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THE IMPACT OF TRADE ON INEQUALITY IN DEVELOPING COUNTRIES

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ABSTRACT

This paper assesses the current state of evidence on how international trade shapes inequality and poverty through its influence on earnings and employment opportunities. While the focus is mainly on developing countries, in part because we have more evidence in that context, the discussion draws parallels to the empirical evidence from developed countries. The paper also discusses perceptions about international trade in over 40 countries at different levels of development, including perceptions on trade's overall benefits for the economy, trade's effect on the livelihood of workers through wages and jobs, and trade's contribution to inequality. The paper concludes with a survey of evidence on several policies that could mitigate the adverse effects of import competition.

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I. Introduction

“There is a real invasion of imported products, most of them coming from China. The consequence is that we are transferring thousands of jobs abroad.”

Such quotes pervade the discussion of international trade in the United States. Yet this particular quote continues: “Jobs that should be offered to Brazilians are being delivered on a tray to the Chinese, Koreans, Indians, etc ...” It was voiced by the President of the association of Brazilian capital goods producers.¹

Over the past four decades, developing countries have implemented large scale trade liberalizations and become integrated into the global trade system, now accounting for over 40 percent of world trade (WTO 2016). Increased international trade has been widely presumed to make households in developing countries better off; and much of the reduction in poverty in developing countries, especially India and China, has been attributed (sometimes loosely) to their more rapid growth as a result of trade.

When set against the stagnant real income growth and rising inequality in developed countries, the contrast has led to the perception, at least in developed countries, that developing countries are on “the winning side” of trade. This belief has fueled the current backlash against international trade in the United States and parts of Europe.² This view has some basis in fact: Autor, Dorn, and Hanson (2013) and Pierce and Schott (2016) have established that import competition from China contributed to substantial job loss in U.S. manufacturing in the 1990s and 2000s, jobs once considered the entry ticket to the U.S. middle class. This has given credibility to the charge that increased trade has been a zero-sum game: developing countries are winners and developed countries are losers, and the higher incomes earned by workers in developing countries have come at the expense of workers in the advanced economies.

And yet discussions about “winners” in the developing countries and “losers” in the developed countries miss the point that international trade generates winners and losers within both sets of countries alike, at least in the short term. Indeed, as the quote from the Brazilian capital goods association illustrates, similar claims about losing from trade are made by developing countries as well.

¹ <http://www.abimaq.org.br/site.aspx/Imprensa-Palavra-Presidente>.

² This sentiment, for example, surrounds the discussion of an influential 2016 book by Branko Milanovic, which documented the large income gains of individuals in countries like China and India—and the relative declines in real income for individuals in the middle classes of advanced economies—between 1988 and 2008.

This should not come as a surprise. Most economic models of international trade, even the ones without any frictions in labor or credit markets such as the Heckscher-Ohlin model, predict that changes in income distribution come with changes in prices brought about by trade. International trade, just like technological progress, domestic competition and shifts in consumer tastes, reallocates resources within a country, and both destroys and creates jobs, with implications for income distribution. Although the aggregate benefits of trade for a country are often stressed, trade economists also emphasize that governments can design compensation schemes so that the winners compensate those hurt by trade and everybody can be made better off. Over the long run, we hope that international trade fuels aggregate growth and that the benefits of growth are shared with the less fortunate within the society. Of course, compensating the losers does not always happen in practice.

The dramatic trade liberalizations implemented by developing countries or by their trading partners since the 1980s have provided an unprecedented opportunity to learn about the effects of trade on growth, inequality, and poverty in developing countries (Goldberg and Pavcnik 2007a, 2016). Over the past 25 years, economists have accumulated substantial evidence on the effects of trade in developing countries by looking at the key mechanisms through which international trade shapes earnings and employment opportunities in a country. Guided by predictions of economic theory, these studies analyzed detailed micro survey data of firms, individuals, and households from before, during, and after the abovementioned international trade shocks to uncover the channels through which trade influenced individual earnings and employment. Policy changes ranged from import liberalization to increased access to export markets, providing settings to study how increased trade—through exporting and importing—has shaped earnings and employment in developing countries.

This paper assesses the current state of this evidence and highlights its implications. While the focus is mainly on developing countries, in part because we have more evidence in that context, the discussion draws parallels to developed countries. Some key findings emerge across several developing countries, and some of these are also seen in developed countries.

Frictions that impede workers from moving across industries, firms, or locations are a continuing theme in the developing country context, shaping trade's unequal impact. Consequently, trade influences worker earnings through several factors: industry affiliation, firm affiliation, and location of residence all play a role in shaping trade's impact on inequality. Individual demographic

characteristics—especially age and education—also play a role, in part because younger and more educated individuals tend to more easily adjust to changes in trade.

Effects of trade on earnings are geographically concentrated and unequal within a country, depending on the region's exposure to import and export shocks. Why are the effects of trade concentrated in local labor markets? Part of the answer is low and imperfect inter-regional worker mobility, especially in the short run after large adverse trade shocks.

Overall, the effects of trade on poverty and earnings inequality, through earning and employment, are context specific. They depend on the nature of trade policy changes or trade patterns and the mechanisms involved; on the mobility of workers and capital across firms, industries, and geographic locations; and the position of affected individuals in the income distribution of a country. As the reforms in India, Vietnam, China, and Brazil illustrate, focusing on how workers are affected by trade beyond formal manufacturing—including in agriculture, services, and the informal sector—is key in this assessment for developing countries.

Over the long run, the negative local effects are presumed to dissipate over time, as workers adjust to the trade shock. But how long does this adjustment take? Evidence is just starting to emerge. In Brazil, the unequal adverse effects of trade on local labor markets persist, and are magnified in the long run, up to 20 years after import liberalization. Lack of inter-regional mobility, local agglomeration forces, and slow adjustment of capital explain why negative regional effects on earnings are amplified in the long-term trends (Dix-Carneiro and Kovak forthcoming). The evidence for workers affected by China's import competition in the U.S. also points to long-run persistence of shocks (Autor, Dorn, Hanson, Song 2014).

Overall, while trade contributes to earnings inequality within a country, the academic literature has concluded that it is not its main driver (Goldberg and Pavcnik 2007a, Helpman 2016). In general, changes in a country's earnings inequality are likely not driven by a single factor, and in developing countries the relationship between trade and technology is highly intertwined. However, trade's adverse effects appear to be highly geographically concentrated and long-lasting in developing and developed countries alike.

The concentrated adverse effects of trade on adult local labor markets spill over into worse educational outcomes for children in affected families, increased crime rates and worse health outcomes in affected communities, and lower provision of local public goods. While there are few studies of the effectiveness of the social safety net and other policies aimed at mitigating such adverse effects, the existing evidence is not encouraging.

The paper proceeds as follows. Section II documents increased international integration of developing countries over the past four decades, noting that large-scale trade policy changes implemented by these countries and their trading partners take a variety of forms. Some focused on reductions in import barriers, while others lowered costs of accessing export markets, improving our understanding of how importing and exporting shapes earnings and employment opportunities in developing countries. Against this background, most recent studies in developed countries focus on importing shocks. This needs to be kept in mind when assessing the evidence.

Section III focuses on perceptions about international trade across countries. Using a survey of more than 40 countries, I show that the majority of the public in low- and high-income countries accept that trade has overall benefits for the economy, even though people in low-income countries view trade as more beneficial for their livelihoods in their own country (in terms of higher wages and job creation) than do people in high-income countries. Yet, the perceptions of trade's benefits for wages and job creation in one's own country also vary across developing countries, with trade being perceived as more beneficial for workers in countries such as Vietnam and China compared to those in Colombia and Brazil.

I focus on the effects of trade through earnings and employment opportunities because they are likely the most relevant for majority of individuals in developing (and developed countries) alike, especially those living below or close to the poverty line. Section IV sketches out how our thinking on trade and inequality has evolved and discusses the unequal effects of trade on income and employment through industry and firm affiliation. The discussion highlights the challenges of examining trade's effects on poverty and inequality in a developing country context using only data from formal manufacturing. Section V focuses on the effects of trade on local labor markets and shows that the effects of trade on earnings are geographically concentrated, in part due to low and imperfect inter-regional worker mobility. Reasons behind low mobility are explored. These findings suggest that the effects of trade on poverty and inequality are context specific.

Section VI examines the persistence of adverse local labor market effects up to 20 years after the onset of a trade shock, highlighting the experience of Brazil and the U.S. It also shows that trade's impact on the local labor market can have longer-lasting effects through children's schooling. Section VII discusses several policies that could at least in principle help mitigate the unequal effects of trade, including active labor market policies, and concludes.

II. Setting the Stage: Four Decades of Global Integration

During the past four decades, developing countries became increasingly integrated into the global economy, accounting for an increasing share of global trade. Figure 1 plots the share of the world's exports of goods and services that is accounted for by low-income, lower middle-income, upper middle-income, and high-income countries in 1985, 1995, 2005, and 2015, based on data from World Development Indicators. Each country is classified into a time-invariant income grouping based on its income classification by the World Bank in 1987.³ The low-income group includes countries such as China, India, Nepal, Vietnam, and Kenya. The lower middle-income group includes Chile, Colombia, and Mexico. The upper middle-income group includes countries such as Argentina, Brazil, and Korea. The figure then tracks the share of world's exports by these groups over time.

Overall, the share of world exports accounted for by non-high-income countries nearly doubled, rising from 20 percent in 1985 to 39 percent in 2015. Much of this increase was driven by the increasing share of the world exports represented by low- and lower middle-countries, which together accounted for 12 percent of world exports in 1985, 14 percent in 1995, 21 percent in 2005, and 29 percent in 2015. Of this increase, low-income countries, which included China and India, experienced the largest gains: from 3.8 percent in 1985 to 17 percent in 2015—the majority of which is accounted for by China. China's share of the world exports grew from 1.3 percent in 1985, to 2.2 percent in 1995, 6.2 percent in 2005, and 12 percent in 2015.

Not only do developing countries account for a larger share of the world trade, but they are also more dependent on international trade than they were before, as demonstrated by the share of imports or exports in a country's GDP (Hanson 2012). For example, between 1985 and 2015, India's exports as a share of its GDP increased from 5 to 20 percent, and its import share increased from 8 to 22 percent.⁴ China's export share rose from 8 to 22 percent and import share from 12 to 18 percent. Mexico's exports as a share of its GDP increased from 15 percent to 35 percent, and the

³ See the data appendix for variable definitions and the list of countries classified in each category. The exact shares depend on the income classification. An alternative classification that compares trade shares of OECD to non-OECD members, based on membership definition in 1980, suggest that the share of world exports accounted by countries that were not OECD member in 1980 rose from 25% to 47% between 1985 and 2015. An alternative classification starts in 1992 and yield similar trends (see Hanson 2012).

⁴ Source: World Development Indicators.

share of its imports climbed from 10 percent to 37 percent. During the same period, the rise in trade's share in Brazil was tamer. The share of Brazil's exports in its GDP was about 12 percent in both time periods, and its imports increased from 7 percent to 14 percent. Of course, focusing on the end points obscures the fluctuations in trade's share of GDP during these four decades, especially the decline in the past decade. But the message is clear: developing countries are more globally integrated today than they were in early 1980s.

