

7 Globalization and within-country income inequality

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7.1 Introduction

Since the 1980s many developed and developing countries have experienced increases in within-country inequality. The growing income gap has coincided with the period of increasing exposure of countries to globalization through increased flows of goods, services, capital and labour across international borders. These developments have instigated a large debate in the academic and policy circles as to whether globalization is responsible for the growing inequality within countries.

This chapter will discuss whether globalization has contributed to within-country inequality by focusing on one dimension of globalization, namely international trade. International trade theory suggests several channels through which international trade would affect within-country inequality. The increased availability of nationally representative micro-level surveys of workers and households has enabled the researchers to hone in empirically on these channels and examine their contributions to increased inequality during the last three decades in a large set of developed and developing countries.¹ The survey thus focuses mainly on the relationship between international trade and inequality since the 1980s. Williamson (2002) provides an excellent survey of the relationship between international trade and inequality in a more historical perspective.

The chapter proceeds as follows. Section 7.2 introduces common measures of inequality and methodological challenges in the measurement of inequality. Section 7.3 reviews the evidence on the evolution of within-country inequality in several developed and less-developed economies. Section 7.4 provides an overview of the link between globalization in a longer time perspective. Sections 7.5, 7.6 and 7.7 examine the link between inequality and merchandise trade, trade in intermediate goods/outsourcing and trade in services, respectively. Section 7.8 concludes.

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7.2 Discussion of common measures of inequality

This section briefly discusses several common measures of inequality and measurement issues associated with them. The discussion draws heavily on a substantially longer discussion of these issues in Goldberg and Pavcnik (2007) and Atkinson et al. (2011).

The top share of income inequality measures provide information on the share of a country's total income held by individuals positioned at the top of a country's income distribution. For example, the measure commonly referred to as the "top 1 per cent of income" captures the share of total income held by individuals positioned in the top 1 per cent of a country's income distribution. This measure of inequality has recently received substantial attention in the academic and policy circles in response to studies by Atkinson et al. (2011). These studies constructed the top share of income inequality series for about 22 countries at annual frequencies over long time horizons.

The computation of top income share usually relies on historic tax records. Published tax records tabulate information for several income brackets, and for each income bracket report the number of taxpayers, their total income and tax liability. The researchers combine this information with the information on a country's total population, total personal income, some assumptions on taxpayer filing behaviour and the underlying shape of income distribution to compute the top 1 per cent inequality measure (see Atkinson et al., 2011 for details).

A key appeal of the top 1 per cent inequality measures is that they can be computed for a relatively large set of countries at annual intervals over long time horizons. For example, the series has been constructed dating back to 1910 in the United States and 1922 in India. This enables one to evaluate the more recent changes in inequality and the debate on globalization and inequality in a broader perspective. Furthermore, tax records identify information on labour and capital income separately so that the definition of income is more all-encompassing than the usual definition of income from surveys (which often focus on wage income). Consequently, changes in inequality can be directly linked to the underlying changes in capital and labour income. The main shortcoming of "top group" income inequality measures is that they cover only a small share of the population, remaining silent about the inequality in the rest of income distribution. This is due to data limitations. Tax records, especially prior to the Second World War, cover only a small share of population, so these data are best suited to compute the share of total income held by individuals in the top 1 per cent (and in some cases up to the top 10 per cent) of income distribution.² Another shortcoming is that to the extent that these measures are commonly computed from tax records, they only capture income that is subject to the

tax (as opposed to total income) and tax evasion and avoidance might lead to discrepancies between the reported and actual taxable income. Furthermore, the computation of inequality measures requires some strong (but unavoidable) assumptions on tax filing, underlying income distribution and additional data (such as total population and total personal income) that are themselves subject to measurement issues.³ Finally, changes in tax laws, the ability of authorities to collect taxes and other aspects of taxation might change over time, giving rise to well-known problems of comparability of inequality measures over time.

Several measures of income inequality (such as the standard deviation of log income and Gini coefficient) capture inequality through a function of second order moments of entire income distribution. These measures are often computed using income information from micro-survey data, such as labour surveys or household surveys. These data usually collect information on individual (or household) income, as well as individual (or household) demographic characteristics and employment. Survey data are often nationally representative, so that one can construct inequality measures representative of the entire population of a country. Another advantage of these measures is that the underlying data include information on the demographic and job characteristics of individuals, such as education level, industry of employment and occupation. One can thus compute measures of inequality across these categories, to analyse the mechanisms through which globalization affects inequality. In fact, most of the literature on globalization and inequality to date, reviewed in sections 7.5–7.7, employs survey data.⁴

There are several shortcomings in the above-mentioned inequality measures. First, because of data unavailability, survey-based income inequality measures have only been more readily available for a large set of countries since the 1970s, and often cannot be computed on an annual basis. These data constraints are particularly binding in developing countries. Consequently, survey-based inequality measures are not well suited to studying inequality over long periods of time. However, the timing of several surveys spans recent large-scale liberalizations in developing countries, so these surveys can be used to study the relationship between trade and inequality since the 1980s. Second, surveys mainly collect information on labour income, but do not contain much information on government transfers, business income and capital income. As a result, most of the studies focus on wage inequality rather than a broader measure of overall inequality. Third, inequality measures based on surveys are subject to several measurement issues due to survey design, summarized in detail by Goldberg and Pavcnik (2007). For example, surveys often change the questionnaires and top coding cut-offs, and suffer from non-response and top coding of high incomes, which particularly affects the inference about the top tail of income distribution. These measurement issues complicate the comparison of inequality over time.

