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International trade or technology? Who is left behind and what to do about it*

*Ann Harrison***

ABSTRACT

We examine globalization's effects on those left behind in both industrial and emerging markets. While access to global markets has lifted billions out of poverty in emerging markets, the benefits have not been equally shared. Increased competition through globalization as well as skill-biased technical change has hurt less educated workers in rich and poor countries. While much of the rising inequality is often attributed to globalization alone, a brief review of the literature suggests that labor-saving technology has likely played an even more important role. The backlash has focused on the negative consequences of globalization in developed countries, and now threatens the global trading system and access to that system for emerging markets. We conclude by proposing some solutions to compensate losers from the twin forces of technical change and globalization.

Keywords: trade, "leaving no one behind", globalization, inequality

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** Member of the Committee for Development Policy (CDP); University of California, Berkeley Haas; research associate at the National Bureau of Economic Research (NBER). All errors remain those of the author.

CONTENTS

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UNITED NATIONS
Committee for Development Policy
UN Secretariat, 405 East 42nd Street
New York, N.Y. 10017, USA
e-mail: cdp@un.org
http://cdp.un.org

International trade or technology? Who is left behind and what to do about it

What do we mean by "no one left behind" in the context of global trade? We mean that opening up to trade should be beneficial for even the least fortunate. Since our definition of those left behind focuses on every individual in each nation, we find it useful to identify individuals left behind in *both* emerging and industrial country markets. Actual evidence linking measures of leaving no one behind (LNOB) to international trade is typically sparse. For this reason, we focus only on four measures of those left behind: poverty, inequality, employment, and wages.

One important lesson for policy makers as a result of recent elections in the United States and Europe is that if the forces of globalization and technical change do not help the "left behinds" in rich countries then they will respond but cutting off opportunities for emerging markets. To preserve opportunities to engage in trade for emerging markets, we need to address what can be done for those left behind in increasingly protectionist rich countries.

We begin by reviewing globalization's effects on those left behind in both industrial and emerging markets. Access to global markets has lifted billions out of poverty in emerging markets, but the benefits have not been equally shared. While the primary focus of this review is on trade, technological change has also disadvantaged individuals with weaker education and skills. Rising inequality is often attributed to globalization alone, yet a brief review of the literature suggests that technology has likely played an even more important role. The backlash has narrowly focused on globalization, and now threatens the global trading system and access to that system for emerging markets. We discuss proposed global and national solutions to compensate those left behind by the twin forces of technology and globalization.

1. Countries left behind by globalization

The pressures of globalization on the left behind affect both developing *countries* disproportionately as well as the least equipped *individuals* within all countries. I begin with a discussion of the poorest countries and trade then move on to a discussion of individuals hurt by trade within developing countries.

One of the best accounts of the challenges posed by globalization for countries left behind is Paul Collier's 2007 book, *The Bottom Billion*. Collier identified the countries in the world economy which were the most marginalized, low growth countries. These countries, many of them in Africa, suffer from a multitude of problems, including civil war, a natural resource curse, small size and landlocked geography, as well as poor governance and corruption. In chapter 6 of his book, he argues that the bottom billion has "missed the boat" for benefitting from globalization. During the 1980s and 1990s a large number of emerging markets began to exhibit high and sustained growth rates, in part through integration into the global economy. High growth in turn was accompanied by a decline in poverty rates. Many of these economies were in Asia, including China, South Korea, Taiwan, Singapore, and Hong Kong, and more recently Vietnam, Malaysia, and Indonesia.

Collier believes that the success of rising Asia now makes it extremely difficult for the bottom billion to succeed via a globalization strategy. His reasons are two-fold. First, he argues that emerging Asia benefited from agglomeration economies which allowed it to cut costs as it expanded. The successful countries are typically large in population, and the more they grew, the more they were able to capitalize on agglomeration gains in global trade. The primarily small countries that make up the bottom billion are going to have a very hard time achieving the size and scale that would allow them to move down their cost curves. The agglomeration argument is reinforced by a second trend: the rising demand by growing countries for more natural resources, which are often sourced from countries in the bottom billion. Increasing demand for scarce natural resources in low income emerging markets is a boon to commodity markets in the short run, but in the longer term helps to trap them in a vicious cycle of natural resource specialization, lack of export diversification, higher volatility and ultimately unsustainable growth.

Collier's argument in 2006 was that the forces of agglomeration combined with the increasing demand for natural resources made it difficult for the bottom billion to replicate the Asian miracle. He argued that part of the trade policy solution was to given least developed countries preferential access and protect them against their Asian competitors. Ten years later, the forces of agglomeration and even greater natural resource scarcity would imply that the problems faced by countries left behind are even more challenging than they were before. Laura Tyson and Susan Lund, writing in the April 2018 issue of *Foreign Affairs*, argue that today there is an even greater digital divide between those left behind and other nations, which exacerbates the problems identified by Collier. Lund and Tyson (2018) believe that old sources of comparative advantage based on cheap labor are less and less important, replaced by advantages due to telecommunications and connectivity.

My 2007 book, *Globalization and poverty*, explored the consequences of increasing globalization for the incidence of poverty and inequality. I focused on two measures of globalization: trade and international capital flows. The book was a rebuttal to the simple idea that global economic integration should help the global poor since poor countries have a comparative advantage in producing goods that use unskilled labor. The book has five key lessons. First, such a simple interpretation of general equilibrium trade models was misleading. Second, the poor are more likely to share in the gains from globalization when there are complementary policies in place. Third, trade and foreign investment reforms have produced benefits for the poor in exporting sectors and sectors that receive foreign investment. Fourth, financial crises are very costly to the poor. We concluded that globalization produces both winners and losers among the poor. The fact that some poor individuals were made worse off by trade or financial integration meant that social protection was critical. These five lessons are discussed in more detail below.

The poor in countries with an abundance of unskilled labor do not always gain from trade reform. Many economists have used the Heckscher-Ohlin (HO) framework in international trade to argue that trade liberalization should raise the incomes of the unskilled in labor-abundant countries. Most researchers who use this framework to argue that globalization is good for the world's poor make a number of heroic assumptions. These assumptions—such as the necessity that all countries produce all goods—are challenged in my book. In addition, the country studies show that labor is not nearly as mobile as the HO trade model assumes; for comparative advantage to increase the incomes of the unskilled, they need to be able to move out of contracting sectors and into expanding ones. Another reason why the poor may not gain from trade reforms is that developing countries have historically protected sectors that use unskilled labor, such as textiles and apparel. This pattern of protection, while at odds with simple interpretations of HO models, makes sense if standard assumptions (such as factor price equalization) are relaxed. Trade reforms may result in less protection for unskilled workers, who are most likely to be poor. Finally, accessing global markets even in sectors that traditionally use unskilled labor requires more skills than the poor in developing countries typically possess.

The original HO model assumes that there are no technology differences across countries. Violation of HO models through differences in technological progress could explain why low skill workers suffer from trade everywhere. Let us take a simple example, as posited by William Easterly (2007) in his chapter for my book. Easterly contrasts the neoclassical view based on factor endowment differences with what he refers to as the productivity differences view. If productivity differences are minimal but endowments differ, then globalization should lead to the kinds of reductions in inequality that HO predicts. However, if there are exogenous differences in productivity—with the richest countries exhibiting the highest productivity—then opening up to trade will exacerbate inequality. According to Easterly, this is because global capital is attracted to the highest productivity countries, which in turn will exacerbate inequality differences across countries. In the empirical component of his chapter, Easterly finds that increasing trade integration is associated with falling inequality in developed economies but rising inequality in developing countries.