II.A. Trade Liberalizations

Income growth, declines in transportation costs, and declines in trade policy barriers all contribute to growth in international trade (Baier and Bergstrand 2001). As discussed in detail in Goldberg and Pavcnik (2016), most high-income countries, including the United States, the United Kingdom, other countries in Western Europe, and Japan, reduced their trade barriers through their participation in the GATT and WTO negotiations from 1947 to 1994. These negotiations reduced average import tariffs in these countries from about 22 percent before 1947 to 3.1 percent in 1999 (Bown and Crowley 2016). By the 1980s, when developing countries started entering world markets, average import tariffs were relatively low in developed countries—less than 5 percent.⁵

High-income countries at times replaced lower import tariffs with non-tariff barriers to trade, most notably in textiles and apparel through the Multi-Fibre Arrangement and relied on subsidies in agriculture. They also participated in preferential trade arrangements. However, from the perspective of developed countries, many of these trade agreements led to very small changes in import tariffs, in part because tariffs were reduced in earlier WTO rounds and focused on reductions in non-tariff barriers or behind the border measures, which are substantially more difficult to measure, at least with aggregate or economy-wide data. In some cases, these trade agreements reduced the uncertainty about trade policy (Handley 2014, Handley and Limao 2014, Pierce and Schott 2016). Lower uncertainty about trade policy might help explain why trade agreements such as the Canada-United States Free Trade Agreement (CUSFTA) and the North American Free Trade Agreement (NAFTA) that did not substantially change trade policy levels might nonetheless have large effects on economic outcomes in high-income countries.

Juxtapose this with the experience of developing countries, which did not lower their barriers in the earlier rounds of GATT or WTO negotiations. Many of these countries implemented

⁵ Bown and Crowley (2016) provide detailed discussion of trade policy landscape in high and low income countries since the mid-1940s.

large-scale, economy-wide unilateral trade liberalization episodes, which reduced barriers on imports. They included Chile in the 1970s, several other countries in Latin America, including Colombia and Brazil in the 1980s and early 1990s, and India's drastic trade liberalization initiated in 1991. Others, like Mexico in 1986, joined the GATT. These reforms led to reductions in import tariffs and declines in non-tariff barriers to trade. For example, India's reform reduced average import tariffs from over 80 percent in 1987 to about 30 percent in 1997 and eliminated many import licenses. Probably the most noted trade policy event in the past two decades was China's entry into the World Trade Organization in 2001. As a result, average import tariffs are now substantially lower in a large set of developing countries than they were in early 1990s (Bown and Crowley 2016).

Developing countries also created preferential regional agreements among each other such as the MERCOSUR. Most recently, developing countries also gained market access to high-income countries—for example, via the dismantling of the Multi-Fibre Arrangement after the completion of the Uruguay Round, accession to the European Union, or bilateral trade agreements such as the U.S.–Vietnam bilateral trade agreement in 2001.

Many of these reforms in developing countries provided excellent settings from which to learn about the channels through which international trade shapes growth, inequality, and poverty in a country. The large magnitudes and other features of policy changes help identify the effects of trade policy from other factors influencing growth, poverty, and inequality (see Goldberg and Pavcnik 2016 for in depth discussion). In addition, the nature of trade policy changes varied across these reforms. Some reforms focused on reduction in domestic import tariffs (which exposed domestic producers to import competition and gave them access to cheaper and a greater variety of production inputs). Other reforms primarily lowered costs of accessing export markets, in high and lower income trading partners (which provided domestic producers with new export opportunities). Yet others simultaneously lowered import tariffs in domestic and foreign markets. This has helped us understand how importing and exporting shapes inequality and poverty in developing countries.

The role of international trade was more difficult to separate from the role of technology and other factors shaping employment, inequality and polarization of labor markets in advanced countries, in part because trade barriers (at least the ones that we can measure well) were already low. The emergence of China has therefore provided, in the words of Autor, Dorn, and Hanson (2016) “a rare opportunity for studying the impact of a large trade shock on labor markets in developed economies.” Discussion of Figure 1 illustrates that China accounts for the majority of the growth in the share of world exports from low-income countries from 1985 to 2015. Studies

attribute much of the increased exports of China to China's internal policy reforms that unleashed its comparative advantage in manufacturing and increased its productivity (Autor, Dorn, and Hanson 2016). From the perspective of the U.S., China's joining of the WTO in 2001 also reduced uncertainty about trade policy, at least vis-à-vis the United States (Handley and Limao forthcoming, Pierce and Schott 2016). Most of this evidence relies on the effects that operate through import competition (or input-output linkages) rather than exporting. This needs to be kept in mind when assessing the evidence.

China's rise has also influenced international trade and the domestic economies of developing countries. For example, China's domestic growth has increased the demand for commodities, influencing international trade in many commodity rich developing countries, including Brazil (Hanson 2012, Costa, Garred, Pessoa 2016). At the same time, China's manufacturing products increased import competition for products made by other developing countries, including Mexico, Brazil and Peru, both in outside markets such as the U.S. and in their own domestic markets (Schott 2003, Utar and Ruiz 2013, Medina 2017, Costa, Garred, Pessoa 2016). Consequently, China's rise also provides an opportunity to study the distributional consequences of trade among developing countries.

III. Perceptions about the Consequences of International Trade Vary across Countries

The backlash against international trade has recently received much public attention in high-income economies such as the U.S. and U.K. One of the key developments over the past four decades is that many developing countries are substantially more integrated into the global economy (Figure 1). This raises the question of how public support for international trade—and the public perception of its effects—varies across countries at different levels of development. I use data from the PEW Global Attitudes survey to more systematically document perceptions of individuals about the impact of trade on a country as a whole, and on earnings and employment opportunities across countries at various stages of development over the past 15 years. The survey includes more than 40 countries with incomes per capita ranging from \$1,000 to \$50,000 (PPP, constant 2011\$) and includes more detailed questions about international trade in 2002 and 2014.⁶

⁶ Pew conducts these surveys at least annually since 2001. See data appendix for details. Surveys in 2002, 2007/08, and 2014 contain more detailed questions about international trade. The analysis focuses on years outside of the 2007-08 crisis.

The majority of individuals in most countries accept that trade has overall benefits for the economy, and the perceptions of trade's benefits do not appear to vary systematically with a country's income level. The survey asked a general question: "What do you think about the growing trade and business ties between (survey country) and other countries—do you think it is a very good thing, somewhat good, somewhat bad or a very bad thing for our country?" Figure 2 plots the percent of individuals that say trade is very good or somewhat good (labeled as "good") for a country against a country's income per capita and the best fit line.⁷ Panels A and B of the figure focus on responses in 2002 and 2014, respectively. The figures single out the responses for a handful of countries that will be the focus of more a detailed discussion later on in the paper.

More than half of the individuals in all surveyed countries said that trade was good. These responses are in line with economists' view that trade is in general beneficial for a country. There does not appear to be a strong relationship between income per capita and trade favorability.⁸ Another trend that emerges from Figure 2 is that between 2002 and 2014, the world has become more critical of trade, with the share of individuals perceiving trade as good in an average country dropping. There were fewer lower-income countries where trade was viewed favorably by more than 90 percent of individuals in 2014. We also observe a notable drop in the perception of trade's favorability in the U.S.: while almost 80 percent of Americans said trade was good for the U.S. in 2002, less than 70 percent thought so in 2014. But there are also countries, such as Argentina, where trade was perceived as more beneficial in 2014 than in 2002. Overall, the responses to the Pew survey suggest that despite the current backlash against trade, the majority of the public in low- and high-income countries do not doubt trade's overall benefits to the economy.

The perceptions about the benefits and costs of trade vary more widely across high- and low-income countries when it comes to trade's effects on the livelihoods of workers through wages and jobs. The public believes trade has an impact on worker livelihood through wages and jobs, but these beliefs vary across countries at different levels of income. Individuals in lower-income countries tend to view international trade as more beneficial for job creation and wages than those in higher income countries. The survey asks the question "Does trade with other countries lead to an increase in the wages of (survey country) workers, a decrease in wages, or does it not make a

⁷The questionnaire also allows a "don't know/refused" option for respondents. However, the relationship between percent of individuals that say trade is bad for a country against a country's income per capita yields findings consistent with those reported in Figure 2. I therefore focus the discussion only on responses about "trade is good."

⁸ However, there are some clear outliers in 2002 among lower income countries, most notably Egypt, Jordan, and Argentina, where the effects of trade on the country in question are perceived unfavorably. Argentina, for example, experienced a crisis in 2001.

difference?” Along the same line, the survey asks the question “Does trade with other countries lead to job creation in (survey country), job losses, or does it not make a difference?”

Figure 3 includes two parts. The top part plots the percentage that believes that trade decreases domestic wages (left panel) and increases domestic wages (right panel) against a country’s income. Perceptions that trade lowers wages increase with a country’s income, while perceptions that trade increases wages decline with a country’s income. The bottom part of the figure plots the percentage of individuals in a country answering that trade destroys jobs (left panel) and creates jobs (right panel) against a country’s income per capita. The responses across countries for jobs are consistent with the responses about wages. Individuals in low-income countries are less likely to say that trade destroys jobs than individuals in high-income countries, and more likely to say that trade creates jobs than individuals in high-income countries.⁹

These perceptions are related to trade’s distributional consequences, and these beliefs influence the backlash against international trade. The China-U.S. comparisons yield one of the more extreme differences in perceptions. Only 12 percent of individuals in China believe that trade decreases wages and more than 61 percent believe that it increases wages; 11 percent believe that trade destroys jobs, whereas 67 percent believe that it creates jobs. Juxtapose this with perceptions of individuals in the U.S., where 45 percent believe that trade lowers wages and 17 percent of individuals believe trade increases wages; while 50 percent say it destroys jobs and 20 percent say that it creates jobs.

Large differences in perceptions between high- and low-income countries aside, the perceptions of trade’s benefits for domestic wages and job creation also vary across developing countries, with trade being perceived as more beneficial for workers in countries such as Vietnam and China relative to workers in Colombia and Brazil. This illustrates heterogeneity in perceptions about the impact of trade on worker livelihood among the developing countries. How has international trade influenced the livelihoods of individuals in developing countries?

IV. The Effects of Trade on Employment and Earnings: Old Ideas and New Evidence

The common belief among academic economists and policy makers is that international trade can best affect poverty via its impact on economic growth. Growth has lifted many individuals

⁹ Individuals in high-income countries are more likely to say that trade does not have an impact on wages and jobs than individuals in low-income countries.

out of extreme poverty, and has contributed to the growing middle class in countries such as China and India over the past four decades. But the effects of international trade on poverty and inequality relative to other domestic reforms and developments that have boosted growth are harder to pin down, and continue to be debated.¹⁰ I will return to this issue in section V. The academic literature has been more successful in uncovering the impact of international trade on inequality through its impact on the relative prices of goods vis à vis the employment and earnings of workers, and on their consumption patterns.

The discussion of the effects of international trade on inequality initially focused on the mechanisms that operate in a simple version of the workhorse model of international trade, the Heckscher-Ohlin Model, based on comparative advantage. As Krugman (1995) noted in his discussion of the effects of growing international trade between the U.S. and low-wage countries: “there is a way to think systematically about the effects of growing world trade: it is called general equilibrium trade theory. Indeed, the hot current topic of newly-industrializing economies’ (NIE) trade in manufactures is almost tailor-made for analysis using the techniques developed decades ago...These are textbook models whose time has come.” Indeed, the discussion of trade patterns in section II illustrated that the traditional models of comparative advantage have been useful for explaining recent changes in trade patterns between developing and advanced economies and among developing countries (Hanson 2012).