Much of the globalization and inequality literature has focused on measures of inequality that capture earnings inequality between individuals across educational categories, industry categories, occupational categories and, more recently, across firms. While these wage inequality measures are admittedly narrower in scope, they focus directly on channels highlighted in the theoretical models of trade and earnings, and are informative about the mechanisms through which globalization might affect overall inequality. These inequality measures are usually computed from labour force surveys, firm-level data, or matched employee–employer data. The relative wage of educated workers (relative to less educated workers), the so-called skill premium, is the most commonly used measure, in part because it was the observed growth in skill premiums since the 1980s that motivated the interest in the link between globalization and inequality. However, the research has also emphasized the inequality of earnings within categories of workers, usually categorized by education level, the so-called residual inequality. The residual wage inequality could be in part determined by workers' affiliation with a particular industry, occupation or firm, and thus represents another venue through which trade could affect inequality. Because these measures are usually computed from survey data they are subject to the above-mentioned caveats of measuring inequality from surveys.

7.3 Evidence on the evolution of within-country inequality

Having discussed the merits of different inequality measures, this section reviews the evidence on the evolution of within-country inequality. I begin with a discussion of the evolution of the top 1 per cent income inequality to put the inequality increases associated with the recent debate on globalization and inequality since the 1980s into a longer time perspective. I next discuss evolution on within-country inequality since 1970s using several inequality indicators. The evolution of inequality is considered for countries at different income and countries in several geographic areas.

Evolution of the share of the top 1 per cent

Recent studies by Atkinson et al. (2011) have generated a rich database on the evolution of the top 1 per cent of income for 22 countries from 1910 to 2000. These countries cover a wide geographic area and include developed and developing countries. Atkinson et al. (2011) highlight several key patterns in the share of the top 1 per cent during the twentieth and early twenty-first centuries.

First, almost all countries experienced a sharp decline in the top 1 per cent share after the first part of the twentieth century. For example, the share of income held by

the top 1 per cent in the United States fell from almost 20 per cent in the late 1920s to about 10 per cent in the 1940s. While the timing of drops varied somewhat across countries, by 1949 the share of the top 1 per cent of income was comparable to the pre-Second World War levels in only three countries.⁵ Second, countries experienced diverging inequality developments in the second part of the twentieth century. While most developed countries observed further declines or stagnation in the share of the top 1 per cent during the 1950s, 1960s and 1970s, the countries varied in the evolution of the share of the top 1 per cent subsequent to the 1980s. The first group, comprised of English-speaking countries (Australia, Canada, Ireland, New Zealand, the United Kingdom and the United States) observed a dramatic increase in the share of the top 1 per cent after the 1980s. The second group includes northern and southern European countries (Finland, Italy, Norway, Spain, Sweden and Portugal) that also experienced an increase in inequality that started in the 1980s, but this increase was more gradual, smaller and accelerated during the 2000s. The third group of countries (France, Germany, Japan, the Netherlands and Switzerland) observed no increases in the share of the top 1 per cent in the second part of the twentieth century, and in some cases inequality declined (the Netherlands). Interestingly, France and Japan, the two countries that have information for the first decade of the twenty-first century, appear to have observed increases in the share of the top 1 per cent since 2000. The increases in the share of the top 1 per cent since the 1980s in these countries seem in large part to reflect increases in the labour income among the top 1 per cent.

The above discussion has focused on developed economies. The analysis of within-country inequality evolution in less-developed countries by Atkinson et al. (2011) is limited by data availability. The longer time series of the share of the top 1 per cent are available for five developing countries: Argentina, China, India, Indonesia and Singapore. Only India, Indonesia and Argentina have sufficient data to compute the share of the top 1 per cent that cover large segments of both halves of the twentieth century, while Singapore's series starts in 1947 and China's in 1984. Moreover, the series for Indonesia and Argentina include long gaps between 1939 and 1981 and between 1973 and 1997, respectively.

Despite these data challenges, several interesting patterns emerge. First, as Atkinson et al. (2011) note, like developed countries, less-developed countries with long time series (Argentina and India) observed a decline in the share of the top 1 per cent after the first part of the twentieth century. The decline in India occurred during the Second World War, while Argentina's inequality declined during the late 1940s and 1950s. Argentina actually experienced an increase in inequality during the world wars because of its role as the main exporter of food to countries involved in war. After the Second World War, Argentina and India both experienced declines in the share of the top 1 per cent that appear more pronounced than the declines in

the top shares of developed countries. Singapore, on the other hand, observed a fairly stable share of the top 1 per cent subsequent to the Second World War. Finally, like Anglo-Saxon countries and northern and southern European countries, all developing countries in the sample experienced an increase in the share of the top 1 per cent starting in the 1980s (China, India, Indonesia) or the 1990s (Argentina, Singapore).⁶ These increases in the top 1 per cent share continued through the 2000s, with the exception of Indonesia, where the share of income controlled by the top 1 per cent declined.

The above evidence suggests that since the 1980s, the richest 1 per cent of the population accounted for an increasing share of the national income of many developed and developing countries, although the extent of this rise and the exact timing varies across countries. Interestingly, despite the rise in the inequality as measured by the top 1 per cent share since the 1980s, all developed and developing countries with sufficiently long inequality series faced higher inequality prior to the Second World War than during most of the post-war period, including the period of the recent rise in the top 1 per cent share.