There are other likely violations of the HO assumptions which imply that the outcomes of globalization for the poor are not at all clear. The most famous theorem associated with the HO model is the Stolper-Samuelson theorem, which states that opening up to trade will increase the return to a country's abundant factor and reduce the return

to its scarce factor. Assuming that developing countries have more unskilled labor, economists such as Anne Krueger used the theorem to argue that globalization should increase the return to unskilled labor and reduce inequality. Recent evidence makes clear this view was not quite right. Davis and Mishra in their chapter for my book, entitled "Stolper Samuelson is Dead", argue that

> *It is time to declare Stolper-Samuelson dead. A theorem, of course, is immortal. It is a logical relation that existed before there were humans and will survive them, just as surely as the theorem of Pythagoras. And the Stolper-Samuelson theorem has the hallmarks of great economic theory: an issue of great substantive importance, elegant analytics, and surprising results. Yet an enormous problem arises when we try to apply the Stolper-Samuelson theorem, unthinkingly, specifically to the question of the consequences of trade liberalization for the poorest or least skilled in poor countries. In this context, Stolper-Samuelson has become a central reference point, indeed a mantra, a totem: "Stolper-Samuelson says that trade liberalization will raise the real income of the abundant (unskilled) labor in poor countries." Stolper-Samuelson, qua theorem, is not wrong, of course. But if we use it, as we so often have, as if it provides a reliable answer to this question of real human significance, then it is worse than wrong—it is dangerous.*

In their chapter, Davis and Mishra (2007) point to a number of reasons why trade liberalization need not raise the real income of unskilled workers in poor countries. First, many goods that are traded are not even substitutes for domestically produced goods. In other words, US consumers may not be buying the corn produced in Mexico by the poorest farmers. Another problem is that what really matters is "local" rather than "global" factor abundance. Mexican exporters likely compete more with Brazilian exporters than with US exporters. Relative to the Brazilians, Mexico may no longer be abundant in unskilled labor, and consequently with trade it is highly possible for unskilled individuals to be made worse off by trade. Another shortcoming of the model, according to Davis and Mishra, is that it ignores the role for intermediates which are likely to raise the return to skilled rather than unskilled labor.

Having made the point that there are many reasons why Stolper Samuelson does not always hold in the real world, what are the key take-aways for policy? Davis (1996) and Feenstra and Hanson (1996) emphasize that a country could be globally labor-abundant but locally labor-scarce—in other words, Mexico is really competing with China, not the United States. This idea of "local" endowments mattering is a critical one—and can serve to explain why inequality could increase in both the US and Mexico simultaneously. It is also likely that barriers to labor mobility within regions of the same country make it difficult for the poorest to take advantage of new trading opportunities, as shown by Topalova (2007) for India. What this means is that even if some parts of a country are rapidly industrializing (such as the coasts in China), other less accessible regions are likely to suffer. The policy implications are two-fold. First, policy needs to concentrate on helping workers find it easier to relocate to where jobs are being created. Second, policy makers worried about dislocation due to trade should shelve a simple-minded approach to HO and measure comparative advantage in terms of the "relevant" competitors against whom their country's goods are actual substitutes.

Those left behind are more likely to share in the gains from globalization when there are complementary policies in place. The book's case studies on India and Colombia suggested that globalization is more likely to benefit those left behind if trade reforms are implemented in conjunction with reducing impediments to labor mobility. In Zambia, poor farmers only benefited from greater access to export markets if they also had access to credit, technical know-how, and other complementary inputs. The studies also point to the importance of social safety nets. In Mexico, if poor corn farmers had not received income support from the government, their real incomes would have been halved during the 1990s. In Ethiopia, if food aid had not been not well targeted, globalization would have had little impact on the poor. The fact that other policies are needed to ensure that the benefits of trade are shared across the population suggests that relying on trade reforms alone to help those left behind is likely to be disappointing.

These illustrations of the critical role for complementary policies imply that reforms bundling such policies with trade integration should be a top priority for policy makers. In the short run, the most critical complementary

policies would be universal social support policies combined with targeted programs to promote labor relocation and training for affected workers. Over the longer term, key complementary policies include investments in human capital, infrastructure provision, promoting credit and technical assistance to farmers, and policies to promote macroeconomic stability.

Export growth and incoming foreign investment have helped all income levels. Poverty has fallen in regions where exports or foreign investment is growing. In Mexico, the poor in the most globalized regions weathered macroeconomic crises better than their more isolated neighbors. In India, opening up to foreign investment was associated with a decline in poverty. The study on Zambia suggests that poor consumers gain from falling prices for the goods they buy, while poor producers in exporting sectors benefit from trade reform through higher prices for their goods. In Colombia, increasing export activity was associated with an increase in compliance with labor legislation and a fall in poverty. In Poland, unskilled workers—who are the most likely to be poor—gained from Poland's accession to the European Union.

Financial crises are costly to the poor. In Indonesia, poverty rates increased by at least 50 percent after the currency crisis in 1997. While recovery in Indonesia was rapid, the Mexican economy took decades to fully recover from its 1995 peso crisis. Poverty rates in Mexico in the year 2000 were higher than they had been ten years earlier. Cross-country evidence also suggests that financial globalization leads to higher consumption and output volatility in low-income countries. One implication is that low income countries are more likely to benefit from financial integration if they also create reliable institutions and pursue macroeconomic stabilization policies (including the use of flexible exchange rate regimes). However, foreign investment flows have very different effects from other types of capital flows. While unrestricted capital flows are associated with a higher likelihood of poverty, foreign direct investment inflows are associated with a reduction in poverty. The poverty-reducing effects of FDI are clearly documented in the book's case studies on India and Mexico.

Globalization produces both winners and losers among the poor. It should not be surprising that globalization's impact defies easy generalization. Even within a single region, two sets of farmers may be affected in opposite ways. In Mexico, while some small and most medium corn farmers saw their incomes fall by half in the 1990s, large corn farmers gained. Across different countries, poor wage earners in exporting sectors or in sectors with incoming foreign investment gained from trade and investment reforms; conversely, poverty rates increased in previously protected sectors which were exposed to import competition. Within the same country or even the same region, a trade reform may lead to income losses for rural agricultural producers and income gains for rural or urban consumers of those same goods.

The limited time series for poverty data from household surveys makes it almost impossible to conclude anything on the aggregate relationship between openness and poverty. In a co-authored paper with Emma Aisbett and Alex Zwane (2005), I measured the linkages between openness, GDP growth, and poverty. We measured openness using both the ratio of trade (X+M) to GDP and average tariffs. We found that greater openness—using either measure--is associated with rising aggregate income.[1]

Aisbett, Harrison and Zwane (2005) then measure the association between openness, GDP growth, and poverty.

1 See Aisbett, Harrison, and Zwane (2005) for more details. To address concerns regarding endogeneity, openness is measured either using its three year lag or the contemporaneous value instrumented using lagged values. These results are robust to the inclusion of other controls, such as country fixed effects or policy variables likely to be correlated with trade policies. Other extensions, using growth of GDP per capita as the dependent variable instead of income per capita, yield similar results. Although some specifications—notably those that include country fixed effects and instrument for openness using lagged values—are not always significant at the 5 percent level, the evidence is generally consistent with a positive relationship between openness and income or growth. The evidence is also consistent with recent work by Lee, Ricci, and Rigobon (2004) who apply more innovative ways to address the endogeneity of openness and continue to find a positive relationship between openness (measured using trade shares) and growth.

Poverty measures were taken from household sample surveys made available by the World Bank. While the results are robust to the poverty measure chosen, poverty was defined as the percentage of households living on less than $ 1 a day in PPP terms. The evidence suggests that growth is associated with a fall in poverty. This key result has been confirmed by many other studies (see, for example Besley and Burgess (2003)). Regardless of income measures or specifications (OLS versus IV) income growth is associated with a reduction in the percentage of the population that is poor.[2]

Although this evidence suggests a strong link from trade integration to aggregate income, and an even stronger association between income growth and poverty reduction, there is no strong link between globalization and poverty outcomes (see Aisbett, Harrison and Zwane (2005)). The coefficients on both trade shares and tariffs are insignificant in OLS or IV regressions that seek to find a causal link from globalization to different measures of poverty (such as poverty incidence or headcount measures). To summarize, there is no evidence in the *aggregate* data that trade reforms are good or bad for the poor.[3] How is it possible that growth and openness to trade are so strongly correlated, and the poverty-reducing effects of growth are indisputable, yet direct linkages from globalization to poverty reduction are evidently weak? One likely explanation is that trade is indeed an "engine of growth", but that in many cases the poorest individuals do not participate directly in trade-related activities. Even in countries with a comparative advantage in producing unskilled-intensive goods, succeeding on global markets requires a highly skilled workforce and the ability to market and distribute goods in an increasingly competitive climate. We will show evidence later in this essay that in the United States export activities disproportionately benefit the more educated component of the labor force and import activities are more likely to harm unskilled worker wages. The component of growth that can be traced to increasing global activity (whether it is trade or foreign investment) is not as pro-poor as other sources—such as innovations that increase agricultural productivity.

