on growth regressions, it is known that many explanatory variables are not "robust": that is, a variable whose coefficient turns out to be significant under certain specifications may turn out to be insignificant under an alternative set of regressors. Sala-i-Martin, Doppelhofer, and Miller (2000) used an approach called the Bayesian model averaging approach to check the robustness of typical explanatory variables that appear in growth regressions. Kawai and Shioji (2001) applied this methodology to regressions of the type considered in this paper, where inequality is the dependent variable, and found that in cross-sectional studies, after controlling for the effects of per capita income, almost nothing is robustly related to inequality, with the exception of some dummies. The result was worse for fixed-effect regressions. I redid the robustness study with specification close to the one in this paper, and found that there is some evidence (though not so strong) that (DC dummy)(log trade share) is robustly positively correlated to inequality. On the other hand, (log trade share) itself is not robust. This result is preliminary but does suggest the importance of performing robustness studies in this kind of analysis.

VI. Other Minor Comments and Questions on the Regression Analysis

My final comments are as follows.

(1) Restricted by data availability, the author's sample over-represents developed countries. What kind of bias would this introduce to the result?

(2) How were ex-communist countries treated in the regression? As they have experienced dramatic rises in inequality recently, their treatment might have a first-order effect on the results.

(3) Inequality data come from various types of surveys (such as individual surveys and household surveys) and it is known that the measure of inequality is sensitive to the type of survey. How were such differences controlled in the analysis?

(4) Various measures of openness have been proposed in the literature. Why not try measures other than the trade-to-GDP ratio?

(5) From the author's regression results, the biggest lesson I have learned is that, at least, trade does not seem to be *bad* for equality. That is consistent with my prior belief on this subject, but would the author agree with such an assessment?

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Comment

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I. Overview

I am very pleased to comment on William R. Easterly's paper. While it provides a rich overview from both a theoretical and empirical perspective of what we know about the effects of globalization on the economy, the focus is on the question of

10. The views expressed are solely my own.

how such effects depend on whether income differences between countries are due to differences in productivity or in factor endowments. To understand the starting point for the analysis, it useful to consider a standard production function of the form

$$Y = Af(K, L).$$

In words, firms employ capital, K, and labor, L, to produce aggregate output, Y, using a technology described by the production function $f(\bullet)$ and a certain level of productivity, A. Other factors of production, in particular human capital and land, are sometimes considered but are omitted from this specification for simplicity. The benchmark in the analysis in the paper is the neoclassical view, according to which countries have the same production technologies and enjoy the same levels of productivity but may differ in terms of their endowments of capital and labor and therefore in their factor ratios. Thus, some countries are relatively wealthy because they have a high capital-labor ratio, which implies that the marginal product of labor, and therefore the real wage, is high. Similarly, other countries are poor because they have little capital and therefore low real wages and income.

The author argues persuasively that this view of the world does not fit the facts. To understand this empirical failure, it is useful to consider two examples.[11] First, since the marginal product of labor is low in capital-scarce countries, the neoclassical model implies that workers will wish to emigrate to capital-rich and wealthy countries. This is indeed something that we observe in the data: movements of labor occur typically from poor to rich countries. But firms' incentives to invest also depend on the assumed capital-labor ratio. In particular, the marginal product of capital is much higher in capital-scarce economies and the model consequently predicts that capital should move to poorer countries. Indeed, as Lucas (1990) notes, given the large differences in capital-labor ratios between rich and poor economies, the model predicts massive capital flows toward poor economies. As Easterly argues convincingly in this paper, this we do not observe.

Second, suppose that there are both skilled and unskilled labor and that the ratio of skilled to unskilled workers is relatively low in poor countries. What does this imply for the international distribution of real wages? Given their scarcity, skilled workers ought to earn higher real wages in poor than in rich countries. The neoclassical view thus suggests that salaries of computer programmers ought to be higher in India or Kenya than in Switzerland or the United States. This also is not the case.

Given the limited explanatory power of the neoclassical view, the paper concludes that productivity differences between countries must be very important. Indeed, the neoclassical view appears relevant only in cases in which there are extreme differences between countries in factor ratios, such as when the United States, Australia, Canada, Argentina, and other economies opened up to globalization in the 19th century. With a lot of land but with little labor and capital, these economies attracted large amounts of investment and workers.

11. It should be noted that the exact implications of the neoclassical view depend on the assumed number of factors of production and whether or not they are mobile internationally.

II. Why Do We Care?

But why should we care about whether income differences are due to differences between countries in factor ratios or in productivity? This is an issue that the author unfortunately does not discuss at any great length. It seems to me that the main reason why the answer to this question is important, beyond providing us with a better understanding of how the global economy works, is that it may help policymakers design better policies. For instance, if we do not observe capital flows to poorer countries because there are obstacles to such flows, then policy should focus squarely on removing these hindrances. If, by contrast, we do not observe capital flows because capital is much less productive in poorer countries, then such policies will be ineffective. Instead, policy should presumably focus on augmenting the productivity of capital.

The finding that productivity is important to understand differences in economic development leads me to ask what policies might help raise it. I suspect that economic policies are crucial in that regard. Moreover, the legal and institutional framework, in particular property rights, may matter, as may political conditions. I would have benefited from a discussion of these issues in the paper.