Evolution of other inequality measures

Most of the literature on income inequality and trade has focused on wage differences across workers with different levels of education. The survey data needed to compute these measures was not widely available prior to the 1970s. Consequently, for most countries, one cannot examine the recent changes in inequality across education groups in a longer historical context. Nonetheless, the evidence suggests that the wage gap between the more- and less-educated workers has increased in a large set of developed and developing countries since the 1980s. For example, in the United States, the returns to education declined during the 1970s, and then rapidly increased in the 1980s. The returns continued to increase during the 1990s, but at a slower rate (Autor et al., 2008). The increase in the return to education since the 1980s also occurred in many other high-income countries, including Germany and the United Kingdom as well as Australia, Canada and Japan, although the increases in the returns to education in some of these countries were substantially smaller than in the United States (Autor and Katz, 1999 and Autor, 2010).

A large body of research has documented that these increases in skill premiums since the 1980s were not confined to developed countries. Goldberg and Pavcnik (2007) summarize the findings on the evolution of skill premiums in several less-developed economies: Argentina, Brazil, Chile, Colombia, Hong Kong (China), India and Mexico. The skill premium increased in these countries during the 1980s and 1990s, with the increase ranging from 10 per cent in India to 68 per cent in Mexico.

Han et al. (2010) show that the skill premium also increased in China from 1988 to 2005. Interestingly, the exact timing of the increases in the wage gap between educated and less-educated workers differs somewhat across less-developed countries. The increases in skill premiums often coincide with the timing of implementation of trade reforms in these countries.

An alternative measure of wage differences between educated and less-educated workers is the ratio of average wage of non-production to production workers. This ratio has also increased since the 1980s in developed and developing countries (Autor and Katz, 1999; Goldberg and Pavcnik, 2007). The use of this measure to capture differences in earnings by education relies on the assumption that non-production workers tend to be relatively more educated and skilled than production workers. In countries, where both measures are available, the ratio of non-production to production wages in general displays similar evolution over time as the skill premium (see, for example, Berman et al., 1998).

Most research has focused on the wage inequality between education groups. However, these measures abstract from changes in wage inequality among workers within education categories. Recent research by Autor et al. (2008) for the United States shows that during the 1990s, the wage inequality continued to increase in the upper half of the wage distribution, while the wage gap between individuals in the bottom and middle part of the distribution narrowed. These findings are difficult to reconcile by only focusing on the relative wage gap between education groups and with increasing returns to education over time. Recent research suggests that part of the recent increase in wage inequality is due to increased inequality of earnings of individuals within educational groups, the so-called residual wage inequality. Increases in within-group inequality during the 1980s and 1990s have been documented in the United States (see Autor et al., 2008) and in developing countries such as Colombia (Attanasio et al., 2004). However, the details of the exact timing of these increases in the United States continue to be debated (see Lemieux, 2006; Autor et al., 2008). The residual wage inequality might be an important channel through which international trade affects inequality. In particular, international trade could influence this component of wage inequality through its differential effects on workers in different industries, occupations, and firms. The evidence on these channels will be discussed in sections 7.5–7.7.

7.4 The effect of globalization on inequality: An overview

The above discussion suggests that inequality has increased in several dimensions since the 1980s in developed and developing countries. A large body of literature has examined the role that globalization, and international trade more specifically,

played in influencing these trends. Before discussing the findings of this literature in detail, it is useful to examine briefly the role of globalization in the evolution of income inequality over longer time periods and in a broader perspective. The top 1 per cent share inequality series are well suited for analysis of inequality over long time horizons. For some countries, these series contain sufficient information to examine whether the observed changes in inequality are driven by changes in wage earnings or capital income.⁷ Atkinson et al. (2011) discuss how the evolution of the top 1 per cent share in various countries since the 1920s was shaped by political changes, wars, macroeconomic and financial crises, global factors and taxation.

According to Atkinson et al. (2011), the drop in inequality after the Second World War experienced in most countries can be attributed to a decline in the capital share of income induced by the Great Depression and the wars through physical destruction, hyperinflation and bankruptcy, among others. The drop in inequality is even more substantial for the top 1 per cent share because the incomes of this group are even more heavily concentrated in capital sources. Interestingly, the share of the top 4 per cent or top 9 per cent does not decline as much because these groups rely more heavily on labour income, which was not substantially affected by the above shocks. Subsequent to the Second World War, the inequality did not rebound. The authors attribute this stagnation in inequality to the introduction of progressive taxation and the estate taxes, which precluded the recovery of the capital income in several developed countries.

The underlying reason for the differences in increase in the top 1 per cent share across countries since the 1980s continues to be a topic of academic debate (see Atkinson et al., 2011). The authors conjecture that the divergent experiences in the evolution of the top 1 per cent share in the second part of the twentieth century could be explained potentially by the differences in progressive taxation, labour market institutions and executive compensation across countries. For example, the recent increase in the top 1 per cent share in the English-speaking countries is driven by the growth in wage income among those at the top of income distribution, which the studies link to increases in the earnings of top executives and superstars. Some argue that the more progressive taxation system in countries such as France and the Netherlands, relative to the United States, explains the lack of increase in the top 1 per cent share in these countries in comparison to the United States since the 1980s. However, factors such as differences in labour market regulation and social norms about earnings inequality across countries might also play a role. These issues will probably be subject to further research.