One important implication is that even if cross-country studies point to a positive relationship between globalization and overall growth, such growth is likely to lead to unequal gains across different levels of income. If the growth effects on average are small and there are large distributional consequences, trade-induced growth could be accompanied by a decline in incomes of the poor. One important policy implication is that focusing primarily on the growth consequences of globalization will not ensure that the most marginalized groups benefit. Increased trade needs to be accompanied by increased social protection for those left behind.

While it is impossible to do justice in this essay to the volume of other research that addresses trade and poverty linkages, it is worth highlighting some key studies. Winters (2002, 2004) was one of the first to lay out a comprehensive framework for understanding the impact of trade reforms on poverty through the different channels of consumption, enterprises, and government revenues. Winters correctly points out that from a theoretical perspective the answers are far from clear. In some regions, opening up to trade will lower the prices of goods consumed by the poor, in other regions, trade could wipe out the sources of livelihood for subsistence farmers. Similarly, while converting quotas to tariffs in the context of trade reform could increase government revenues available for pro-poor programs, reducing tariffs could easily have the opposite effect. Winters also points

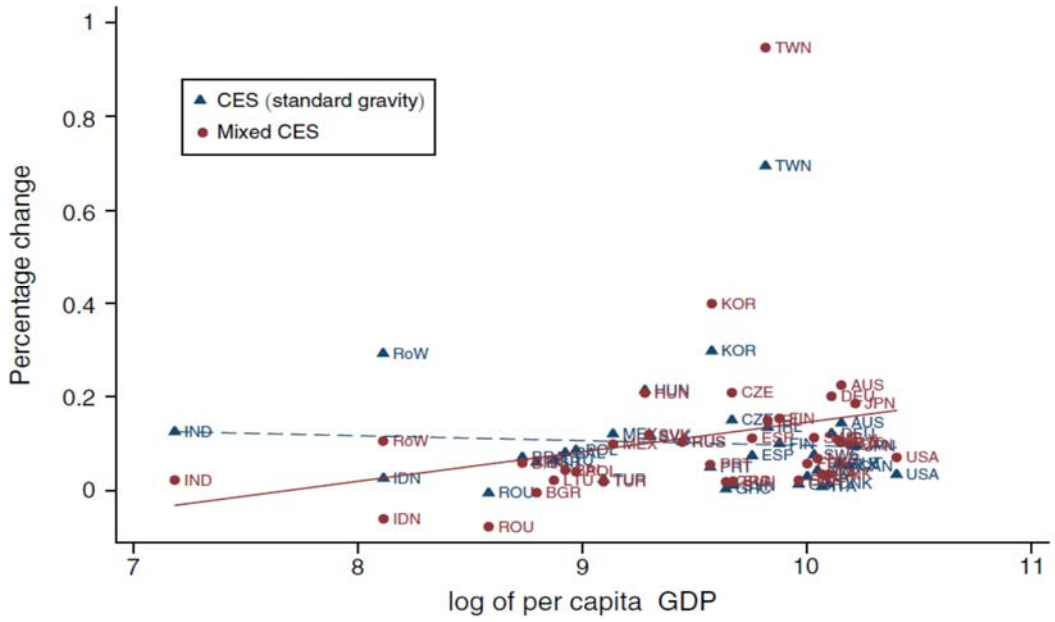
[2] The coefficients on real GDP per capita are much larger than those reported by Besley and Burgess (2003). The poverty-reducing effects of growth are larger because any one of the following changes alone leads to big changes in the coefficient on GDP per capita: the inclusion of time effects, a larger sample with more years of data and more countries, the inclusion of other policy determinants of poverty, or a PPP real GDP per capita measure. The fact that any of these modifications leads to such large changes in the coefficient on GDP per capita suggests that—despite a strong poverty-reducing effect of growth—the exact magnitude of the effect cannot be precisely estimated.

[3] In a comparable exercise using country-level poverty headcounts and trade shares, Ravallion (2004) reaches a similar conclusion; he argues that there is no robust relationship between poverty and globalization in the aggregate data. Possibly the only exception to these general conclusions is Agenor (2004), who finds that there is a nonlinear relationship between measures of poverty and globalization. Agenor finds that at low levels, globalization appears to hurt the poor, but beyond a certain threshold, it seems to reduce poverty. For earlier related studies, see Dollar and Kraay (2001, 2002).

to many of the shortcomings inherent in the elegant models of economists. For example, most models assume some variant of perfect competition or zero profits over the long term. However, if distribution channels or local markets are controlled by domestic monopolists, many of the expected benefits of globalization for the poor and non-poor may not materialize.

In the last decade, studies on globalization and country outcomes have continued to proliferate. In light of the hundreds of studies, it is difficult to do justice to all of them, so I will only mention selected studies in this essay. The latest papers in the area of globalization use structural models to cast light on the linkages between opening up to trade and country welfare. One such study, by Adao, Costinot, and Donaldson (2017) estimates how world welfare would have been affected if China had not become integrated into the world economy since 1995. Using a mixed CES specification and computable general equilibrium techniques, they show that the fall in China's trade costs were estimated to be around 20 percent between 1997 and 2005. They estimate that this fall in trade costs resulted in welfare gains for China of between 1 and 1.5 percent in GDP per capita per year. They then estimate a positive impact on welfare for the rest of the world and show that rich countries generally gained more than emerging markets. Only three economies—Bulgaria, Romania, and Indonesia, appear to show net welfare losses. The distribution of gains and losses from China's integration into the world economy is shown below. Two issues are important to note. First, these effects—despite the enormous increase in China's share in global trade—are not large. Second, these effects do not take into account distributional differences across income groups within an economy, which we discuss in more detail below.

Distribution of gains and losses from China's integration into the world economy



Source: Adao, Rodrigo, Arnaud Costinot, and Dave Donaldson. "Nonparametric counterfactual predictions in neoclassical models of international trade." *American Economic Review*107.3 (2017): 633-89.

2. Individuals left behind by globalization in emerging markets

My 2007 book indicated that globalization systematically promotes individual employment and earnings in export intensive sectors and regions which receive more foreign direct investment. However, in regions and sectors facing intensified import competition, inequality and poverty often rise, while wages fall. These were the results found by Topalova for India (2007), for example. More recent surveys (see Pavcnik (forthcoming)) also find that in emerging markets there are both winners and losers from globalization. Pavcnik (forthcoming) identifies those left behind as individuals working in less productive enterprises, in import-competing sectors, and with less education. Since these were already individuals at the bottom of the earnings distribution, globalization has consequently been associated with an increase in inequality in countries like Colombia, which she studied in the wake of their trade reforms. When workers cannot easily move from shrinking sectors to expanding sectors, the negative consequences of trade reform are larger. Pavcnik also reports some positive examples however: in Vietnam, the growth of exports led to a shrinking of the informal sectors as the formal sector expanded, resulting in better employment conditions and higher pay.

A number of recent studies measure the unequal effects of trade on the consumer side. One of the earliest papers to do so was Porto (2006). Porto explored how Argentina's trade reform differentially affected consumers depending on their expenditures and the design of the trade reform. Fajgelbaum and Khandelwal (2016) in a QJE paper entitled "The Unequal Effects of Trade" measure the differences in the effects of trade for many countries. Focusing exclusively on the consumption side, they show that opening up to trade is typically pro-poor because the poor tend to consume a greater share of traded goods and these goods typically have a lower elasticity of substitution across source countries. Their counterfactuals suggest that moving from current trade shares to autarky would disproportionately hurt poorer consumers. It is important to emphasize that this approach does not address the supply side. If the poor were to be more adversely affected in employment opportunities and wages, these effects would counter their gains on the consumption side.

Borusyak and Jaravel (2018) address exactly this issue, using data for the United States. While they do not examine the consequences for poverty in the least developed countries, their results are instructive. They find that while the gains from trade are pro-poor on the expenditure side—as found by Fajgelbaum and Khandelwal (2016)—these effects are dwarfed by the effects on the earnings side. For the US, the negative impact of trade on earnings is significantly larger for less skilled workers, which more than offsets the gains on the consumption side.