In a simple version of this textbook model, increased global integration of low-income economies was expected not only to increase aggregate welfare through the usual gains from trade, but also to reduce poverty and inequality in developing countries. Trade theory would suggest that the effects of international trade when resources are fully mobile across industries depend on workers’ characteristics such as education. Relative to richer economies, poor countries tend to be relatively abundant in less-educated workers. With international integration, these countries become more specialized in unskilled-labor-intensive industries, increasing the relative demand for less educated workers. Trade is therefore predicted to increase the wages of less educated workers and lower the real wage of educated workers in developing countries. These model-based predictions were influential in the policy debates about liberalizing trade in developing countries in academia and in institutions such as the World Bank and the International Monetary Fund.

¹⁰ See Feyrer (2009), Estevaderodal and Taylor (2013) for evidence that trade increases aggregate income and growth. The question then arises whether trade-induced growth is pro-poor.

When confronted with the data, these predictions found little support in developing countries. Counter to the prediction, the earnings of better educated workers actually increased relative to less educated workers in several developing countries that implemented large-scale trade liberalizations during the late 1980s and early 1990s (see Goldberg and Pavcnik 2007a for a detailed discussion of this literature).¹¹ In addition, the above framework assumes perfect mobility of workers across industries. However, the evidence pointed to lack of mobility of workers across industries in response to large trade shocks in developing countries, at least during the short and medium run after trade reforms (Goldberg and Pavcnik 2007a).

Indeed, frictions that impede workers from moving across industries, firms, or locations (see section V) are a continuing theme in the developing country context, shaping trade's unequal impact. There are no easy answers to the questions "Is trade good for the poor?" and "Does trade increase inequality?." The answers are nuanced and context specific. They depend on the nature of trade policy changes (or trade patterns) as well as the mechanisms involved; on the mobility of workers and capital across firms, industries, and geographic locations; and on the position of affected individuals in the income distribution of a country.

IV. A: Worker Industry Affiliation Plays a Role

The traditional production gains from trade occur when international trade reallocates resources toward industries with comparative advantage, so that workers relocate from import-competing to export-oriented industries. If workers cannot easily move across industries in response to trade policy shocks because of the need for industry-specific skills or rigid labor markets, in the short or medium run, industry affiliation can influence the effects of trade on workers' earnings.

In fact, a large body of literature points to a lack of labor reallocation across industries in the short-run aftermath of large-scale trade reforms in developing countries (see Goldberg and Pavcnik 2007a for a review).¹² In some cases, the responses to lower import tariffs then occurred through relative wage adjustment. The loss of earnings could also be attributed to declines in rents shared with workers in imperfectly competitive industries. In the case of Colombia, for example, earnings losses due to lower industry wage premiums negatively affected less skilled workers in particular,

¹¹ They study the effects of trade liberalizations in Argentina, Brazil, Chile, Colombia, Hong Kong (the impact of China's opening), India, and Mexico.

¹² This includes studies for Mexico (Revenga 1997, Hanson and Harrison 1999, and Feliciano 2001); Morocco (Currie and Harrison 1997); Colombia (Attanasio, Goldberg, and Pavcnik 2004); and a large set of developing countries (Wacziarg and Wallack 2004) and more recent work on India (Topalova 2010) and Vietnam (McCaig and Pavcnik 2014).

because tariff cuts were larger in more unskilled-labor intensive industries. But overall, import liberalization played a relatively modest role, through this channel and others, in increasing Colombia's wage inequality between educated and less educated workers in the aftermath of the country's trade reforms (Attanasio, Goldberg, and Pavcnik 2004) and in influencing urban poverty (Goldberg and Pavcnik 2007b). An important caveat is that because of data availability, most of the above studies rely on data that is representative of workers in manufacturing formal firms above a certain employment cut off or workers in urban areas (for example, the study for Colombia).

The findings from developing countries differ from those in studies on developed countries, namely in the U.S., where employment in the 1970s and 1980s was more responsive to trade policy shocks than were wages (Grossman 1986, Revenga 1992). Along similar lines, manufacturing employment is reduced in the U.S. in response to increased low-wage import competition in the U.S. during the 1990s (Bernard, Jensen, and Schott 2006, Pierce and Schott 2016), and in Canada in response to increased competition from U.S. firms after the Canada–U.S. Free Trade Agreement (CUSFTA) (Trefler 2004).

IV. B. Firm Affiliation Matters, as Does Worker Education

A worker's employer or firm affiliation provides another mechanism that shapes how international trade affects earnings and employment opportunities. Firms differ in their performance within narrowly defined industries in developed and developing countries, and trade theory suggests that initially better-performing firms are better positioned to withstand and adjust to increased competition from imports, as well as to take advantage of new exporting opportunities (see surveys by Harrison and Rodriguez-Clare 2010, De Loecker and Goldberg 2014, Melitz and Redding 2014).

The key message from this literature is that it matters what type of firm a worker works for and how skilled the worker is. Better performing firms are more likely to survive the selection forces of pro-competitive effects of import competition, as well as more likely to engage in international trade, through exporting or importing of production inputs. Firm adjustment to international trade, in turn, affects worker earnings opportunities. Trade leads to unequal effects on employment and wages for workers across firms within an industry and for educated and less educated workers within a firm. Because better performing firms tend to pay higher wages and trade further increases wages in better performing firms, this increases inequality between workers across firms.

For example, evidence from Indonesia's import tariff liberalization suggests that import competition reduces wages of workers in firms that only sell domestically relative to more

productive, exporting firms. In addition, workers in firms that import intermediate inputs tend to earn higher wages than workers in firms that only source inputs domestically (Amiti and Davis 2012). The declines in industry employment due to import competition should be particularly concentrated in less productive firms. Studies from developing and developed countries, including Brazil, the U.S., and Canada, find support for larger employment declines in less productive firms in response to increased import competition or bilateral trade liberalization (Menezes-Filho and Muendler 2011, Bernard, Jensen, and Schott 2006, Trefler 2004).

Exporting also increases wages of workers employed in initially high performing firms relative to other workers. High performing firms are better positioned to take advantage of new exporting activities than low-performing firms, and they share part of their revenue with workers.¹³ Access to export markets also encourages more productive firms to innovate, adopt advanced technology, or upgrade the quality of their products. Why? Exporting gives firms access to larger markets, which makes innovation or technological adoption more profitable, especially for better performing firms (Yeaple 2005, Bustos 2011a). Exporting to richer countries also gives firms access to sophisticated consumers, encouraging product quality upgrading (Verhoogen 2008).¹⁴ This literature has used exporting shocks due to devaluation of domestic currency or trade agreements such as MERCOSUR to examine these responses. Indeed, the adoption of new technology and quality upgrading due to exporting is associated with increased earnings of individuals in affected firms relative to other firms within an industry.

Exporting also increases the wage gap between more and less educated workers within firms. This occurs because the adoption and operation of new technology and innovation by exporting firms requires skill (Bustos 2011b). Likewise, the production and marketing of high-quality products requires skilled workers or more effort from skilled workers, increasing the relative demand for services of more skilled labor (Verhoogen 2008, Brambilla, Lederman and Porto 2012).

An advantage of these studies based on firm-level data is that they can simultaneously show how firms are adjusting production and how this affects workers. The challenge, on the other hand, is that workers that lose employment in this process are not observed after the loss of employment. In order to understand the adjustment process to trade, it is key to know how easily these workers gain employment elsewhere. We return to this issue in Sections V and VI, which focus on settings

¹³ This could reflect efficiency wages, fair wages, or profit sharing. See Helpman (2016) for review of theory literature.

¹⁴ Consumers in high-income countries are more quality-sensitive than consumers in developing country markets, so that firms need to sell higher-quality products in richer markets.

that can capture these effects. In addition, because this evidence is based on datasets that only cover formal manufacturing firms, these findings on inequality are only representative of workers employed in the formal manufacturing sector. Even if we only focus on manufacturing, this means that the data is representative of only 20 percent of manufacturing workers in India (Nataraj 2011), 42 percent in Vietnam (McCaig and Pavcnik 2015), and 70 percent of workers in Brazil (Dix-Carneiro and Kovak 2017). This raises the question of what types of workers are more likely to work in the formal manufacturing sector. Evidence from many developing countries suggests that more educated workers are more likely to select into this sector (see Goldberg and Pavcnik 2003 and discussion of broader literature in McCaig and Pavcnik 2015). Another question that arises is whether and how these exporting activities affect workers in the rest of the economy through general equilibrium effects.

In fact, exporting can influence labor market outcomes of workers beyond those in the formal manufacturing sector, at least in a small country such as Vietnam (see also related evidence on China in Section V). An example from Vietnam's experience after the U.S.-Vietnam Bilateral Trade Agreement illustrates how international trade can contribute to economic development by promoting the reallocation of workers out of informal microenterprises to the formal sector. The informal sector is important in low-income countries given that 70–80 percent of employment in many low-income countries is in informal, family run microenterprises or farms (Gollin 2002, Banerjee and Duflo 2007, La Porta and Shleifer 2014, Tybout 2000). In Vietnam, 85 percent of workers economy-wide, and 66 percent of those in manufacturing, were employed in informal microenterprises at the onset of the U.S.–Vietnam Bilateral Trade Agreement.

The primary policy change in this agreement was that the U.S. lowered taxes on Vietnamese exports. When exporting requires fixed costs, the theory would suggest that lower exporting costs benefit better performing firms, so that labor demand in the formal sector increases. In fact, in the case of Vietnam, the removal of a product market distortion such as a tariff on exports, which had been more binding for more productive firms, provided an impetus for the expansion of jobs in the formal sector.

During this time period, the share of informal workers in Vietnam was declining, and trade contributed to this process. Lower export costs were associated with the reallocation of workers from microenterprises to the formal sector (McCaig and Pavcnik 2014). In a low-income country setting such as Vietnam, working in a formal sector firm rather than a microenterprise changes the way a worker is attached to the workforce. In Vietnam, workers in the formal sector earn higher

wages, are more likely to receive non-wage/salary payments, work longer hours, and are less likely to hold multiple jobs. Not all workers were affected equally: individuals in areas of Vietnam closer to seaports, younger cohorts, and the low and high educated were more likely to be reallocated.^{15,16}

This discussion illustrates that it is important to incorporate the informal sector in the analysis. Indeed, labor reallocation across the formal and informal sectors provides a potentially important margin of adjustment to trade reform in developing countries. This margin will also play a role in long run adjustment to trade reform in local labor markets in Brazil (section VI).

V. The Focus on Local Labor Markets: The Effects of International Trade on Earnings and Employment are Geographically Concentrated

International trade has unequal effects on the earnings of individuals residing in different local labor markets. The economic activities of certain regions within countries are more closely linked to international trade. Some regions have a high concentration of industries subject to import competition, while others specialize in export-oriented industries or industries that are gaining market access abroad. In this setting, nationally implemented trade policy (or other trade shocks) are predicted to have different effects on wages across regional labor markets. Regional wage changes reflect a weighted average of national price changes, with more weight in industries that use more labor and have more elastic labor demand (Kovak 2013). A national trade-induced price change is predicted to have a larger effect on wages in local labor markets where the affected industries represent a higher share of total employment.

Why are the effects of trade concentrated only in local labor markets? Part of the answer is low and imperfect inter-regional worker mobility, especially in the short run after large adverse trade shocks. For example, less than 1 percent of rural individuals in India and less than 5 percent of individuals in urban India moved across districts for employment purposes in the 1980s and 1990s.¹⁷ Regions that are benefiting from trade and have increased employment opportunities observe inflows of workers. For example, in Vietnam, provinces that were better positioned, because of their

¹⁵ Vietnam has higher education levels than other countries at similar levels of income (McCaig and Pavcnik 2017). Formal sector activities required relatively low skill.