The literature highlights the possible role of globalization in the evolution of the top incomes in several dimensions. Some of the changes in the top 1 per cent share in several developing countries are attributed to changes in commodity prices in global

markets. For example, Argentina observed an increase in the top 1 per cent share during the world wars due to an increased demand for its food exports, driven by the wars. Globalization could also play a role in explaining the recent increase in the top 1 per cent share through wage income in English-speaking countries such as the United States. One possible explanation for the increase is that technological change and globalization created a global market for top executive talent and superstars (Atkinson et al., 2011), which increased the global demand and earnings for the most talented individuals. While these explanations are consistent with the observed evolution of the top 1 per cent share, future research is needed to examine these conjectures in further detail and assess the relative role of globalization.

Substantially more research has examined the role of globalization for the more recent changes in inequality since the 1980s. The subsequent sections of the chapter examine the existing evidence on whether the increased international trade contributed toward the observed increases in inequality in developed and developing countries since the 1980s. Because other chapters in this book focus on the employment effect of globalization, the discussion in this chapter focuses strictly on the effect of trade on wage inequality through the wage channel. The discussion abstracts from changes in inequality that occur if workers lose jobs in response to trade shocks and experience transitional unemployment.⁸ The rest of the chapter focuses on the relationship between trade and wage inequality since the 1980s, by examining the role of merchandise trade (section 7.5), outsourcing (section 7.6) and trade in services (section 7.7).

7.5 Merchandise trade

Skill premiums and Stolper–Samuelson effects

Most of the earlier literature on the effects of trade on wage inequality focused on the channels emphasized in the workhorse model of trade, the Heckscher–Ohlin model. This model illustrates trade in final goods between countries that differ in their relative factor endowments such as the relative endowments of educated and less-educated workers. A simple version of this model with two countries, two goods and two factors of production suggests that countries well endowed with educated labour should specialize in production of goods that use educated labour relatively more intensively, while countries well endowed with less-educated labour would in return specialize in and export goods whose production requires relatively less-educated labour. Such trade will increase the relative demand for educated labour and thus increase the wage gap between educated and less-educated labour in countries abundant with relatively educated labour (such as the United States). On the other hand, the relative demand for less-skilled labour in countries abundant in

unskilled labour will fall, thus reducing the wage inequality between educated and less-educated workers there.

The growth in wage inequality between educated and less-educated in countries such as the United States during the 1980s and 1990s coincided with trade reforms implemented in many less-developed economies. These reforms, in turn, led to increased trade between poor and rich countries. However, the mechanisms highlighted above most likely do not account for much of the observed increase in inequality since the 1980s. A large body of research on this topic finds little support that international trade in final goods driven by relative factor endowment differences can account for much of the observed increase in skill premiums in developed and developing countries. This evidence is discussed in detail in several studies (Lawrence and Slaughter, 1993; Berman et al., 1998; Autor and Katz, 1999; Harrison and Hanson, 1999; Wood, 1999; Goldberg and Pavcnik, 2007), so this section summarizes the main arguments only briefly.

First, the Stolper–Samuelson mechanism suggests that increased relative demand for skilled labour in countries abundant in skilled labour occurs as a result of shifts in the relative demand for skilled labour across industries. Labour-intensive industries using skilled labour expand and those using unskilled labour contract, with all industries employing an increasing share of less-skilled labour. However, the employment shifts across industries have not been sufficiently large to account for the large increase in wage inequality. Most of the observed increase in demand for educated labour in countries such as the United States is driven by increased relative demand for skilled labour within industries. For example, the wage and employment share of skilled workers increased in virtually all industries during the 1980s and 1990s in the United States, including the non-traded sectors (Lawrence and Slaughter, 1993; Autor and Katz, 1999), which is at odds with the Hecksher–Ohlin mechanism. Berman et al. (1998) find evidence for a within-industry shift in the relative demand for skilled workers for several OECD countries.⁹

In addition, studies have documented that, contrary to the predictions of the simple Hecksher–Ohlin model, many developing countries that liberalized their trade during the 1980s and 1990s also observed an increase, rather than a decrease, in wage inequality between education groups (Robbins, 1996; Harrison and Hanson, 1999; Wood, 1999; Goldberg and Pavcnik, 2007).¹⁰ Some developing countries such as Colombia and Mexico tended to protect industries employing unskilled labour intensively, so tariff-induced price declines would be expected to be largest in those sectors. As a result, the observed increase in wage inequality was in principle consistent with the Stolper–Samuelson mechanism (Hanson and Harrison, 1999; Goldberg and Pavcnik, 2007). However, as in the developed economies, the increased relative demand for skilled labour in many developing countries was

predominantly driven by increase in the relative demand for skilled labour within industries rather than across industries. The wage-bill share or employment share of skilled workers increased in most traded and non-traded industries during this period in the countries studied (Goldberg and Pavcnik, 2007).

Krugman (2008) has recently suggested that international trade accounts for a larger share of the growth in wage inequality in the United States in the 1990s and 2000s because of the rapid increase in the share of imports coming from low-wage countries such as China and India during this period. This view is not shared by researchers such as Irwin (2008) and Katz (2008), who use the evidence above as well as evidence on the polarization of the US labour force from Autor et al. (2008) and Autor (2010) to counteract Krugman's argument in their comments to Krugman (2008). Michaels et al. (2010) examine whether information and communication technologies (ICT) can account for this polarization of labour markets in many Organisation for Economic Co-operation and Development (OECD) countries, where the demand for middle-skilled workers is declining relative to the demand for high- and low-skilled workers. Using data from 1980 to 2004, Michaels et al. (2010) find evidence that industries that increase their use of ICT observe greater increases in demand for high-skilled workers and a greater relative fall in demand for workers with a middle level of skills. Interestingly, trade (as measured by imports and exports as a share of total industry output) also plays a role, but the effect of trade is not robust to controls for differences in research and development (R&D) intensity across industries. The study concludes that ICT can account for a quarter of the increase in the relative demand for college-educated workers between 1980 and 2004 in these countries.