Pacvnik (forthcoming) emphasizes the importance of local labor markets in determining the impact of trade. After Mexico joined NAFTA, wage earners in the north of Mexico where most exporters were based benefited while employees in regions far from the US did not. In India after the 1991 reforms, districts facing the highest tariff declines as a function of pre-existing production patterns exhibited the slowest improvements in poverty rates. One important implication is that there is significant lack of worker mobility across regions within countries. This means that individuals already located in areas that face more import competition, have fewer skills, receive less capital investment, and host the least productive firms are likely to be both harder hit and to find difficulty in relocating to winning regions. Recent work on Brazil suggests that these unequal effects are magnified over time, with losers from globalization getting worse off 20 years after a reform, while winners continue to gain.

3. Individuals left behind in industrial countries: disentangling globalization and technology

A key group of voters in the United States, France (in the presidential elections), and Great Britain (illustrated by the Brexit vote) associates global competition with declines in their welfare. A separate question is whether *in fact* greater international competition has led to worse labor market outcomes. Is the pain real, or is import competition just a visible and convenient scapegoat? In the last six years, many new studies have appeared re-evaluating the

linkages between trade and worker-level outcomes. Many of these studies use China's entry into the WTO in 2001 as a kind of natural experiment to evaluate the impact of globalization on wages, employment, and other measures of labor force well-being.

Even before the recent events in NAFTA countries and Europe, economists had begun to question whether the textbook models (HO, Ricardo) of trade adjustment where workers move costlessly from contracting to expanding sectors. The ability of workers to be able to shift from less productive into more productive firms and sectors is critical for the new trade literature that emphasizes firm heterogeneity. Models that allow for heterogeneity in firm productivity include the pioneering work by Melitz (2003) and follow up papers by Melitz and Ottaviano (2008) and Melitz and Trefler (2012). The Melitz framework creates a new channel through which trade affects industry productivity: the increased competition leads to a reallocation of market share towards the most productive firms, and less productive enterprises shrink or exit the sector.

Melitz (2003) was inspired by Pavcnik's (2002) study showing that two thirds of productivity growth in Chile occurred through reallocation of market share towards more efficient firms. Decompositions for other countries, however, generally show that most firm productivity gains occur through within firm improvements rather than between firm reallocation. This is particularly true for India, as shown by Harrison, Martin, and Nataraj (2014). Decomposing sources of productivity gains for manufacturing enterprises in China also indicate that most productivity gains are from within firm improvements rather than between firm reallocation (see, for example, Aghion, Cai, Dewatripont, Du, Harrison). While further work is warranted, one reason for this could be the difficulty in moving labor from less productive to more productive enterprises.

Trefler (2004) used a heterogeneous firm framework to identify what happened to wages and employment in Canada as a consequences of the US-Canada Free Trade Agreements. The results were sobering. Trefler found that while enterprises in Canada improved productivity performance, this improved performance was associated with a significant decline in employment. Trefler also found that the reform favored better educated workers, for whom wages increased.

Recent Studies Measuring the Impact of Globalization on Workers. Since 1984, when there were 25 million jobs in US manufacturing, about half have disappeared. The share of employment in manufacturing for the US has steadily declined from one in four workers to less than 1 out of 10 today. In much of Europe, the story is the same: manufacturing employment shares have steadily declined by nearly 2 % a year since the 1980s.[4] These were typically good jobs: Ebenstein, Harrison, McMillan and Phillips (2014) show that if the same individual moves from manufacturing to services, their wage falls by up to 20 % in real terms if the cause is trade. This fall in wages for people who move out of manufacturing jobs suggests that there is a significant premium to remaining in this sector.

In the United States, inequality is at its highest level since the 1920s. Chart 1 updates an earlier chart created by Anthony Aktinson (2015). The figure shows the level of inequality in major industrial and emerging markets using standard Gini measures and household disposable income collected by the Luxembourg Income Study (LIS). Chart 1 shows that the United States has the highest level of inequality within high income countries. While inequality is higher in a number of emerging markets like Mexico, in those countries inequality has declined or remained relatively stable. Rising inequality in the United States combined with an erosion of high paying manufacturing employment has likely contributed to voter discontent.

Did economists, who have long supported free trade, miscalculate the costs of globalization? We made two mistakes. First, we thought that it would be much easier for people to shift out of trade-impacted sectors. Key results from Ebenstein et al (2014) shown in Chart 2 makes this point. In the first four columns, we measure the impact of changes in offshoring and trade on individual wages within manufacturing and show that with this approach there is no significant impact of international competition. In the last four columns, we measure

[4] See Jean Imbs (2017) in *The Factory-Free Economy*, edited by Lionel Fontagne and Ann Harrison (2017).

globalization at the occupational level and show significant effects. This is because a lot of the action is in *leaving* manufacturing, which is captured by occupational exposure as some occupations are more tradeable than others.

Chart 2 also shows us what kind of US workers have been most affected by international competition. The wage impacts of occupational exposure to global competition are significantly higher for workers engaged in routine tasks. Chart 2 shows that routine workers are significantly affected by both imports (in a negative way) as well as exports (in a positive way). The point estimates indicate that a 10 percent increase in import competition would lead an individual's wages to decline by 3 percent, while a 10 percent increase in exports would lead their wages to increase by nearly 7 percent. All this would be missed in typical research that evaluates the effects of import competition within manufacturing, since moving across industries doesn't hurt workers as much as being forced to leave manufacturing. The positive impact of US exports is something I will get back to when I discuss the literature on China and labor market outcomes. Note also that offshoring to *low* income countries hurts routine workers, while offshoring to high income countries (like Europe) only has benign effects. One reason is because much of the foreign investments between rich countries are of the horizontal type, where the main motivation is market access rather than seeking cheaper wages. Another reason is because vertical FDI, which seeks to source cheaper or higher quality inputs, is complementary between rich countries but leads firms to substitute lower cost workers for a more expensive labor force when flowing from richer to poorer countries. Studies in the 1970s, 1980s, and early 1990s consequently would have missed the negative impact of offshoring because most of it was to high income regions like Europe, instead of to Mexico and China where many firms go now.

The results in Chart 2 also show that non-routine workers, which typically include individuals with a college education and those performing more complex tasks, are not affected by either offshoring or trade. This difference in impact means that globalization has become a divisive issue across the US population.

Most models of international trade suggest that the best outcomes in terms of welfare can be achieved if we are able to "compensate the losers". Our second mistake as academics was to assume that this would be an easy task. For example, the United States comprehensive trade adjustment program, known as TAA, has not been subjected to a lot of evaluation. Yet preliminary evidence suggests that half of those who could have benefited didn't use it. There have been surprisingly limited efforts to understand whether those who did apply for TAA are made better off relative to other comparable individuals. Preliminary evidence, conducted by Ben Hyman, suggests that TAA can be effective in getting workers to go back to work (2017). If so, then finding ways to increase take-up above fifty percent of eligible workers could do a lot to alleviate the pain for losers from globalization.

Blaming China China accounts for nearly 25 percent of non-oil imports in the United States. [5] There are now a number of highly influential papers evaluating whether Chinese exports can account for the decline of US manufacturing employment. These include work by David Autor, David Dorn, and Gordon Hanson showing local labor market effects of Chinese competition, and Peter Schott and Justin Pierce's work on China's joining the WTO. Autor, Dorn, and Hanson (2013) suggest that China's rise accounts for around 25 percent of the decline in manufacturing employment in the United States.

These results have been questioned by Robert Feenstra in a series of papers and also by Shang Jin Wei in a new paper focusing on vertical linkages. Feenstra, Ma, and Xu (2017a) argue that the original results in Autor, Dorn and Hanson (ADH) are over-stated. They show that taking into account local demand shocks and including local housing prices leads the ADH result to lose significance for aggregate employment. A second paper by Feenstra, Ma and Xu (2017b) makes the point that looking only at Chinese exports is like evaluating traffic in one direction. They show that the negative employment effects of Chinese imports on aggregate employment are completely offset by the

[5] See the presentation by Robert Feenstra, June 28, 2017, "The 'China Shock' in Trade Reconsidered", The Groningen Growth and Development Centre 25th Anniversary Conference.

positive effects of US exports. We already saw this in Chart 2, where export growth would completely offset the negative effects on wages of import competition.