¹⁶ Over longer term, individuals in younger birth cohorts shift from the informal to the formal sector during a period of fast growth in Vietnam from 1999-2009, but 70% of the decline occurs through between birth cohort changes. Older cohorts that tend to work in the informal sector are replaced by younger workers that tend to work in the formal sector (McCaig and Pavcnik 2015)

¹⁷These figures reflect permanent migration and are based on questions that compare the contemporaneous residence to the residence 10 years ago.

existing industrial structure, to benefit from export opportunities receive more in-migrants than less affected provinces (McCaig 2011). Over time, these movements presumably reduced some of the initial inter-regional earnings inequalities induced by the trade agreement.

However, most studies that focus on import competition shocks find that even when there are meaningful declines in trade protection for local industry, populations do not respond to these adverse trade shocks by moving over time. This was the case in India, Brazil, and Mexico, 5–8 years after the onset of reforms (Topalova 2010, Kovak 2013, Dix-Carneiro and Kovak forthcoming, Chiquiar 2008).¹⁸ The low degree of mobility out of labor markets with adverse labor demand shocks is not unique to developing countries. The working age population did not respond to increased Chinese import penetration in the U.S. regional labor markets during the 1990s and 2000s (Autor, Dorn and Hanson 2013). More generally, low-skilled workers are much more likely to continue to live in areas that face declines in labor demand in the U.S., despite lower wages and employment opportunities (Notowidigdo 2013).

A key message from this literature is that trade policy has differential effects on the earnings and other labor market outcomes of individuals across local labor markets, depending on the region's exposure to import and export shocks. Individuals in regions with a high concentration of industries subject to import competition—or bigger tariff cuts—experience reduced earnings, relative to individuals in less-exposed regions (Topalova 2007 and 2010 for India; Kovak 2013, Dix-Carneiro and Kovak forthcoming, Costa, Garred, and Pessoa 2016 for Brazil, Chiquiar 2008 for Mexico). The finding is consistent with evidence on geographically concentrated negative labor market effects of import competition in the U.S. (Autor, Dorn and Hanson 2013, McLaren and Hakobyan 2016).

Along the same lines, individuals in regions with a high concentration of industries benefiting from lower export costs or increased demand for their exports experience higher earnings than individuals in less exposed regions (McCaig 2011 for Vietnam, Costa, Garred, and Pessoa 2016 for Brazil, Chiquiar 2008 for Mexico; Erten and Leight 2017 for China). The literature on developed countries does not provide much evidence on the geographic concentration of the effects of exporting. This in part reflects the lack of trade shocks that are large enough to identify these effects in a large country such as the U.S. and does not necessarily mean that these effects do not exist.

¹⁸The lack of spatial mobility in countries such as India and Brazil parallels the findings that trade reform did not affect the structure of industry employment in several developing countries in the short run.

One important feature of the local labor market literature is that it relies on nationally representative data of households, regardless of their employment status, and includes workers employed in all sectors, including agriculture and services. This approach thus provides a more representative picture of how trade shapes earnings opportunities in society. For example, as noted in section IV, studies that focus on formal manufacturing alone would only cover 20 percent of workers in manufacturing in India and 42 percent of manufacturing workers in Vietnam (and only 14 percent of workers economy-wide in 1999).

V.A. An Illustration: India and Vietnam

The studies from India and Vietnam illustrate how trade can either increase or decrease poverty (in relative terms) within a country through the local labor market channel. These two examples illustrate that the effects on poverty are context specific: they depend on the nature of trade shocks, which determines the effects of trade on local product and labor market demand, and the position of affected individuals in the income distribution of the country in question.

Consider the case of India, a country that accounted for a third of the world's poor at the onset of its 1991 large scale trade liberalization, studied by Topalova (2007, 2010). India unilaterally implemented its 1991 trade reform, primarily reducing barriers such as import licenses and tariffs on imports to India. The reduction in tariffs was large, as the average tariff dropped from more than 80 percent to about 30 percent by the late 1990s. National poverty in India had been declining since 1980s. However, households living in rural districts in India that were more exposed to reductions in tariffs observed lower declines in poverty after the reform, as measured by the headcount ratio or poverty gap, than households living in less exposed districts. Why? Increased import competition reduced the demand for labor, so that the hard-hit districts experienced relative declines in agricultural wages, and wages in industries with larger tariff cuts also declined.¹⁹

Mobility across districts is particularly low for individuals living in the poorest households (Figure 4, Topalova 2010). These households fared worst during trade reform. Consumption per capita fell for families in the bottom 10th and 20th percentile of the consumption distribution in hard-hit regions relative to families in less hard-hit regions. Consumption per capita was not affected for richer families within the same district. In this case trade made poorer households in hard-hit

¹⁹The reform included large reductions in agricultural tariffs. Although quantity restrictions on agricultural products were removed later on, 40 percent of agricultural products could be freely imported by 1998 (as compared to 7 percent in 1989 (Topalova 2007)). The study relies on data from 1987/88 and 1999/00 NSS.

districts worse off, at least relative to richer households in their own district and relative to their counterparts in less affected regions.

Consider now the relationship between trade and poverty in Vietnam, a country that implemented a bilateral trade agreement with the U.S. in 2001, studied by McCaig (2011). In the short run, the agreement primarily lowered U.S. import taxes on Vietnamese exports, so that the costs of exporting fell. Vietnam is divided into provinces, and some provinces have a greater concentration of industries that observed a decrease in export costs as a result of the agreement. During this time period, poverty in Vietnam was declining. However, families living in provinces that were more exposed to this positive export shock observed greater declines in poverty relative to families in less exposed regions (McCaig 2011). Why? Greater demand for products produced in Vietnam as a result of the agreement led to increased labor demand in these provinces, and higher provincial wages. Wages increased, especially for less-educated workers, thus reducing poverty. Because Vietnamese regions that benefited more from the trade shock were better off to begin with, trade in this instance amplified regional inequalities. Better-off regions observe some in-migration.

Of course, we have to keep in mind that these effects are all relative because they compare the effects of trade on poverty between regions more and less affected by trade. For example, in India, aggregate poverty was declining, so to the extent that trade contributed to reduced poverty through aggregate general equilibrium price effects or through its effect on aggregate growth, these adverse effects in practice mean smaller gains. Because we have one observation per country, without a model and additional assumptions, one cannot establish trade's overall contribution to poverty reduction.

V.B. From Agriculture to Manufacturing and Services: China's Entry into the WTO

International trade can also contribute to economic development and poverty reduction if it promotes structural change and the reallocation of workers from agriculture to manufacturing. This is the usual story told for China, a country that often serves as a poster child for how trade can lift people out of poverty through export-led growth. In fact, since the 1980s many individuals in China moved from rural, agricultural areas to urban areas and gained jobs in manufacturing. This relocation, combined with productivity growth, contributed to impressive declines in China's poverty. Several factors contributed to the productivity growth in manufacturing, including China's internal reforms with large investments in infrastructure, privatization, state-owned-enterprise restructuring, but trade also played a role (Brandt et al. forthcoming). As noted in Section II, China's

entry into the WTO granted the country a normal trading relationship with the U.S., reduced the uncertainty about trade policy in a major export destination, and increased its exports to the U.S. (Pierce and Schott 2016).

Indeed, trade contributed to the structural change and the reallocation of workers from agriculture to manufacturing (Erten and Leight 2017). Chinese counties that were more exposed to the policy change, because of their pre-existing industry structure, observed shrinking agricultural employment and output as well as expanding employment and output in manufacturing and services. Per capita (and total) GDP increased in these counties relative to less exposed counties after the policy change. Inflows of FDI and export growth played important roles in this process.

As I noted in the introduction, much of the reduction in poverty in developing countries, especially India and China, has been attributed (sometimes loosely) to their more rapid growth as a result of trade. Indeed, the above evidence from Vietnam and China illustrates how export opportunities helped lift households out of poverty through the labor market channel and structural transformation, at least in relative terms. At the same time, evidence from India and Brazil illustrates that individuals living in geographic areas more exposed to import competition were made worse off from trade through the labor market channel, at least in relative terms.²⁰ In practice, trade affects countries through both of these channels. Importantly, this local labor markets analysis cannot identify the effects that trade might have on aggregate earnings/poverty through aggregate general equilibrium price effects or through its effect on growth. Nonetheless, it shows high concentration of the benefits and costs of trade.

V.C. Why Don't People Move across Regions within a Country?

Low degree of inter-regional mobility out of labor markets with adverse labor demand appears relevant in developing and developed country context to understand labor market responses to trade. Why do people not move across regions within a country in response to negative earnings shocks? This is an active ongoing agenda in economic research that has put forth several possible explanations.

Moving is costly, and imperfect capital markets might preclude people from borrowing to relocate. This might explain why the poor bear the brunt of the costs of lower protection in rural

²⁰Studies on Brazil focus on wages and do not directly consider poverty. In addition, because Brazilian regions more exposed to its 1991 import reform were richer to begin with, trade actually reduced inter-regional inequality in Brazil.

India (Topalova 2010). The causes of mobility might not just be financial. In lower income countries, with imperfect insurance markets and low-levels of public social safety nets, individuals rely on their families and communities for help in times of crisis. For example, informal insurance within castes in India generate a disincentive for individuals to move away or marry outside of caste groups, and there is compelling evidence that this caste-based informal insurance contributes to why families rarely move in India (Munshi and Rosenzweig 2016). Likewise, government restrictions on mobility, such as the Hukou system in China, can play a role.

Workers that lose jobs in import-competing industries might not have the skills demanded in industries and regions with expanding employment opportunities. Young (2013) argues that rural–urban wage gaps mainly reflect differences in skills of workers living in rural and urban areas, and differences in skill-intensity of production located in rural and urban areas, so that wage gaps do not reflect frictions, but instead reflect labor sorting based on skills. In a trade context, Dix-Carneiro (2014) finds large adjustment costs of switching across industrial sectors, particularly for less educated and older individuals.

Individuals might not move because of match and search frictions in labor markets. It can be hard for individuals to learn about opportunities for themselves in other locations. Several recent randomized control trials examine the impact of making it easier for people to get jobs elsewhere. For example, a recruitment campaign that provided information about job opportunities in business process outsourcing in urban areas of India to young rural women led to increased mobility and labor force participation (Jensen 2012).

Finally, housing costs might also play some role, potentially in explaining differences in mobility across different types of workers. Evidence from the U.S. suggests that housing costs deter the mobility of less-educated workers from regions facing negative labor demand shocks (Notowidigdo 2013). Less-educated individuals are less likely to migrate out of U.S. regions that face negative labor demand shocks than college-educated individuals, and earlier literature attributes this to higher mobility costs for low-skilled workers (Topel 1986, Bound and Holzer 2000, Glaeser and Gyourko 2005). Negative labor demand shocks reduce housing costs in local markets. Because low-skilled individuals spend a greater share of their budget on housing, they might be less likely to move than higher-educated individuals (Notowidigdo 2013).

This discussion illustrates a variety of reasons—including education, information and traditional institutions—for low mobility and demonstrates why the effects of trade on earnings might be context specific.

VI. The Long-run Local Labor Market Effects of Trade

VI.A. The Local Labor Market Effects of Trade are Persistent, and Magnify over Time

The studies of the effects of trade on earnings or local labor markets discussed so far capture the short- and medium-run effects of import competition about 5 to 9 years after the implementation of trade reforms or local shocks. These negative local effects are presumed to dissipate over time, as workers adjust to the trade shock, by changing the firm or industry of employment toward areas less affected by import competition, or by moving out of locations affected by increased import competition and toward locations with expanding sectors. But how long is the long run? Do outcomes improve over the long run? How much mobility is there?