The lack of evidence for wage inequality increases induced by Hecksher–Ohlin type mechanisms is often viewed as a confirmation of skill-biased technological change (SBTC) as the main driver of growing wage inequality (Berman et al., 1998; Autor and Katz, 1999). While many labour and trade economists now agree that SBTC plays a dominant role in accounting for trends in wage inequality in developed and developing countries during the 1980s and 1990s, recent research has uncovered evidence on channels other than the Stolper–Samuelson mechanism through which trade could have contributed toward wage inequality. In particular, the recent literature on trade with heterogeneous firms suggests that trade could contribute toward wage inequality via residual wage inequality, by influencing differences in wages paid to workers across heterogeneous firms. Moreover, the growing skill premium in developed and developing countries could be driven by increases in offshore outsourcing. I discuss the literature on trade and residual wage inequality in the next section. The literature on wage inequality and offshore outsourcing is discussed in section 7.6.

Residual wage inequality

The discussion in the subsection “Evolution of other inequality measures” of section 7.3 suggests that recent increases in wage inequality are also in part driven by increased inequality in wages between people with the same observable characteristics, the so-called residual wage inequality. This subsection reviews the empirical evidence on the channels through which trade could influence this component of wage inequality, namely differences in worker wages across industries and firms.

Industry wage premiums

International trade could influence residual wage inequality through its effect on industry wage premiums. Industry wage premiums are the part of workers’ earnings that cannot be explained by worker demographic characteristics (such as education, age, gender, and so on), but can be attributable to workers’ industry affiliation. These industry-specific wage differences for observationally equivalent workers could reflect industry-specific human capital, industry-specific rents, efficiency wages or compensating differentials.

Goldberg and Pavcnik (2007) provide a detailed discussion of the channels through which international trade could influence industry wage premiums, which I briefly summarize below. In the models where labour mobility is limited across industries such as the Ricardo Viner model, declines in industry-specific tariffs would lead to proportional declines in relative earnings in industries with larger declines in tariffs. There is a large body of evidence that labour mobility is limited across industries and regions several years subsequent to trade reforms in developing countries, so this is potentially an important channel. To the extent that industry wage premiums reflect rents that profitable firms in industries with imperfect competition share with the workforce, the elimination of trade barriers could reduce industry wages through increases in product-market competition. The above-mentioned channels both suggest proportional declines in wage premiums with greater declines in industry protection. In a setting where wages are an outcome of union bargaining, higher tariffs might be associated with lower wages if unions prefer employment protection and stability (achieved through higher protection) to higher wages. A fourth channel through which trade could influence industry wage premiums is labour productivity. The literature on trade and productivity has found relative productivity improvements in firms in industries that face larger tariff reductions (see Tybout, 2003 and Syverson, 2010 for a survey). Firms in liberalized industries pass some of these productivity improvements on to workers in the form of higher wages. In this case, declines in industry tariffs would be associated with increases in wage premiums.

In summary, tariff reductions could either increase or decrease industry wage premiums, depending on the underlying channels at work. The empirical evidence on

the effect of trade liberalization on industry wage premiums in fact finds that declines in trade barriers or increased import competition are associated with declines in industry wage premiums (Abowd and Lemieux, 1993 for Canada; Goldberg and Pavcnik, 2005 for Colombia; Feliciano, 2001 for Mexico), increases in industry wage premiums (Kumar and Mishra, 2007 for urban India; Goh and Javorcik, 2007 for Poland; Gaston and Trefler, 1994 for the United States;) or no effects on wage premiums (Pavcnik et al., 2004 for Brazil).

To the extent that trade influences industry wage premiums, this might either increase or decrease wage inequality, depending on the structure of industry wages prior to trade reforms and the effect of trade on industry wages. For example, in the case of Colombia, tariff declines were associated with declines in industry wage premiums and industries with the lowest industry premiums initially in manufacturing observed the largest tariff cuts. Thus trade could have increased wage inequality through this channel. However, as Goldberg and Pavcnik (2007) suggest, the magnitude of the effect was relatively small (the average decline in tariffs of 37 per cent led to a 4 per cent decline in industry wage) and, given that industry wage premiums account for about 2 per cent of variation in log wages (conditional on observable worker characteristics), was unlikely to be of first order importance.

Wage inequality and heterogeneous firms

Recent literature has documented large heterogeneity in various performance measures across firms within narrowly defined industries in developed and developing countries (see, for example Roberts and Tybout, 1996; Tybout, 2003) and this firm heterogeneity has important consequences for the participation of firms in international markets. For example, in the presence of fixed costs of exporting, the initially more-productive firms select to become exporters and expand, in response to increased export market profitability, while less-productive firms contract (Melitz, 2003). In addition, more-productive firms also upgrade product quality and production technology in response to new export opportunities (Verhoogen, 2008; Bustos, 2011).