Shang Jin Wei makes a different point. He shows that if we take into account the benefits from Chinese imports that are inputs into other sectors, we can again offset the negative employment effects found by Autor, Dorn, and Hanson. Yet another paper by Robert Feenstra (Amiti, Dai, Feenstra and Romalis (2017)) shows that China's entrance into the WTO accounts for a 1 % reduction in the US price index each year between 2000 and 2006.

To summarize, there is clearly a segment of industrial country wage earners who are being left behind by the increase in global competition. These are the individuals with less education who are already frustrated by high levels of inequality and who are not being reached by programs like the TAA. Yet Harrison and McMillan (2011) and Fontagne and Harrison (2017) make the case that import competition is a small problem compared to the onslaught of automation. For example, manufacturing employment as a share of total employment in the United States has steadily declined since the 1960s, but China did not begin the transition to a more open economy until 1978.[6] Something else besides Asian competition is needed to explain the steady decline in industrial country manufacturing employment shares. The evidence points to a combination of structural change and technological progress.

Harrison and Margaret McMillan (2011) explored the determinants of labor demand for US multinationals. They showed that firms moving factories offshore can account for about 10 percent of the manufacturing employment decline. Most of it—12 out of the 17 percentage point decline in labor demand between 1982 and 1999—is because cheaper capital equipment is replacing people. In Fontagne and Harrison (2017), Jean Imbs documents the structural shift in OECD countries away from manufacturing employment. Imbs shows that manufacturing employment in the USA and rest of OECD has been falling since the 1970s. But manufacturing as a share of GDP has been steady. In the US, for example, manufacturing as a share of GDP in constant terms has remained at 12 % for the last 50 years, while employment shares have steadily declined. This is true for most of the industrial world: falling manufacturing employment has been accompanied by a steady manufacturing VA share in GDP. How can that be? Because productivity is rising.

4. The Consequences: political polarization and stagnation in growth of world trade.

Donald Trump won the US presidential election by convincing voters in key swing states like Michigan, Ohio, and Pennsylvania that he would "make America great again". Trump promised to impose 20 percent tariffs on imports, build a wall to keep out Mexican immigrants, and renegotiate NAFTA. In the 2016 first round of voting in the French presidential elections, Marine Le Pen generated strong support on a far right platform that included leaving the European Union. The United Kingdom actually took the plunge, with the majority voting for Brexit in June 2016.

These separate events suggest a return to protectionism. Chart 3 shows that after four decades of rising trade shares, global integration has stalled. Since 2010, trade shares have declined for all country income levels. Another striking fact is that low income countries, which had the highest share of trade in GDP in 1960, have exhibited the slowest gains in globalization. The share of trade in GDP for this group has advanced very little compared to other income levels over half a century. The slowdown in global integration is also evident in the steady increase in the number of trade restrictive measures adopted at the country level, as monitored by the World Trade Organization, the WTO (Chart 4).

[6] For an overview of China's trade and industrial policies, see my chapter "Trade and Industrial Policy: China in the 1990s to Today", in *The Oxford Companion to the Economics of China*, 2014, Oxford University Press.

What is causing this slowdown? New studies show that exposure to global competition from low income countries is associated with a shift towards populist outcomes. Two studies of France and Germany found that regions more exposed to trade with low wage countries increased the vote shares going to extreme right parties.[7] Votes for Brexit were more strongly associated with local exposure to trade with China.[8] Gordon Hanson and colleagues analyzed voting patterns within the US between 2002 and 2010 and showed that increased exposure to trade with China was associated with a shift towards both extreme right and extreme left candidates.[9]

While not the focus of most policy debates in the United States, a more open United States post-WWII contributed to a decline in *global* inequality. Chart 5 shows that global inequality has declined as countries in the middle of the global income distribution have grown the fastest. The kind of global leadership that was provided by the United States and Europe post-World War II to open international markets provided opportunities to grow and reduce poverty. Poverty rates in China and India have fallen by more than half. Chart 5, created by Branko Milanovic, is known as the elephant graph due to its shape. Without China, this curve looks pretty flat. One important question articulated by Paul Krugman in conversation with the author is whether continued growth of middle income emerging markets is possible without hurting routine workers in rich countries. I reviewed the evidence above suggesting mixed evidence on whether China's entry into the WTO in 2001 was associated with falling employment and wages in industrial countries competing with Chinese goods. Does this imply that we need to choose between promoting global equality and within country equality?

Dani Rodrik asks this question explicitly in a recent 2017 working paper entitled, "Is Global Equality the Enemy of National Equality?"[10] He argues that the seeming trade-off is no longer relevant in 2017. This is because many would-be industrializers have either de-industrialized or missed the opportunity to move into large scale manufacturing. As technology leads labor-intensive manufacturing to use more robots and China has begun to de-industrialize, the opportunities for emerging markets are more limited. For this reason and others, Rodrik argues that migration provides more opportunities for reducing global inequality going forward.

5. Implications for Policy: Trade, Technology and LNOB

The accumulated evidence suggests that globalization and technology have left behind not only the poorest countries, but also the poorest individuals within both industrial and industrializing countries. The fact that least developed country exports account for only 1.1 percent of global trade suggests that there is much scope for improvement. Populist right wing movements in countries that have been pro-trade for decades also mean that the pro-globalization agenda is at greater risk today than any time since the 1930s. What can be done to leave no one behind?

International Solutions. Advocating protectionism is unlikely to yield beneficial solutions. Many studies (see the comprehensive review in Harrison and Rodriguez-Clare (2004)) report that trade and growth have been highly correlated over time, regardless of the difficult challenges in assigning a causal link from trade openness to long run growth. Trade can be an important avenue for growth in both emerging and industrial country markets. Consequently, one critical policy challenge is *how* to maintain open markets for both countries and segments of those populations that are being left behind.

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[7] See Malgouyres (2014) and Dippel, Gold, and Heblich (2015).

[8] See Colantone and Stanig (2016), NBER Working Paper 21812.

[9] They also analyzed the votes in the 2016 presidential election and found a robust positive effect of rising import competition on Republican vote share gains. In a counterfactual exercise, they show that if Chinese import penetration had been 50 percent lower then Hillary Clinton would have been elected instead of Donald Trump.

[10] Accessed on Dani Rodrik's website.

Practically speaking, policy solutions for global trade should be reformulated with the goal of leaving no one behind. Since the overarching principle in all post-war negotiations has been reciprocity, it is clear that LNOB has not been a big priority. Re-orienting negotiating principles would imply prioritizing openness to goods from LDCs and prioritizing openness to goods from sectors that employ vulnerable groups. For example, ensuring that industrial countries keep markets open for garments and apparel, as well as agricultural products produced by lower income households, is one strategy. Limiting protectionist measures in industrial countries—such as anti-dumping and countervailing measures—which fall on LDCS as well as vulnerable populations in exporting countries would also be helpful. Since the GATT and now its successor the WTO operates on the basis of reciprocity, this would mean upending the framework for the countries and populations that are left behind.

Paul Collier in his book on the bottom billion proposed creating a concessional arm at the WTO. Just as the World Bank has a separate grant facility to support the poorest countries, which is independent of its loan operations, the WTO should be mandated to negotiate market access for the goods of least developed countries and vulnerable populations. One ongoing weakness with the WTO is that the strongest negotiating teams—coming from the least vulnerable countries—will typically come out on top. Further efforts to support WTO delegates from LDCs are also needed. One idea would be to create a mentorship program, linking each delegate from an LDC to a delegate from a stronger country. A one-on-one mentorship program could not only enhance the negotiating teams for the left behinds but could also provide an opportunity for those left behind to better articulate their challenges to other WTO members. The cost would also be lower than other programs that have been proposed or implemented.

Trade preferences were developed explicitly to address the need for special treatment for countries left behind. Trade preferences, however, face a number of problems. Trade preferences typically involve special access by developing or less developed countries to industrial country trade markets or more advanced developing countries. Arrangements that confer trade preferences include the Generalized System of Preferences (or the GSP), the AGOA, and most recently duty-free tariff-free (DFTF) access for least developed countries. These preferences typically give poorer countries access to a protected market, and depending on the circumstances can lead to a transfer of the tariff or quota rents that would have accrued to the protected market to the poor country exporter. In that sense, they act like a voluntary export restraint that transfers rents to the exporting country.