Evidence on this question is just starting to emerge: the negative effects of import competition on earnings and employment through local labor markets persist, and are even potentially magnified in the long run, in developing and developed country contexts.

Consider the case of Brazil, where the 1990–1995 unilateral trade liberalization lowered domestic tariffs on imports. Dix-Carneiro and Kovak (forthcoming) examine how formal sector earnings and employment of workers adjust before, during, and 20 years after the onset of Brazilian trade liberalization, through the exposure of local labor markets.²¹ In addition, they also examine the role of the informal sector in the adjustment process to trade.²² In Brazil, 58% of workers overall and 28% in manufacturing are informally employed at the onset of trade reform in 1991. This is to my knowledge the only study in a developing country that has examined the long-run adjustment to import competition.

The study finds that the adverse effects of lower import tariffs on formal earnings and formal employment of workers are magnified over time. Figures 4a and 4b from their study illustrate these findings.²³ The graph plots the estimated effects of the 1995–1990 decline in tariffs on log regional earnings in the formal sector for each year from 1991 to 2010. The x-axis lists the years. The vertical lines in the figures denote the onset of trade reform in 1991 and the end of policy changes in 1995. The effect of tariffs on earnings and employment for the years after 1991 are

²¹ The analysis is based on match employee-employer data from RAIS.

²² A worker is considered informal in Brazil if he or she does not have a signed work card. This includes self-employed and informal employees.

²³ These figures and figures 5a-5c replicate figures from Dix-Carneiro and Kovak (forthcoming). I thank the authors for providing the results of the regression analysis underlying these graphs.

measured relative to 1991. Consistent with the estimates of the shorter and medium-run effects of trade on earnings, the negative estimates suggest that individuals in regions exposed to greater tariff cuts experienced larger reductions in earnings. What is perhaps more striking is that the magnitude of the effects increases over time. Consider individuals in two regions, one that experienced a 10 percentage point greater decline in tariffs between 1990–1995 than the other region. The decline in earnings was 5.29 percentage points greater in the more affected region than in the less affected region between 1991 and 2000. The gap in earnings due to trade widened to almost 16 percentage points by 2010.

Similarly, trade reform also led to larger declines in formal employment in regions more exposed to trade policy changes relative to less exposed regions. As with earnings, the negative effects on employment in the formal sector in more affected regions also widened over time until about 15 years after the onset of reform, leveling off thereafter. Figure 4b, which has the same structure as Figure 4a, illustrates the timing of effects of tariff declines on log regional employment. Compare again the two regions from above, one that experienced a 10 percentage point greater decline in tariffs than the other. The decline in employment was about 35 percentage points larger in the region with a larger tariff cut than in the less affected region between 1991 and 2000, but the effect grows to 46 percentage points by 2004 and levels off there until 2010.²⁴

These effects are contrary to the predictions of the conventional model of local labor markets, which suggests that the earnings differentials should dissipate over time as workers relocate across regions to arbitrage away regional earnings differences. Why are the effects of import competition long lasting, in Brazil persisting 20 years after the onset of trade reform, and why do they magnify over time?

For the case of Brazil, imperfect inter-regional mobility of workers and the dynamics of labor demand amplify the effects of the initial trade shock over time (Dix-Carnerio and Kovak forthcoming). As discussed earlier, inter-regional labor mobility is imperfect about 9 years after the start of trade reform. What is perhaps more surprising is that regions exposed to larger tariff cuts do not observe significant changes in working-age populations relative to less exposed regions, even 20 years after the start of the reform. This is in line with evidence from the U.S., where regions negatively affected with increased import competition don't observe significant changes in population 10 years after the start of increased import competition (Autor, Dorn and Hanson 2013).

²⁴ Earnings gaps persist, at 12.6 percentage points by 2010, even when one accounts for lower prices in these regions.

Why are the effects magnified over time? The dynamics in the demand for labor magnify the short-run effects of trade on earnings and employment in the formal sector over time for two reasons. First, there is evidence of agglomeration economies in formal employment at the regional level, and agglomeration economies appear to magnify the initial negative local labor demand shock to the traded sectors, but this process takes time (Kline and Moretti 2014, Dix-Carneiro and Kovak forthcoming). Decreased formal employment in a region has negative spillovers for regional productivity, and decreased productivity, in turn, further reduces earnings and demand for formal employment.

Second, the slow adjustment of capital away from hard-hit regions also magnifies the effects of the initial labor demand shock (Dix-Carneiro 2014). The new investment might respond more quickly to liberalization in places with more economic activities relative to hard-hit regions, while depreciation in hard-hit regions takes more time. These effects are illustrated in Figures 5a–c. The effects of tariffs on the number of establishments, average establishment size, plant entry and exit, and job creation and destruction in the Brazilian formal sector are consistent with this view.²⁵ Figure 5a plots the effects of the 1990–95 trade policy change on (log) the number of establishments and average establishment size over time. As previously, all effects are measured relative to 1991. Trade leads to a decline in the number of establishments and this effect increases over time, with no offsetting increase in the average size of surviving establishments over time. Figure 5b separates the total number of establishments to directly examine the effects of trade on cumulative establishment entry and exit. One observes the decline in firm entry soon after the onset of the reform (reflecting relative investment in more favorable affected places) and slower growth in firm exit (reflecting relative capital depreciation in negatively affected places). Overall, these developments are reflected in negative effects of import-competition on job creation, and positive effects on job destruction that increase over time in hard-hit areas depicted in Figure 5c. Overall, this evidence is consistent with slow capital stock adjustment, in that capital owners did not immediately downsize, but only downsized or shut down local plants in response to import competition as capital depreciated.

VI.B. How Workers Adjust

How do Brazilian workers adjust, given that they do not migrate away? The informal sector plays an important role, especially over the long run (Dix-Carneiro and Kovak 2017). Additional analysis uses the Census of Population, which includes formal and informal workers and is available

²⁵ Data constraints preclude a construction of direct measure of capital or investment at regional level.

every 10 years. About 10 years after the onset of reform, in 2000, not only is the growth in non-employment higher in regions more hard hit by the 1991 trade reform, but informal employment also grows more relative to less affected regions. Informal employment therefore in part buffered the employment losses. Over 20 year, the informal sector fully absorbs the displaced workers. 20 years after the onset of reform, total regional employment growth since 1991 (formal and informal combined) is similar across regions facing larger and smaller tariff reductions. However, the reform had a negative long-run effect on regional earnings (formal+informal), although this effect was smaller than when focusing on earnings in the formal sector alone, since lower tariffs are not associated with significant changes in earnings in the informal sector.²⁶

The persistence of the effects of import competition on workers does not appear unique to developing country labor markets, as persistent localized effects of trade have also been found in the U.S. (Autor et. al. 2013, 2014, 2016), as well as in other developed countries. Individuals living in commuting zones of the U.S. subject to greater exposure to import competition from China observed a greater decline in manufacturing employment, lower earnings, and higher unemployment than individuals living in areas less exposed to import competition. These employment losses are consistent with firm-level evidence that U.S. firms in manufacturing industries more exposed to low-wage competition are more likely to exit and reduce employment (Bernard, Jensen and Schott 2006, Pierce and Schott 2016) or, for that matter, with the declines in manufacturing employment in Canada after the implementation of CUSFTA (Trefler 2004).

What is striking is the geographic concentration and persistence of the adverse effects of the shocks and how workers in hard-hit regions adjust to the shock: workers do not move elsewhere, and some of them, after prolonged unemployment, exit the labor force. A follow-up study on long-term workers paints an equally bleak picture (Autor et. al. 2014). Workers employed in industries that were more exposed to Chinese competition in 1991 were more likely to face longer periods of non-employment and have lower earnings, which the study attributes to a decline in industry-specific capital.

The concentrated effect of trade on local labor markets can have additional effects—beyond their effects on adult labor market outcomes—that prolong their impact or amplify their effects. Several studies have found evidence that trade might have negative spillovers, by increasing crime in local labor markets relatively hard-hit by trade in developing and developed countries (Dix-Carneiro,

²⁶ Dix-Carneiro and Kovak suggest that this could reflect increased demand by consumers in harder-hit areas for lower-quality goods, which tend to be produced by the informal sector.

Soares, and Ulyssea 2017, Feler and Senses forthcoming) and correlate with adult mortality in the U.S. (Pierce and Schott 2017). Poorer health and greater crime in hard-hit areas might again imply broader consequences for societies, further contributing to social tensions.

VI.C Next Generation: Trade's Effect on Education and Child Labor

Trade's impact on local labor market, even short-term ones, can have longer-lasting effects because they influence a family's investment decisions for children's schooling.

Earning opportunities of families living in poverty influence their human capital decisions. Consider the case of the geographically concentrated adverse effects of India's import liberalization, which led to increased poverty in harder-hit districts, discussed in section V.A. Edmonds, Pavcnik, and Topalova (2009, 2010) show that primary school attendance for children ages 5–14 declined in districts of India that were more hard-hit by India's trade liberalization relative to less exposed districts. Girls, in particular, were less likely to attend school, and these effects were particularly large in districts with larger schooling costs. Interestingly, foregone household consumption due to schooling costs appear to play a large role in this relationship and girls disproportionately bear the burden of helping their families cope with poverty. These results are consistent with recent experimental evidence that has also emphasized the importance of schooling costs in education decisions.

The experience of India illustrates that the family as a whole is affected by trade adjustment, and that the focus on adjustment assistance to adults alone might not be sufficient. In addition, the children who were of school age when their communities were affected by trade reform bear the consequences of lower school attendance throughout their lives. In particular, the primary school-age children in rural districts of India had lower primary school completion rates and higher illiteracy ten years after the onset of India's trade reform relative to their peers in less exposed districts. Back of the envelope calculations suggest that these children experience about 40 percent lower lifetime consumption than children in communities that only benefit from the reform.

India's example focuses on the effects of import tariff liberalization, which increased poverty in hard-hit districts in India relative to less affected districts. Trade can also improve schooling or reduce child labor if it increases the incomes of local poor families. For example, exporting opportunities may increase the demand for products produced by relatively less educated workers, including children. However, if most children work because of poor economic circumstances in which their families live, increased export opportunities might reduce child labor by improving the

incomes of poor households. The income effect dominates for the case of Vietnam's rice export quota liberalization in the early 1990s (Edmonds and Pavcnik 2005). Because exporting increased the standard of living among the poor farmers, child labor declined, even though demand for child labor increased. Within a region, declines in child labor were particularly large in households that were net rice producers prior to reform. It is important to note here that India's and Vietnam's examples point to poverty as the main channel through which trade affects schooling and child labor.

Trade can also improve schooling if it increases the returns to education, or brings jobs to the community that require higher levels of education. For example, areas of India experienced an inflow of IT service jobs in the first decade of this century. Multiple studies suggest that outsourcing of IT services, such as call centers, to India benefited schooling of children in areas hosting these centers relative to areas with lower exposure. For example, Oster and Steinberg (2013) find increased schooling in areas of India where IT call centers were located. Information about availability of these jobs plays a role in schooling decision. For example, a recruitment campaign in rural villages that provided information about job opportunities in business process outsourcing in urban areas of India to young rural women increased schooling of younger girls in these village (Jensen 2012).