Firm heterogeneity potentially has important implications for understanding how trade influences wage inequality. The earliest studies on this topic focus on the importance of firm heterogeneity in explaining the increase in skill premiums. If production for the export market is relatively more skilled-labour intensive than production for the domestic market, increased access to export markets will increase the relative demand for skilled labour and could contribute toward the economy-wide increase in skill premiums. Bernard and Jensen (1997), show that exporting firms tend to be more skilled-labour intensive than non-exporters and this finding has been subsequently confirmed in many other developed and developing countries (see, for example, Hanson and Harrison, 1999 for Mexico). Bernard and Jensen (1997)

further show that much of the increase in within-industry demand for skilled labour is driven by employment shifts across firms, toward exporting firms.

Subsequent studies have examined how heterogeneous firms within industries affect the relationship between international trade and wage inequality. In these models, workers' wages depend in part on firm productivity or profitability. For example, workers' wages reflect firms' underlying productivity or profitability through fair wages (Amiti and Davis, 2008) or through efficiency wages (as in Verhoogen, 2008). Declines in trade costs affect firms' incentive to engage in international trade and their profitability, and thus have the potential to influence wage inequality between workers across firms.

For example, a study by Verhoogen (2008) proposes a new channel to explain why trade would increase wage inequality in developing countries: product quality upgrading. The idea is that firms from developing countries need to produce higher quality products for the export markets than for the domestic markets to appeal to consumers in rich countries. When firms within an industry are heterogeneous and face a fixed cost of exporting, only the most productive firms enter the export market and subsequently upgrade the quality of their products. This, in turn, increases the wages of workers in more-productive firms relative to the wages of those employed in less-productive establishments, leading to growing inequality. Verhoogen (2008) confirms the predictions of this model with firm-level panel data from Mexico. Normally, exporting and wage determination are highly correlated, and nearly impossible to disentangle in a statistical sense. However, by noting that initially more-productive firms were differentially more likely to export in response to Mexico's unanticipated exchange rate shock in 1994, Verhoogen (2008) is able to identify the impact of exporting on wages. The results show that inherently more-productive firms were more likely to respond to the exchange rate shock by upgrading the quality of their products (as measured by an international quality standard (ISO 9000)). The results support the hypothesis that increased export market access led to growing wage inequality in Mexico, increasing the relative wages of workers (and especially white-collar workers) in initially more-productive plants relative to the wages of workers in firms with low productivity. Related studies by Bustos (2007, 2011) find that increased export market access induces Argentine firms to upgrade technology, leading to increased demand for relatively skilled labour within firms.

While many studies have documented that exporters pay higher wages than non-exporting firms within narrowly defined industries, the sources of export wage premiums are debated. Do exporting firms pay higher wages because they employ better workers or do higher wages reflect a firm-specific component? Frias et al. (2009) use matched employee–employer data from Mexico to show that only about one-third of the exporter wage premiums can be attributed to worker characteristics,

while the rest are due to plant-specific effects. More importantly, they show that the observed increases in wages in exporting firms relative to non-traded firms after increased export opportunities are not driven by the employment of better workers by exporting firms. Other studies that examine empirically the link between trade and wages with heterogeneous firms also find that declines in trade barriers are associated with average wage increases in exporting firms. Krishna et al. (2010), for example, use matched employee–employer data from Brazil and show that increases in wages in exporting firms relative to non-traded firms subsequent to trade reform are not predominately driven by the matching of better workers to exporting firms. Instead, exporting firms tend to pay otherwise identical workers a premium to exert more effort or perform higher quality work in response to declines in trade costs. Amiti and Davis (2008) also find increases in the average wages of workers in exporting firms in Indonesia during their trade liberalization in the 1990s.

In summary, the recent literature suggests that the heterogeneity of earnings across firms might be an important component through which trade influences worker wages. The above evidence suggests that trade in industries with heterogeneous firms could contribute toward increases in wage inequality not only through an increase in skill premiums, but also through an increase in residual wage inequality. If initially more-productive firms (or exporters) are paying higher wages to workers prior to trade shocks, the increases in wage disparities across heterogeneous firms induced by the trade shocks lead to further increases in the residual wage inequality. While the existing empirical studies suggest that trade does in fact influence residual wage inequality, future work needs to determine how much this channel contributes to the observed aggregate wage inequality.

7.6 Trade in intermediate inputs: Outsourcing

A growing share of trade occurs in intermediate goods and firms increasingly engage in “global production sharing”. In the mid 2000s, for example, trade in intermediate goods accounted for two-thirds of world trade (Noguera and Johnson, 2010). Trade in intermediate goods and global production sharing can affect the wage inequality through its influence on the wage gap between the skilled and unskilled workers, and through its differential effects on wages of workers in different industries, occupations and firms. In this section, we examine the empirical evidence on these channels.

Skill premium

Several models suggest that the expansion of “global production sharing” could in principle account for part of the growing wage gap between skilled and unskilled

workers in both developed and developing countries. Feenstra and Hanson (1996, 1997) consider a setting where countries differ in the relative endowments of unskilled labour (and thus the relative wages of unskilled to skilled workers) and where the production of a final good can be split into production stages that vary in their relative use of unskilled and skilled labour. When transportation and trade costs are reduced, cost-minimizing firms from developed countries find it profitable to relocate unskilled-labour-intensive parts of production to countries abundant in unskilled labour and keep skilled-labour-intensive stages of production in developed countries (which tend to be more abundant in skilled labour). This reallocation in production across countries increases the skill intensity of production and thus the relative demand for skilled labour in both developed and developing countries. This model predicts a trade-related increase in demand for skilled labour that operates within (as opposed to between) industries and can account for the simultaneous increase in the skill premium in the developed and developing countries during the 1980s and 1990s.