Today, most WTO developed country members grant either full or nearly full DFQF (duty-free and quota-free) market access to LDC products. Also, a number of key developing country partners (like India and Chile) grant a significant degree of DFQF market access to LDC products.

The evidence on the actual gains accruing to beneficiaries of these different preference schemes has been mixed. The reasons are varied. First, it appears that many LDCs who could take advantage of trade preferences fail to do so, possibly because the administrative costs are high or these potential beneficiaries do not export the goods which have been granted preferences. Second, the value of the preferences are often small, and have been falling (known as “preference erosion”) as average tariffs globally have fallen and quota constraints have been lifted. This implies that preferential treatment makes increasingly little difference. How can preference erosion can be reconciled with the small share of the least developed countries in world trade ? One reason is because preference erosion has been concentrated in goods that are generally globally traded and not in so-called “sensitive” sectors such as agriculture, areas where the least developed countries arguably have an advantage. Preferences have often been denied or restricted for goods which least developed countries could export but which are considered sensitive in the host country—such as agricultural commodities (i.e., sugar, rice) or textiles and apparel. Secondly, preference erosion is consistent with ongoing barriers to LDC goods in the sense that many of the barriers are not explicit but implicit such as health and safety requirements. One factor that has also contributed to preference erosion is the proliferation of regional trading agreements, whose members often enjoy duty and quota free access to each other’s goods.

Expanding the importance of trade preferences for LDCs would consequently involve (1) lowering their administrative costs (2) including LDCs as much as possible as partners in the preferential trading arrangements

that contribute to preference erosion and (3) expanding preferences for goods which LDCs export such as agricultural commodities and apparel.

Solutions with global and national components. Global solutions should focus on building effective trade preferences for LDCs and other countries in need. Below, we also discuss the importance of complementary policies to ensure that the benefits of trade are more equally shared. In between these two important policy areas exists a third dimension which we only briefly mention here: the need to design trade agreements in a way that preserves enough policy space for countries to define industrial and social policies. This topic has been subject of an important debate in last years (particularly during the more active phases of the Doha Round), and is discussed in great detail by Dani Rodrik, Joe Stiglitz, and others.

For example, explicit subsidies for export promotion, domestic content laws, and infant industry protection is now explicitly restricted or prohibited by the WTO. Yet many industrial countries and successful emerging markets such as South Korea and Taiwan employed these instruments to catch up with industrial countries. China's approach to this dilemma following its accession to the WTO has been to eliminate the most egregious examples of these policies but to quietly continue to employ quite a few of them. The evidence in Aghion et al (2015) suggest widespread use of tax holidays and subsidies in China. Even if domestic content rules do not explicitly exist, there is significant pressure to create local capabilities for entering multinationals across different components of the value-chain. Other countries see these industrial policy activities as successful and would like to emulate them.

National solutions. The second important change that needs to be made is systematic and widespread compensation for those left behind by globalization in both rich and poor countries. The latest studies show that globalization has imposed real and prolonged pain for dislocated workers in both industrial and emerging markets. Without a substantial increase in social protection, support for the global trading system will continue to erode.

Recent thinking on how to ensure that no one is left behind emphasizes the importance of universal mechanisms of redistribution, such as universal access to social services or the strengthening of universal social protection. These are the first best solutions advocated by international organizations such as the United Nations and the ILO. The United Nations (2016) report "Leaving no one behind: the imperative of inclusive development" makes the following points (pages 121-122):

> *"Policy approaches to address exclusion and leave no one behind have often been centered on the promotion of the rights and capabilities of disadvantaged social groups. There is nonetheless growing recognition that action to promote social inclusion must go beyond group-specific approaches…that would address the underlying social, economic and political causes of inequality and social injustice….The universal provision of social protection as well as good-quality health and education services can address a range of exclusionary barriers. Access to good-quality education in particular empowers individuals economically by enhancing their human capital, but it also entitles them socially and politically…."*

The United Nations and ILO call for universal provision of services in health care and education, as well as social protection for all of society. The UN has advocated for a Social Protection Floor which is nationally defined, reflecting country-level differences in administrative capabilities, fiscal space, needs and priorities. Examples of such programs include the European Union's "Europe 2020" strategy and Rwanda's vision 2020. Effective solutions to support individuals left behind by globalization are likely to include universal access to higher quality and lower cost public education at all levels as well as training programs like those in Germany. While the question of affordability has been posed, estimates by the ILO and others suggest that a universal social protection floor (excluding health care but including old-age, disability and family allowances) is feasible even for least development countries. Of course, such programs would be enhanced by measures that strengthen fiscal space and improve domestic resource mobilization through tax and transfer reforms.

Even when universal social programs are effective, such approaches are likely to require special measures. Combatting rising insecurity with more effective safety nets should also be explored, such as a Trade Adjustment Assistance program that covers all affected workers. In the US, Trade Adjustment Assistance (TAA) was designed to provide a safety net for individuals hurt by trade, but many who qualify do not apply. Increasing take-up so that the majority of workers who qualify actually use it should be a top priority. While a greatly expanded safety net may seem ex ante to be a costly policy solution, I suspect that the costs are small relative to the lost opportunities from a more protectionist world.

One recurrent theme throughout this essay is that much of the dislocation that is perceived to be associated with globalization is likely associated even more with technological change. What should policy do if the main reason for a rise in inequalities is actually not trade, but rather technology? This is a difficult question, but a very important one. The United Nations conducted an online survey in 2016 of scientists and experts around the world, asking them about crucial emerging technologies that could affect the SDG agenda, both in terms of opportunities as well as threats. The online survey results are instructive for two reasons. First, the scientists identified a number of technology developments likely to adversely affect the left behind. These included the "digital-tech" space that includes big data technology, 3-D manufacturing, cloud computing, digital monitoring and other areas. Other areas identified were nano-technology, neuro-technology (robots, artificial intelligence, driverless cars, drones) , and green technology. For all these areas, while scientists identified areas of potential for helping those left behind, they also identified a number of possible adverse effects, including unequal benefits, job losses, polarization, new inequalities, deskilling, widening technology gaps, and poor people priced out.

What was most remarkable about the UN study is that the volume is silent on solutions to these problems. While dislocation due to trade over the decades has resulted in targeted programs that address some of the concerns, the large disruptions in the labor force due to the next wave of new technologies have not yet been seriously addressed. Some innovative proposals have been suggested by individuals across the political spectrum. Anthony Atkinson and Bill Gates both suggested evaluating new technology for its ability to create jobs instead of eliminate them. Anthony Atkinson proposed supporting technology which is labor-using and taxing technologies which eliminate jobs. Such a proposal is highly controversial and opposed by orthodox labor economists, who feel that such an approach would discourage innovation and productivity growth. Our discussion above regarding the importance of universal social protection floors takes on a new urgency in light of the potentially large job losses arising from new technology.

Can we better identify the complementarities between measures of globalization and other policies? It is increasingly evident that the poor are more likely to gain from openness to trade if there are other complementary policies in place. A number of recent studies emphasize the importance of complementary policies in determining the benefits or costs of trade reforms for developing countries. For example, Freund and Bolaky (2005) show that trade reforms actually lead to income losses in highly regulated economies.

However, much more work is needed to identify which types of policies should accompany trade reforms. There has been little analysis to show, for example, that financial globalization would be beneficial to developing countries if it was accompanied by flexible exchange rate regimes or better institutions. Additional work is needed to identify whether trade reforms introduced in conjunction with labor market reforms are more likely to reduce poverty, and how to properly design social safety nets to accompany trade reforms. While Mexico has been successful in targeting some of the poorest who were hurt by reforms, these programs are expensive and additional research could identify whether this approach is realistic for the very poorest countries.