In the case of IT jobs outsourced to India, the new jobs required higher education than the jobs otherwise available in the local labor market, so that the arrival of the jobs increased local educational attainment. However, Mexican teens were less likely to complete high-school after the arrival of maquiladora jobs to local labor markets, because these jobs required less education than other available higher-paying local jobs and raised the opportunity cost of staying in school (Atkin 2016).²⁷

The above discussion highlights that there are several channels through which international trade influences decisions of households to send children to school/work in poorer countries. As is the case with adult labor markets, it demonstrates that the effects are geographically concentrated and depend on the type of trade policy change and exact mechanisms involved, as well as on the specific context in a country (or a region in a country).

VII. Concluding Thoughts

²⁷ See Blanchard and Olney (2017) for the effect of international trade on schooling across countries.

The discussion in Sections IV-VI has highlighted several channels through which trade shapes inequality and poverty. The answers to questions of whether trade benefits the poor or increases inequality within a country are context specific. They depend on the nature of changes in trade policy or patterns and the mechanisms involved; on the mobility of workers and capital across firms, industries, and geographic locations; and on the position of affected individuals in the income distribution of a country. The good news is that we now know more about the variety of channels through which trade can affect poverty and inequality, and factors that impede individuals from sharing more equally in benefits from trade. Indeed, the empirical and theoretical literature on trade and inequality has come a long way, relative to using the simple Heckscher-Ohlin model for predictions in the 1980s when developing countries started opening up.²⁸

While trade contributes to inequality within a country, the academic literature has concluded that it is not its main driver (Goldberg and Pavcnik 2007a, 2016, Helpman 2016). Indeed, the Pew Global Survey suggests that the public does not perceive trade as the main culprit for inequality between rich and poor within a country. Figure 6 plots the relationship between the percentage of individuals in a country that blamed trade as the principal cause for inequality and the country's income per capita in 2014.²⁹ Individuals in none of the surveyed countries view trade as inequality's main driver.³⁰ Lower income countries, even though more favorable of trade's benefits in general and more likely to perceive trade as beneficial to worker livelihood in own country in Section III, tend to view trade slightly more as the main driver of inequality than higher income countries.

In general, the effect of trade on income inequality might not yet be a first order concern for developing countries, many of which have lifted a large share of their populations out of extreme poverty over the past four decades. Likewise, most of these countries did not experience large

²⁸ Consistent with the developments in empirical work, theory on the effects of trade on inequality is much more nuanced (see Helpman 2016 for a recent review).

²⁹ The question in the Pew Global Survey in 2014 asks: "In your opinion, which one of the following is the most important reason for the gap between the rich and the poor in our country today?...trade and business ties between countries, our government's economic policies, how much workers are paid, our educational system, our tax system, or some people work harder than others?"

³⁰ If respondents don't blame trade, they tend to point to two other causes: domestic governmental policies, as well as how much workers are paid (this second reason is more a symptom than a cause). As a result, I also examine the answer to this question in 2002. In 2002, the survey asks about the direct role of trade rather than the role of multiple factors: "Do you think this change in the gap between rich and poor people is largely because of the way the world has become more connected or mostly for other reasons?" Note that the responses between the two surveys are not directly comparable because of the changes in the exact wording of the question. Even in this case, with the exception of 3 cases (Japan, Jordan and Egypt), most individuals don't view trade as the main reason for inequality.

downturns in economic activities or quickly rebounded during the 2007–08 financial crisis, avoiding the usual calls for protectionism that arise during economic downturns (Bagwell and Staiger 2003).

Although trade is not the primary contributor to changes in aggregate inequality, adverse effects of import competition appear to be highly geographically concentrated and long-lasting, in developing and developed countries. And they spill over to factors such as education of the next generation, community crime, and adult health.

Despite the adverse distributional consequences of trade, resorting to protectionism is not a solution. While it is true that the aggregate size of gains from trade from quantitative models continues to be debated, these are very stylized models.³¹ Empirical studies suggest that trade increases aggregate income and growth (Feyrer 2009, Estevadeordal and Taylor 2013). Likewise, the empirical literature on the effects of trade policy also consistently finds that international trade and lower barriers to trade improve firm outcomes, such as productivity and innovation, that are correlates of aggregate growth (see Goldberg and Pavcnik 2016). And the gains from trade are larger in industry-specific studies that can capture the institutional nuances of a specific industry and non-tariff barriers to trade (see Goldberg and Pavcnik 2016). Beyond that, protectionism too would generate winners and losers.

How can we ensure equality of opportunity and broader sharing in gains from trade?

VII.A. Compensation

Although one could in principle design a compensation scheme so that winners share the gains from trade with the losers, such schemes do not necessarily happen in practice. In an influential book titled “Has Globalization Gone Too Far?,” Rodrik (1997) warned that governments are not well equipped to mitigate the adverse shocks and uncertainty of globalization. The evidence on how social transfers mitigate the effects of adverse trade shocks is scant.

Consider the use of social transfers in response to the China shock in the U.S. (Autor, et. al. 2013). Transfer payments increased in response to increased import competition, including unemployment and trade adjustment assistance, disability benefits, retirement benefits, other government income assistance, and medical benefits. But these income transfers offset only about 10 percent of the income loss for a household without children (Autor, et al. 2013, 2016).

This is to my knowledge the only study that directly examines the role of social transfers in adjustment to trade. Several European countries have a more generous social safety net than the

³¹ Quantitative models suggest relatively small gains from trade (Costinot and Rodriguez-Clare 2014).

U.S. These countries also experienced increased imports from China, so they present good case studies to compare with the experience in the U.S.

VII.B. Active Labor Market Policies

Possible ways to address the bleak employment opportunities of workers in areas hard-hit with trade include retraining and other forms of active labor market programs. What has been tried so far, mostly does not appear to work in developing and developed countries. A recent survey systematically assesses evidence based on 24 randomized control trials that examine the effectiveness of several types of active labor market programs across in over 10 developing countries and concludes that “these programs have at best modest impact in most circumstances,” and points to the high costs of some of the programs, especially vocational training (McKenzie 2017). The evidence from developing countries is consistent with the general lack of effectiveness of active labor market policies in developed countries (Crepon and van den Berg 2016).

Evidence is from recent randomized control trials in countries including Colombia, the Dominican Republic, Ethiopia, Kenya, the Philippines, and India, which aimed to improve labor market outcomes for low-income young and for unemployed people through three types of labor market interventions. One set of interventions focused on vocational training, which aimed to improve the technical skills of potential workers. Other programs provided employment subsidies to the employers, which aimed to increase the demand for labor among employers by reducing costs to the firms. A third type of program aimed to lower search frictions in the labor market, and improve the matching of the needs of employers with workers, through the offering of public information about jobs, skill certification, organization of job fairs, and transportation services. Economically, the goal of these programs is to reduce frictions in the labor market, which could be large in some settings.

An assessment of vocational training programs suggests that only 6 out of 9 studies found “a significant impact on employment” and that the results across these programs suggest that “for every 100 people offered vocational training, fewer than 3 will find a job they would not have otherwise found.” Effects on earnings are also modest. McKenzie points out that this means a cost of approximately \$17,000–\$60,000 per additional person employed (McKenzie 2017). Employment subsidies were also not particularly effective, especially in cases where only firms had to register workers formally, and even in the one study with positive effects, these effects were not long-lasting. These are discouraging results given the high cost of vocational training and employment subsidies.

The costs of search and matching programs is substantially lower (\$25 dollars per assisted individual), but the survey notes that “only 1 out of 10 interventions finds a significant impact on employment.”

The policies might not have been effective because places and sectors that were targeted by the programs ultimately were not places that had a current demand for workers (McKenzie 2017). Indeed, the one successful program was the recruitment campaign that provided information about job opportunities in business process outsourcing in urban areas of India to young rural women (Jensen 2012) discussed in Section V. Exploring ways to reduce the spatial mismatches might be particularly relevant for the consequences of trade shocks, which are spatially concentrated.

VII.C. Provision of Public goods

Government could in principle help individuals and communities smooth these adverse shocks, and more generally, invest in local infrastructure and the provision of public goods. Consider the example of trade and schooling in India discussed in Section VI. Schooling costs might make schooling expensive relative to other things that the poor household consumes. Consequently, for the case of schooling cost in India, policies that reduce the cost of primary schooling can break the relationship between poverty and schooling, helping children in families living in poverty break out of the poverty cycle.

Of course, government’s ability to do so will depend on the availability of tax revenue. When local governments are responsible for the provision of local public goods, and government revenue is highly dependent on local sources of taxes, such smoothing might not occur. In this case, trade-induced adverse shocks to individual income and communities might be amplified.

This is the case in the United States, where much of the local revenue is financed by local property and sales taxes. In fact, evidence from the United States suggests that families in areas hard hit by increased import competition from China not only disproportionately bear the hardship of the job loss, but at the same time bear the negative consequences of an eroding local tax base (Feler and Senses forthcoming). Localities harder hit by import competition experienced declines in policing and increased property crime rates, deteriorating local infrastructure, and lower funding for schools (Feler and Senses forthcoming).

Government budgets in developing countries are potentially not as well positioned to assist those hurt by international trade. For some developing countries, large-scale trade reforms meant large losses in government revenue, in part because collection of taxes at the border might be easier

to administer than other forms of taxation. In fact, some developing countries have been only partially successful at recovering lost tariff revenue with other forms of taxation (Bown and Crowley 2016). Of course, fast-growing developing countries are better positioned to address these challenges.

Given this state of affairs, it is important for academics and policy makers alike to engage more with distributional issues to design policies that ensure growth and its opportunities, whether caused by trade or technological progress, are shared more broadly by the less fortunate in society.

Data Appendix

Section II and Figure 1:

Exports of Goods and Services (Current USD). (Source: WDI)

Exports as a share of GDP: Exports of goods and services (% of GDP), (Source: WDI)

Imports as a share of GDP: Imports of goods and services (% of GDP). (Source: WDI)

Country Classifications*

Low Income (L): Low income group aggregate: Low-income economies are those in which 1987 GNI per capita was \$480 or less.

Lower Middle Income (LM): Lower middle income group aggregate. Lower middle income economies are those in which 1987 GNI per capita was between \$481 and \$1940.

Upper Middle Income (UM): Upper middle income group aggregate. Upper middle income economies are those in which 1987 GNI per capita was between \$1941 and \$6000.

High Income (H): High income group aggregate. High income economies are those in which 1987 GNI per capita was \$6000 or greater.

Countries that did not exist in 1987 or were not in the data in 1987 were assigned World Bank income designation the first available year. Most of these countries are former republics of Yugoslavia and USSA.

Section III:

PEW Survey Data

Over 40 countries are represented across the income level spectrum. The analysis in this paper draws only on data from 2002 and 2014. Countries that do not have data available in 2014 are not included in Figure 3 and 6. Countries without data in 2014 are excluded from Figure 2, Panel B. Some countries do not have nationally representative sample in 2002 and are marked below as such.