Several empirical studies find evidence consistent with this model in developed and developing countries. Hsieh and Woo (2005) show that the demand for educated labour and skill premiums increased in Hong Kong (China) after firms reallocated unskilled-labour-intensive production from Hong Kong (China) to mainland China after China's liberalization of foreign activities in the early 1980s. Similarly, Feenstra and Hanson (1997) show that outsourcing (here measured through the foreign direct investment (FDI) activity) affects the skill premium in Mexico, where foreign-owned plants often assemble inputs into final goods.

One implication of the above-mentioned model is that firms in developed countries such as the United States will rely more heavily on the imported inputs in production. Feenstra and Hanson (1999) measure outsourcing with the share of imported inputs in total inputs used in a given industry. They show that industries that experienced a greater increase in outsourcing observed a greater increase in the wage gap between skilled and unskilled workers during the 1980s. Increased reliance on outsourcing in production can account for 15–24 per cent of the increase in wage inequality in the United States during this period. However, Sitchinava (2007), who extends the Feenstra and Hanson (1999) analysis to the 1990s and early 2000s, finds that the outsourcing measures used by Feenstra and Hanson (1999) are less successful in explain the wage inequality in the United States during the 1990s and early 2000s. This is perhaps not surprising given that the trends in US wage inequality have changed since the 1990s. Autor et al. (2008) show that wage inequality continued to grow during the 1990s and 2000s in the upper half of the wage distribution in the United States, but stagnated in the bottom half. They attribute this polarization of the labour market to SBTC, where technology is a substitute for middle-skilled jobs, complement for high-skilled jobs and does not

affect low-skilled jobs. Feenstra (2008) suggests that the polarization of the labour force during the 1990s and 2000s could also be explained by the growing importance of service outsourcing, where middle-skilled routine tasks are increasingly outsourced to low-wage countries such as India.

Other wage channels

More recent empirical work has examined how outsourcing affects wage inequality through channels other than the skill premium. These studies differ from the above-mentioned work by relying on individual worker surveys and examining how offshore outsourcing affects individual workers' wages through changes in wages associated with the switch from manufacturing to non-manufacturing jobs, industry-specific wage premiums, or occupation-specific wages. The focus on these dimensions of earnings heterogeneity is potentially important given that offshorability of occupations/tasks/parts of production might not just be related to the skill intensity of occupations/tasks/parts of production, as Blinder (2009) has shown.

Ebenstein et al. (2009) use information from the Current Populations Surveys from 1981 to 2006 to examine the effect of offshoring on wages in the United States. They first show that US multinationals lowered their employment in the United States from 12 to 7 million between 1982 and 2002. During this same period, US multinationals nearly doubled their employment in affiliates located in low-wage countries, while the employment in affiliates in high-income countries remained relatively constant. The authors then examine how the shift of jobs abroad affects wages in the United States. They measure offshoring with the number of workers employed abroad by US multinationals. They focus on industry- and occupation-specific exposure to offshoring.

Several interesting results emerge. How offshoring affects wages depends on the location of offshoring activities. There is no relationship between wages and industry-specific exposure to offshoring to low-wage countries. However, offshoring to high-wage countries is associated with increases in wages, and these effects appear to be driven by workers that perform non-routine tasks. The lack of relationship between the industry–wage differential and offshoring could in principle be explained if workers can relatively easily switch industry affiliation. The authors also show that switching from manufacturing to services or agriculture is associated with large wages losses (3 and 6 per cent, respectively), although these results could be driven by selection and are not linked directly to offshoring activities.

Because workers might have more difficulty switching occupation, the authors also examine how offshoring affects workers' wages through occupation-specific exposure. Occupations vary greatly in their exposure to offshoring, ranging from no

exposure in occupations such as teachers to high increases in exposure in categories such as shoe machine operators that observed an increase in occupation-specific offshoring. Workers in occupations that observe an increase in offshoring to low-wage countries observe a decline in earnings, while workers in occupations that observe an increase in offshoring to high-wage countries experience gains in earnings. The declines in earnings associated with low-wage offshoring occur at all levels of education and are particularly pronounced for older workers. Interestingly, the authors find no relationship between offshoring and wages during the 1980s, a period when fragmentation of production was perhaps less prevalent. However, the offshoring to low-wage countries has a negative effect on wages in the United States in the 1990s and early 2000s. From 1997 to 2002, a 10 per cent increase in employment in low-income locations was associated with a 1.1 per cent decline in domestic wages, while a 10 per cent increase in employment in high-income locations was associated with a 1.1 per cent increase in domestic wages. The authors show that during the 1990s the dispersion of occupation-specific wage premiums has narrowed. However, they do not directly map these developments to a broader measure of wage inequality.

The above-mentioned papers mainly focus on manufacturing trade and offshoring. The paper by Liu and Trefler (2008) is to my knowledge the only one that examines the effect of service offshore outsourcing on earnings for the case of the United States. Liu and Trefler examine the effect of service offshoring and inshoring to low-wage countries, namely China and India. Unlike the study by Ebenstein et al. (2009), Liu and Trefler (2008) define offshoring as imports of services from unaffiliated parties. Their measure of service offshoring relies on data from the Bureau of Economic Analysis on imports of "Other private services", which include categories such as "Other business, professional and technical services", and encompass many of the services such as software engineering. The authors relate this data to industry and occupation codes to examine how a worker's exposure to offshoring at an industry or occupation level affected their earnings from 1996 to 2005.