Further research is needed to identify the source of the immobility of labor. While studies on India and Colombia show that some of these sources are artificial—stemming from labor market legislation which inhibits hiring and firing—Goh and Javorcik argue that much of the immobility of labor in Poland is due to societal factors which discourage workers from relocating. Further evidence, identifying the relationship between gross labor inflows and outflows and trade reforms would be useful in this regard. The most recent evidence on the painful costs of trade

reform for those left behind in Brazil, for example, show that a major underlying problem is the lack of mobility across different local labor markets. The issue is the same in industrial countries. The immobility of the least skilled workers in the United States means that when local labor markets are negatively affected by trade, those workers either are unwilling or unable to move. New evidence consistent with this suggests that in the USA, trade adjustment assistance is consequently most effective where local labor markets are resilient.

While the need for labor mobility is emphasized here, does this mean that protection to workers should be scrapped? Clearly the answer is no. Although workers need to be able to move from contracting to expanding sectors, dropping measures that provide rights for workers does not seem to be the answer either. Workers in many developing countries still do not benefit from basic health and safety regulations, and the right to organize is frequently not recognized by governments. In many countries, workers seeking to form unions are fired or jailed, or even worse. Striking the right balance between safeguarding worker rights and ensuring labor mobility in order to create new jobs is difficult, but necessary.

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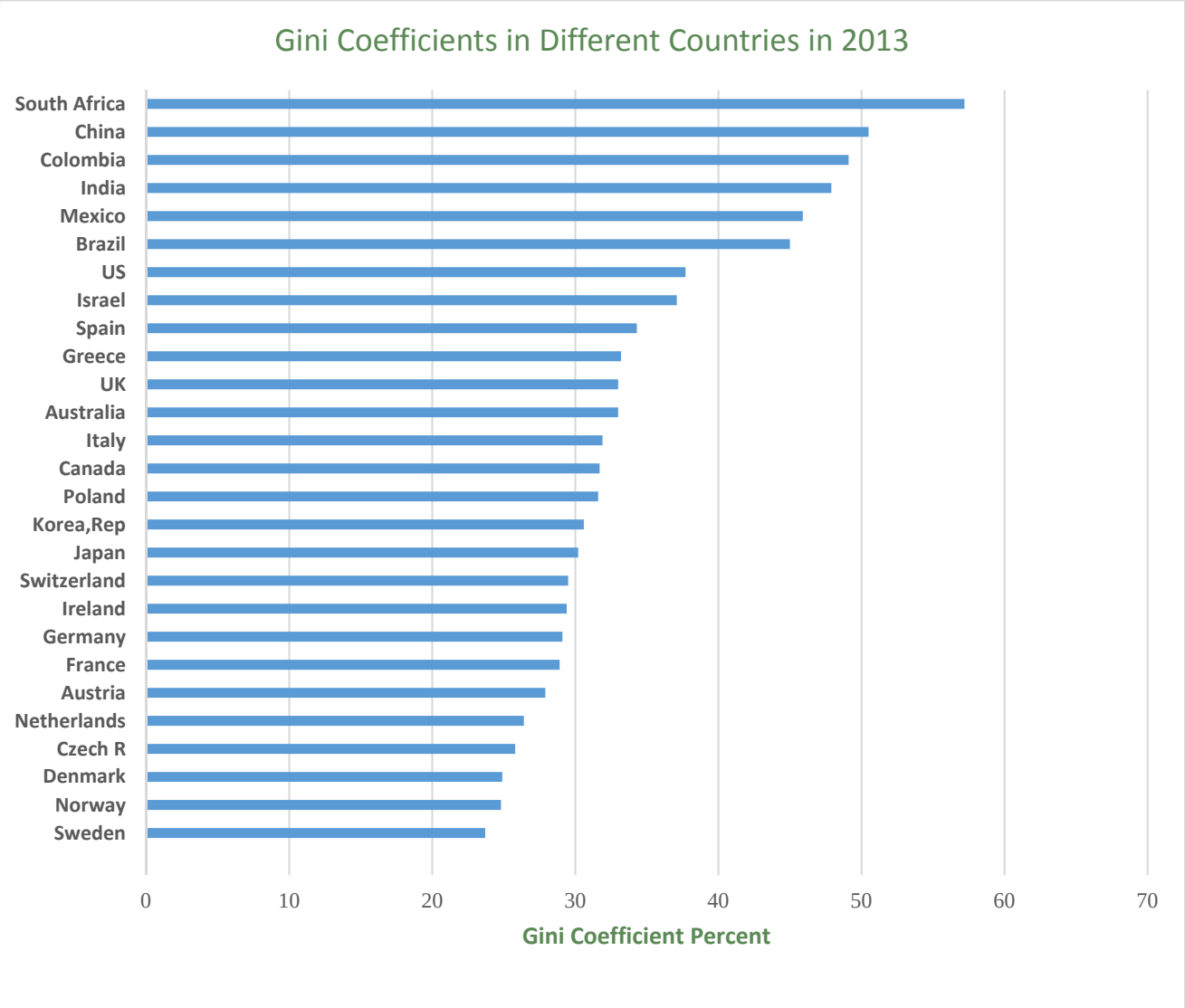
Chart 1: International Comparisons of Within Country Inequality in 2013. The Chart shows that the United States has the highest level of inequality (as measured by the Gini Coefficient) within high income countries.



Note: This graph shows the Gini coefficient for equivalent household disposable income in different countries ranked in decreasing order. The coefficient in Sweden was 23.7 per cent.

Sources: LIS Key Figures http://www.lisdatacenter.org/data-access/key-figures/download-key-figures/, downloaded 9 June 2017. The data are for 2013 except for Australia (2010), Canada (2010), China (2005), France (2010), India (2011), Ireland (2010), Israel (2012), Japan (2008), Korea (2012), Mexico (2012), South Africa (2012), Sweden (2005).

Chart 2: Table 2 from Ebenstein, Harrison, McMillan and Phillips (2014) showing that wage impacts of different measures of globalization are significantly higher for workers engaged in routine tasks.

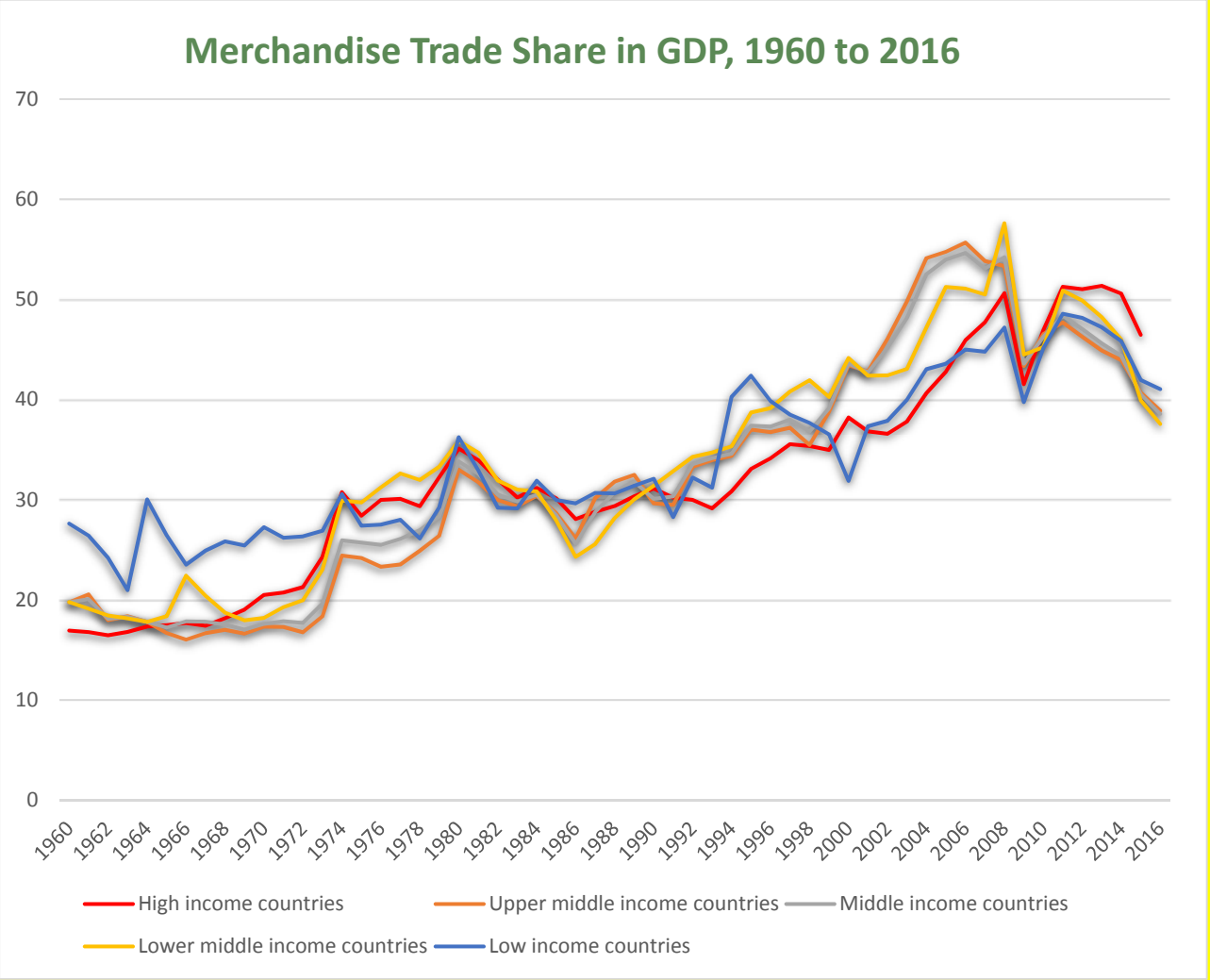
TABLE 2.—OLS ESTIMATES OF WAGE DETERMINANTS USING OCCUPATIONAL VERSUS INDUSTRY EXPOSURE TO OFFSHORING AND TRADE, 1984–2002
Dependent Variable: Log Wage