Sample countries: Angola†*, Argentina, Bangladesh†, Bolivia†*, Brazil†, Britain, Bulgaria*, Canada*, Chile□, China†, Colombia□, Czech Republic*, Egypt†, El Salvador□, France, Germany, Ghana, Greece□, Guatemala†*, Honduras†*, India†, Indonesia†, Israel□, Italy, Ivory Coast†*, Japan, Jordan, Kenya, Lebanon, Malaysia□, Mali†*, Mexico, Nicaragua□, Nigeria†, Pakistan, Palestine□, Peru, Philippines, Poland, Russia, South Africa, South Korea, Senegal†, Slovakia*, Spain□, Tanzania, Thailand□, Tunisia□, Turkey, Uganda, Ukraine, United States, Uzbekistan*, Venezuela†, Vietnam†

Legend:

† - non-national sample in 2002

* - data only available for 2002

□ - data only available for 2014

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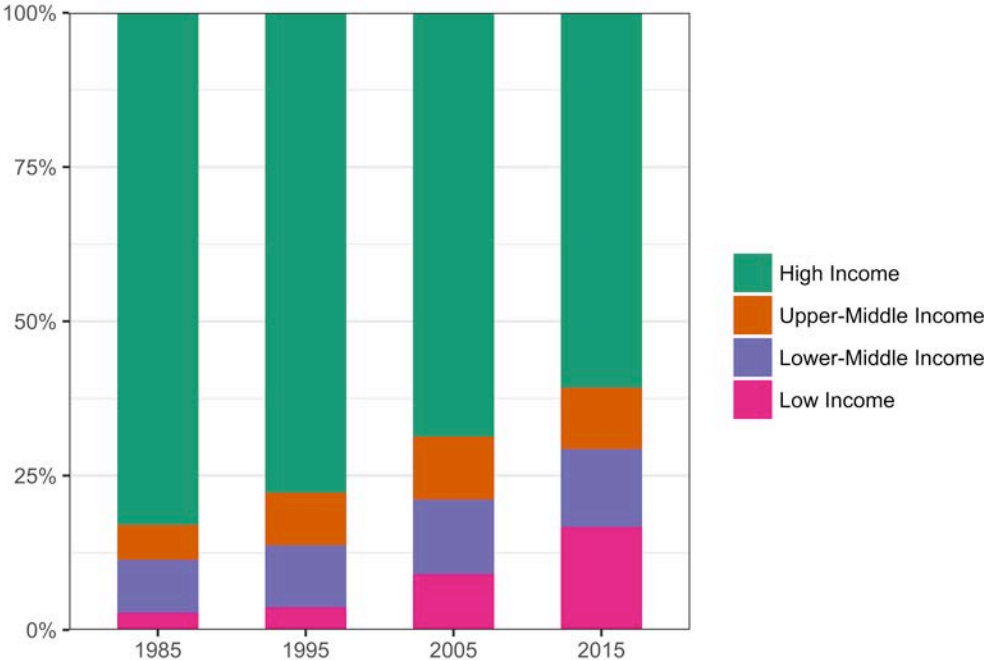
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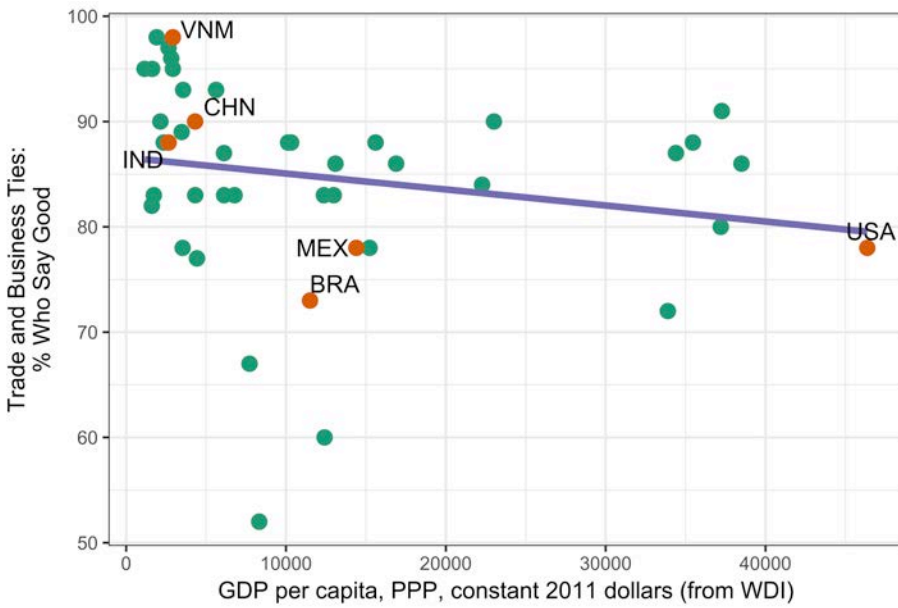
Figure 1: Percentage of World Exports of Goods and Services by Country Income



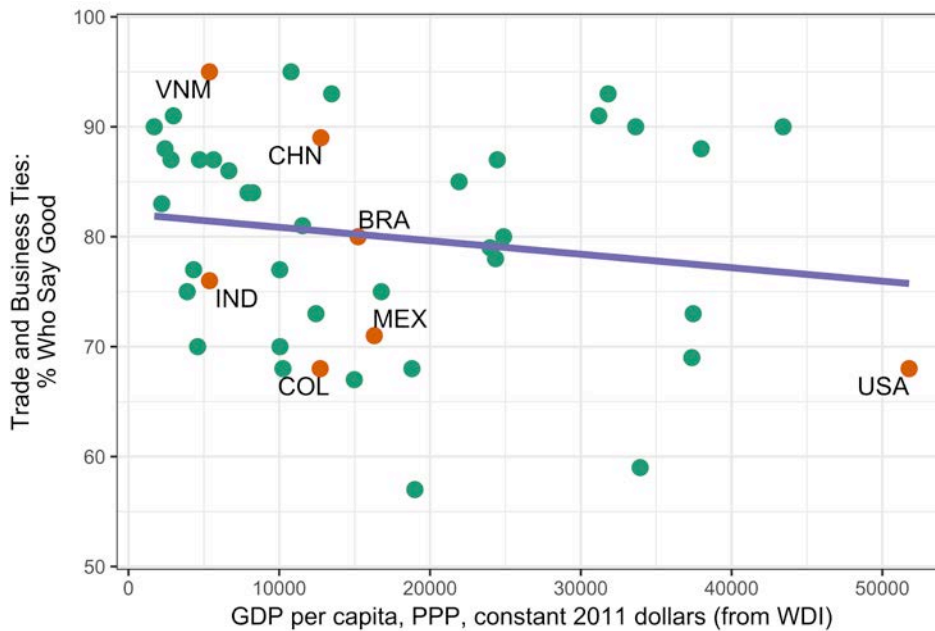
Note: Authors' calculations based on data from WDI (World Exports of Goods and Services). A country's income category group is fixed in time and based on a country's position in 1987 World Bank income groups. See Data Appendix for a list of countries in each group.

Figure 2: Trade and Business Ties Are Good for a Country

Panel A: 2002

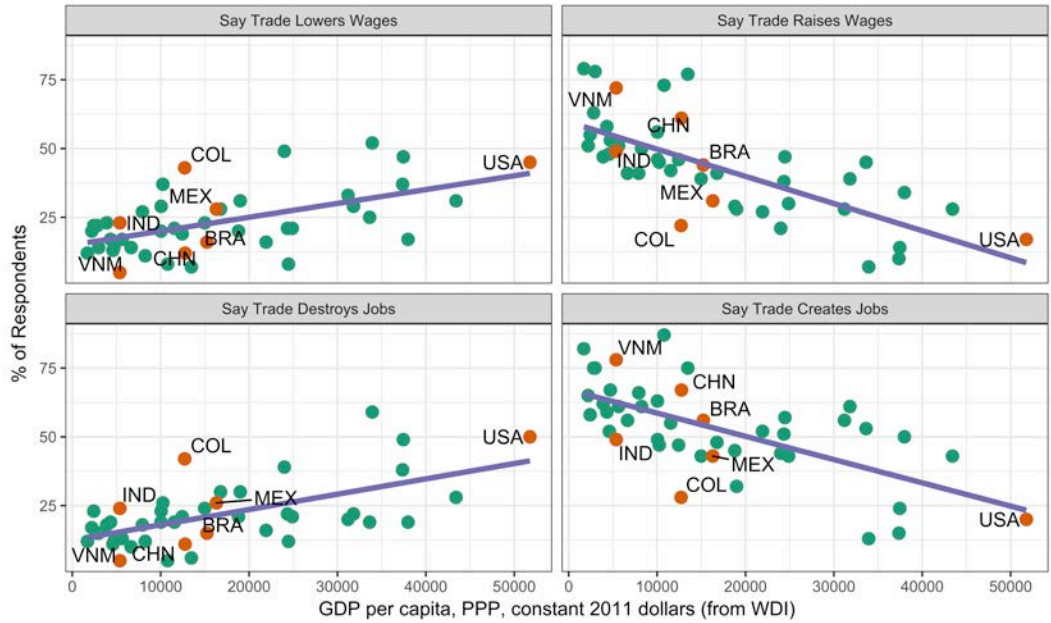


Panel B: 2014



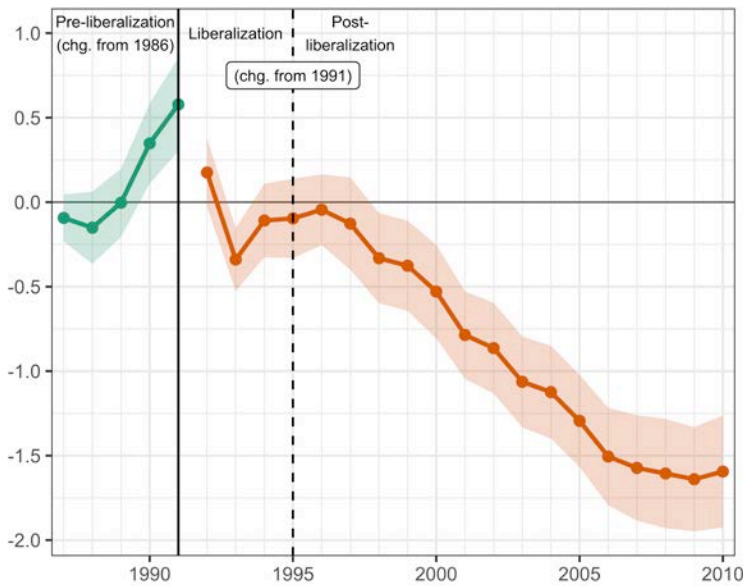
Note: The figure plots the percent of individuals in a country that say trade is very good or somewhat good for a country (labeled as “good”) against a country’s income per capita and the best fit line. Based on 2002 and 2014 PEW Global Attitudes survey and World Development Indicators. The figure singles out the responses of a handful of countries: Vietnam (VNM), China (CHN), Brazil (BRA), India (IND), Colombia (COL), Mexico (MEX), the United States (USA). Colombia is not in the sample in 2002.

Figure 3: Perceptions of Trade’s Effect on Wages and Jobs in Own Country



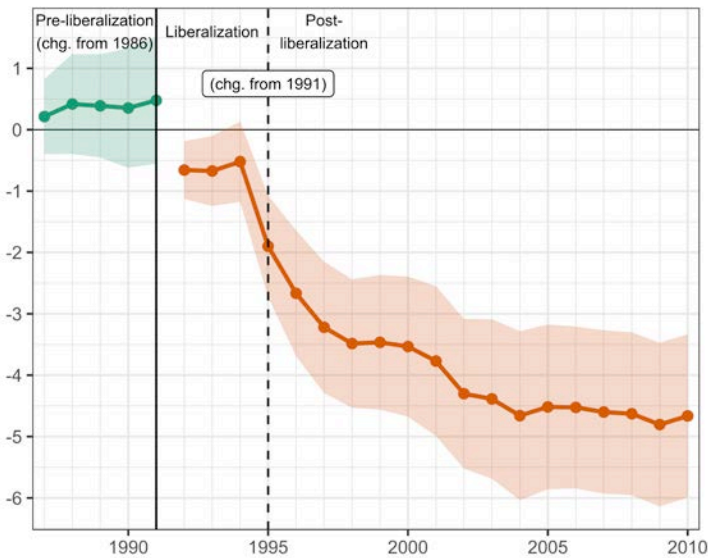
Note: The figure plots the percent of individuals in a country that say trade lowers wages (top left), raises wages (top right), destroys jobs (bottom left), or creates jobs (bottom right) in that country against a country’s income per capita and the best fit line. Based on 2014 PEW Global Attitudes survey and World Development Indicators. The figure singles out the responses of a handful of countries: Vietnam (VNM), China (CHN), Brazil (BRA), India (IND), Colombia (COL), Mexico (MEX), the United States (USA).