III. Globalization and Inequality

Turning to the relationship between globalization and inequality, both domestic and international, which is an important theme in the paper: while the neoclassical model suggests that globalization tends to reduce inequality, it is not possible to draw any firm conclusions in this regard in the presence of productivity differences. But are inequality considerations important when policymakers face the question of whether to embrace globalization or not? I suspect not.

The reasons for this are, I believe, as follows. The central issue for policymakers would seem to be whether or not globalization improves resource allocation and raises income. While it may or may not do so, suppose it does. If so, by assumption there will be many that gain a lot, but potentially a few who lose a little, from globalization. There is thus a potential trade-off between making the economy wealthier at the cost of a more uneven domestic income distribution. But if income *re*distribution is possible through fiscal policy, the question of whether or not to embrace globalization is independent from the question of the effects of globalization on domestic inequality. Policymakers should first consider whether it is beneficial or not to open up the economy. If it is, in a second stage they should determine how much redistribution is necessary to offset any increase in domestic inequality.

Finally, let me turn to the importance of international income inequality. Suppose a country gains from embracing globalization. Would we then expect it not to accept these gains because of the impact on international inequality? I would suspect not: most policymakers would probably focus on the effects on the domestic economy in setting policy. Overall, then, if globalization raises income and if income redistribution is possible, the domestic and international inequality considerations will

probably play little, if any, role in explaining countries' policy choices. This raises the question, then, of why much of the discussion on globalization, including this paper, focuses so squarely on inequality. It would be interesting to hear the author's views on this issue.

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General Discussion

In response to the discussants' comments, William R. Easterly emphasized that cross-country inequality measured by per capita income was deemed more important than within-country inequality in considering the effects of globalization. He maintained that implementation of redistribution was very difficult, thus people did care about cross-country inequality. He did, however, agree that some portion of within-country inequality was attributable to political factors, as the experiences of Latin American countries showed.

Easterly added that his paper assumed labor-augmenting (Harrod-neutral) technological change, consistent with neoclassical growth theory. Etsuro Shioji reiterated his comment that labor-augmenting technological change need not lead a country to export labor-intensive goods, using the example of the Cobb-Douglas production function.

Many participants agreed with Easterly's main conclusion that productivity differences seemed more important than factor endowments in considering the effects of globalization on inequality, although they noted that further study of the former's sources was needed. Vincent R. Reinhart (Board of Governors of the Federal Reserve System) commented that workers' resistance to the pressure to equalize wages in the Old Globalization era could be consistent with the Heckscher-Ohlin-type factor endowment model.

Shigenori Shiratsuka (Bank of Japan) pointed out that the factor endowment view and the productivity differences view are very difficult to separate in practice because of dynamic interaction between the two mechanisms. Akira Otani (Bank of Japan) suggested that the paper be extended to account for intra-industry trade in examining the effects of globalization on inequality. Easterly generally agreed with the importance of these lines of extension.

Maurice Obstfeld (University of California at Berkeley) remarked that, from a historical perspective, institutions had also played a significant role in determining the effects of globalization on inequality. Hiroyuki Hino (International Monetary Fund) suggested that productivity differences might become smaller than anticipated if the non-tradable nature of economic security, such as institutions and culture, were considered. Easterly agreed that institutions were important in understanding the history of globalization and trade structure, although he noted it was very hard to quantify the effects of institutions on inequality.

Obstfeld mentioned the importance of studying why globalization occurred and how income distribution was decided, given that globalization itself would be endogenous. Hiroshi Fujiki (Bank of Japan) said that if a "superstar" developed a new idea, then the superstar should earn a higher income to encourage his or her innovation, and such inequality should be reconciled in the long term by appropriate policy measures. Easterly agreed with Fujiki that wage gaps could provide incentives to increase productivity. He noted, however, that whether such incentive effects worked depended crucially on a society's income mobility.

Hino remarked that rising inequality in both rich and poor countries seemed to be another challenge for the factor endowment view. In response, Easterly remarked that rising inequality in both rich and poor countries was another blow against the factor endowment view and seemed to urge us to develop additional theoretical models. Jean-Philippe Cotis (Organisation for Economic Co-operation and Development) noted that an explanation was needed as to why the process of income convergence among European economies ceased at the end of the 1970s.

Regarding the importance of income inequality, Bennett T. McCallum (Carnegie Mellon University) questioned whether people really cared about it based on the observation that the United States was a popular country where workers wanted to immigrate, despite inequality in its income distributions. He suggested that this observation might be interpreted as a revealed preference of the people, and further empirical investigation would be interesting. Hino suggested that elections are another form of revealed preference. Assaf Razin (Tel Aviv University and Cornell University) commented that the lack of a common fiscal policy within enlarged European Union (EU) member states posed another challenge for redistribution policy in these member states. He noted that this was in contrast to the United States, where redistribution was carried out at the federal level. Easterly acknowledged McCallum's counter-example of the United States being a popular immigrant destination. Still, he was in favor of Hino's view that another form of revealed preference for inequality was elections, noting that people in Latin American countries today seemed to be voting in protest against inequality.