	Offshoring and Trade Measured by Industry-Specific Exposure, Manufacturing Only				Offshoring and Trade Measured by Occupation-Specific Exposure, All Sectors			
Variable	All Occupations	Most Routine	Intermediate Routine	Least Routine	All Occupations	Most Routine	Intermediate Routine	Least Routine
Lagged log of low-income-affiliate employment	0.001	0.002	0.000	0.002	−0.0401**	−0.0702***	0.018	0.072
	(0.002)	(0.002)	(0.003)	(0.003)	(0.016)	(0.016)	(0.029)	(0.056)
Lagged log of high-income-affiliate employment	0.0143***	0.00793*	0.011	0.0239***	0.0339**	0.0508***	−0.003	−0.045
	(0.005)	(0.005)	(0.007)	(0.008)	(0.015)	(0.014)	(0.026)	(0.048)
Lagged export share	0.022	−0.021	0.002	0.047	0.255**	0.667***	0.232	−0.815*
	(0.043)	(0.058)	(0.048)	(0.045)	(0.121)	(0.157)	(0.184)	(0.420)
Lagged import penetration	0.077	0.090	0.042	−0.050	−0.290***	−0.296***	−0.761	1.083
	(0.050)	(0.061)	(0.057)	(0.074)	(0.091)	(0.099)	(0.466)	(0.750)
Number of observations	551,528	316,048	150,319	85,161	3,068,095	1,109,835	1,156,208	802,052
R^2	0.46	0.39	0.41	0.38	0.50	0.42	0.54	0.40

See table 1 for sources. Robust standard errors are reported in parentheses below the coefficient estimates. The workers are taken from CPS samples from 1984 to 2002, with their lagged values of the independent variables taken from 1983 to 2001. The standard errors are clustered by industry and five-year period in columns 1–4 and by occupation and five-year period in columns 5–8. The classification of occupations into routine categories is determined by the proportion of tasks that are routine in each occupation, with low being occupations with more than two-thirds, intermediate being between one-third and two-thirds, and high being occupations with less than one-third of tasks designated routine. We also control for the lagged log price of investment, lagged total factor productivity, and lagged capital to labor ratio among manufacturing workers. Among nonmanufacturing workers, these controls are set equal to unity. Wage specifications control for a worker's gender, age, race, experience, whether in a union, and include industry, year, education, and state fixed effects. The occupation-specific exposure regressions also include two-digit occupation fixed effects. Controls for computer use rates are imputed by the worker's industry (columns 1–4) and by occupation (columns 5–8). Significant at *10%, **5%, ***1%.

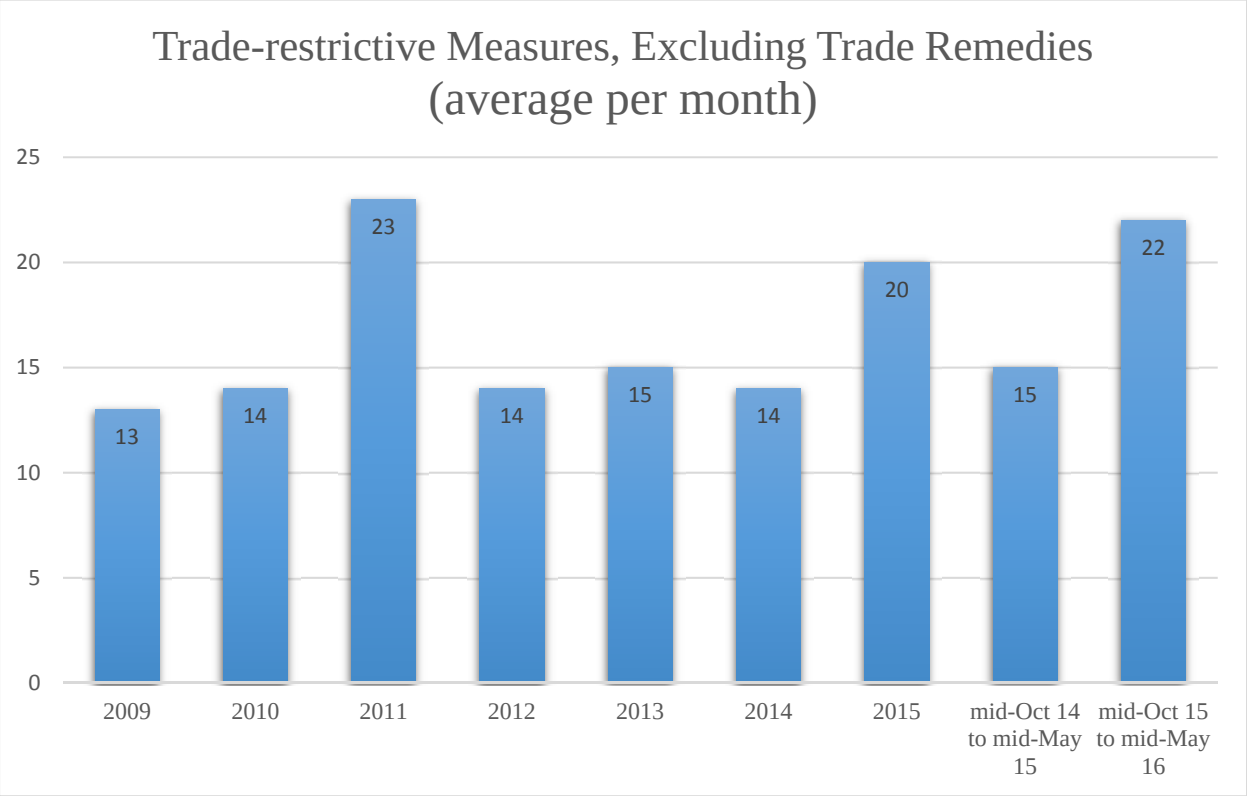
Source: "Estimating the Impact of Trade and Offshoring on American Workers Using the Current Population Surveys", Avraham Ebenstein, Ann Harrison, Margaret McMillan and Shannon Phillips, *The Review of Economics and Statistics*, October 2014.

Chart 3: Slowdown in Growth of Global Trade Since the Financial Crisis.



Source: Graph compiled by the author based on World Bank Open Data Repository. Each line shows the average share of trade (exports plus imports) in GDP for the period 1960 through 2016 by country income category according to the World Bank classifications.

Chart 4: Trade Restrictive measures also rising over time.



Source: World Trade Statistical Review, WTO, 2016, Chart 7.1

Chart 5: Branko Milanovic's elephant diagram showing the reduction in global inequality. Global inequality, which measures inequality between countries, has declined because of the catch-up of middle-income emerging markets (primarily China).

Source: Courtesy of Branko Milanovic, from Lakner and Milanovic (2016).