Figure 4a: The Effects of Import Liberalization on Regional Formal Earnings



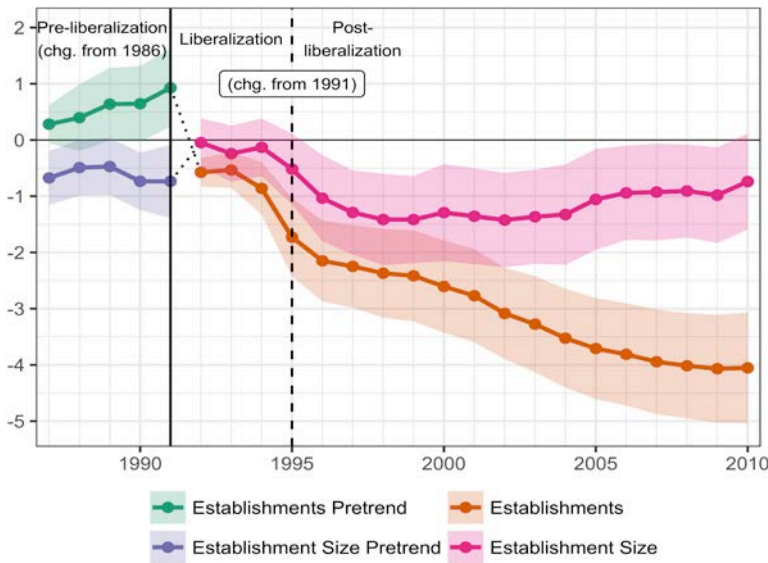
Note: Source is Dix-Carneiro and Kovak (forthcoming). The graph shows the effect of regional import tariff reduction (from 1990 to 1995) on regional (log) formal earnings premium from 1991 to the year listed on the x-axis. Negative estimates imply larger earnings declines in regions facing larger tariff reductions (relative to less affected regions). Vertical bars indicate that trade reform begins in 1991 and ends by 1995. Shaded areas represent 95 percent confidence intervals. Pre-liberalization trends are measured relative to 1986.

Figure 4b: The Effects of Import Liberalization on Formal Regional Employment



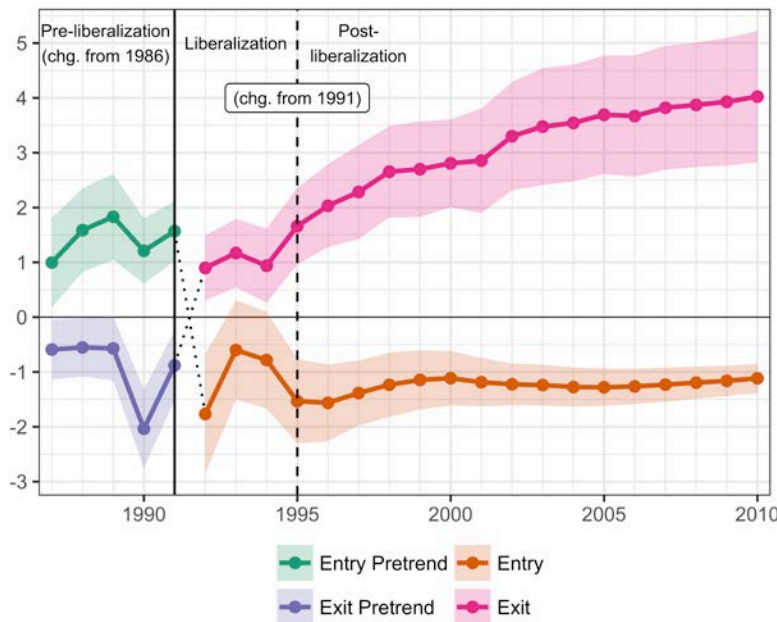
Note: Source is Dix-Carneiro and Kovak (forthcoming). The graph shows the effect of regional import tariff reduction (from 1990 to 1995) on the change in regional (log) formal employment from 1991 to the year listed on the x-axis. Negative estimates imply larger employment declines in regions facing larger tariff reductions (relative to less affected regions). Vertical bars indicate that trade reform begins in 1991 and ends by 1995. Shaded areas represent 95 percent confidence intervals. Pre-liberalization trends are measured relative to 1986.

Figure 5a: The Effects of Import Liberalization on Number of Establishments and Establishment Size



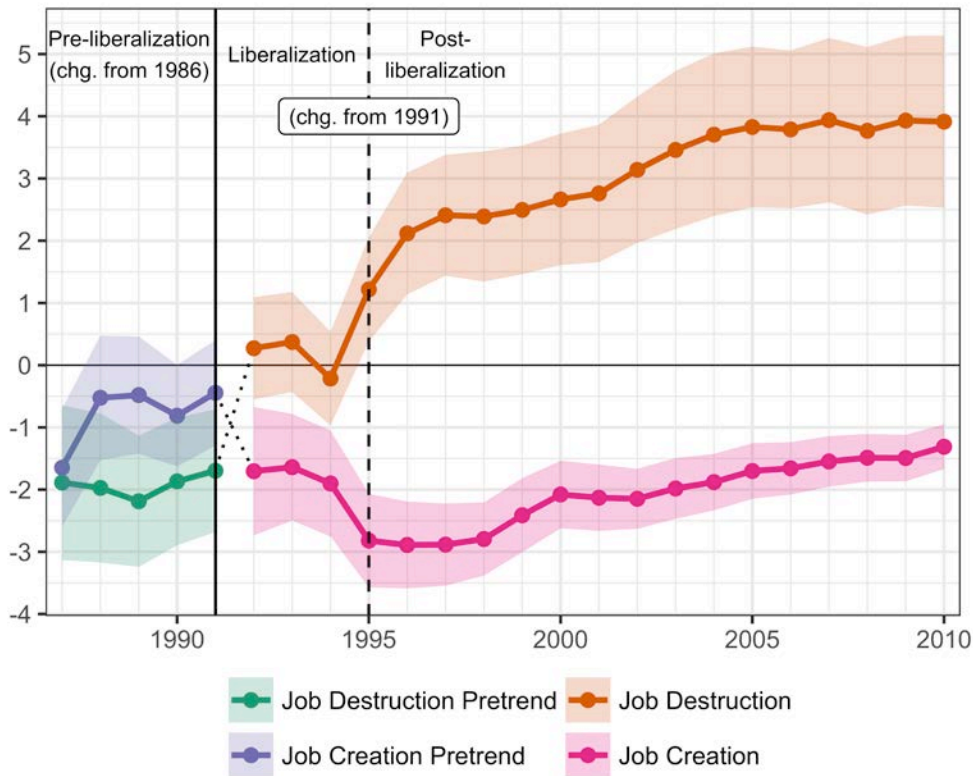
Note: Source is Dix-Carneiro and Kovak (forthcoming). The graph shows the effect of regional import tariff reduction (from 1990 to 1995) on the change in regional log number of formal establishments [marked with pink] or the change in regional log average formal establishment size [marked with orange]. Change is measured from 1991 to the year listed on the x-axis. Vertical bars indicate that trade reform begins in 1991 and ends by 1995. Shaded areas represent 95 percent confidence intervals. Pre-liberalization trends are measured relative to 1986.

Figure 5b: The Effects of Import Liberalization on Establishment Entry and Exit



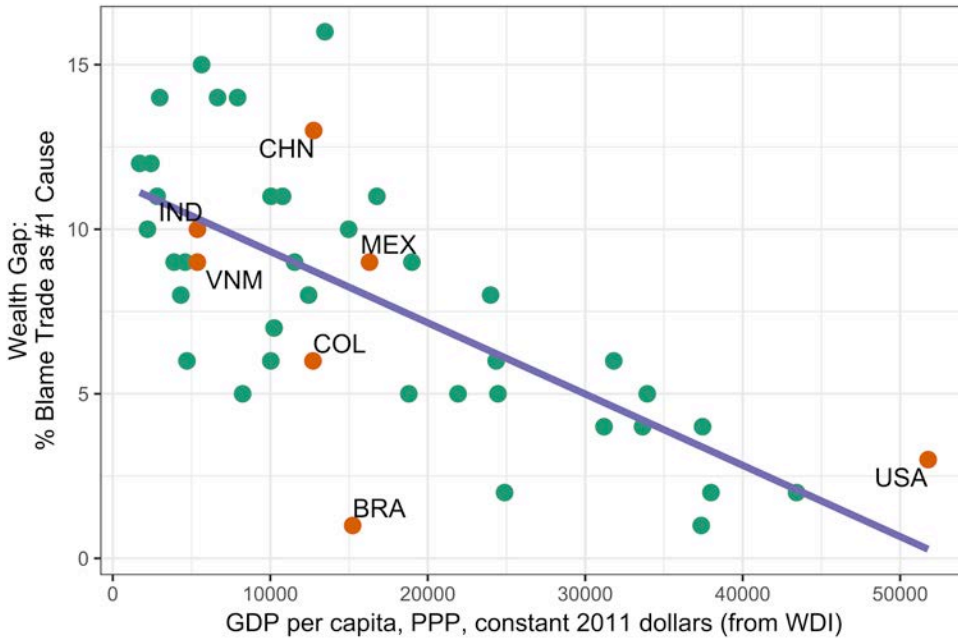
Note: Source is Dix-Carneiro and Kovak (forthcoming). The graph shows the effect of regional import tariff reduction (from 1990 to 1995) on (log) cumulative regional formal establishment entry [marked with orange] or exit [marked with pink] from 1991 to the year listed on the x-axis. Positive exit estimates and negative entry estimates imply larger rates of exit and smaller rates of entry in regions facing larger tariff reductions (relative to less affected regions). See notes to Figure 5a.

Figure 5c: The Effects of Import Liberalization on Job Creation and Job Destruction



Note: Source is Dix-Carneiro and Kovak (forthcoming). The graph shows the effect of regional import tariff reduction (from 1990 to 1995) on (log) cumulative regional job creation rate [marked with pink] or destruction rate [marked with orange] from 1991 to the year listed on the x-axis. Positive job destruction estimates and negative job creation estimates imply larger rates of job destruction and smaller rates of job creation in regions facing larger tariff reductions (relative to less affected regions). Vertical bars indicate that trade reform begins in 1991 and ends by 1995. Shaded areas represent 95 percent confidence intervals. Pre-liberalization trends are measured relative to 1986.

Figure 6: Percent that Blames Trade as Number One Cause for Inequality



Note: The figure plots the percent of individuals in a country that blame trade as number one cause of wealth gap between rich and poor in that country against a country's income per capita and the best fit line. Based on 2014 PEW Global Attitudes survey and World Development Indicators. The figure singles out the responses of a handful of countries: Vietnam (VNM), China (CHN), Brazil (BRA), India (IND), Colombia (COL), Mexico (MEX), the United States (USA).