The authors find very small effects on wages. Service offshoring is associated with small declines in wages, while service inshoring is associated with an increase in wages, with a net positive effect. The authors conclude that: "suppose that over the next nine years all of insuring and offshore outsourcing grew at rates experienced during 1996–2005 in business, professional, and technical services, i.e. segments where China and India have been particularly strong. Then workers in occupations that are exposed to inshoring and offshore outsourcing . . . would earn 1.5% more" (p. 1). These results suggest that service in- and offshoring to low-wage countries has so far not contributed much to the wage inequality in the United States.

Wages and offshoring at the firm level

Firms within narrowly defined industries differ in the extent to which they rely on imported inputs and offshoring in production. Several recent papers have examined the relationship between outsourcing/offshoring and wages at the firm level, using direct imports of inputs or materials as a measure of offshoring. This measure of outsourcing does not account directly for imported inputs purchased through a wholesaler. In addition, better performing, larger firms are not just more likely to engage in international trade, but also pay higher wages and in general tend to perform better along several dimensions (Tybout, 2003). It is thus important to ensure that the differences in wages across firms that directly import and those that do not are not simply driven by some other dimensions of firm heterogeneity.

A key advantage of this firm-level approach is that it can capture the effects of offshoring on wage inequality across workers that work in different firms within an industry. Given that heterogeneous firms differ in their responses to trade shocks within industries, this source of inequality might be important. Two recent studies have relied on changes in import costs to identify these effects. Amiti and Davis (2008) find that increased imports of intermediate inputs are associated with increases in average firm wages in Indonesia during the 1990s. Hummels et al. (2010) use matched employee–employer data from Denmark from 1995 to 2006 and confirm this finding. Their detailed analysis shows that the effects differ by worker education. The wages of college-educated workers increased, and the wages of the less-educated workforce declined in firms that increased their use of imported inputs. They also find that workers displaced by outsourcing experience bigger wage losses upon being rehired than workers that lost a job for other reasons, and these effects are particularly profound for less-educated workers. While some of these effects could in part be driven by selection issues, the results point to a potentially important within-industry source of wage inequality.

7.7 Trade in services

During the last two decades, many non-traded services have increasingly become traded. In the United States, service exports have grown from 1 per cent of GDP in 1970 to 2.9 per cent of GDP in 2003 (Irwin, 2009). Service imports accounted for 2.4 per cent of GDP by 2003 (ibid.). Likewise, trade in intermediate inputs has been traditionally associated with manufacturing sectors, but has more recently also encompassed trade in services. The increased growth in service trade has received much attention in the popular press because it was in part driven by the growth in imports of business, professional and technical services, typically associated with white-collar jobs in the United States. As trade in these services increased, many

worried about the future prospects of employment in the United States in these sectors.

To date, there is to my knowledge little empirical evidence on how trade in services affected wages and wage inequality. One problem is that trade in services is inherently difficult to measure (Jensen, 2009), especially at the level of detail needed in the empirical work. Consequently, researchers have to overcome significant hurdles to address this question with the existing data. One study that examines the link between service trade and wages is that by Liu and Trefler (2008) on the consequences of service offshoring and inshoring to low-wage countries for the US labour market. As discussed in detail in the subsection “Other wage channels” of section 7.6, the study finds very small effects of offshoring/inshoring on wages in the United States and concludes that the hype about the effects of offshoring on labour markets is “much ado about nothing” (Liu and Trefler, 2008, p. 1). Given that service trade will probably continue to grow, the consequences of service trade for wage inequality will likely remain the topic of future research.

7.8 Conclusion

This chapter has examined the evolution of inequality within countries and discussed the role that international trade plays in the increases in wage inequality experienced in many developed and developing countries since the 1980s. Because this growth in inequality coincided with the period when many developing countries implemented significant trade liberalization, and developed economies started trading increasingly with low-wage countries, the increases in skill premiums were originally attributable to the Stolper–Samuelson type effects of international trade. The large subsequent literature has shown that the effects of trade on wage inequality are more nuanced and depend on the specific country in question, the nature of trade liberalization and/or the type of trade that countries engage in.

Most labour and trade economists agree that trade in final goods based on factor endowment differences cannot account for the increases in growing wage inequality since the 1980s. Instead, the consensus seems to have emerged that SBTC was the dominant driving force in the growth in inequality. However, several recent studies indicate a potential role for international trade in affecting wage inequality that operates through channels other than the Stolper–Samuelson type effects.

One potentially important channel is through trade in intermediate inputs and through outsourcing. An increasing share of trade occurs in intermediate goods and firms increasingly engage in “global production sharing”. In the mid 2000s, trade in intermediate inputs accounted for two-thirds of world trade. Several studies in

developed and developing countries have found that outsourcing is associated with increased skill premiums. More recent worker- and firm-level studies for the United States also emphasize the importance of outsourcing for occupational wage differentials, especially for workers operating more routine tasks since the 1990s. However, studies so far find very little evidence that such effects matter for service offshoring with low-wage countries.

Another potentially important channel includes the differential effects of trade on the wages of workers across heterogeneous firms within industries. Recent literature has documented large heterogeneity in various performance measures across firms within narrowly defined industries. In the presence of fixed costs of exporting, the initially more-productive firms select to become exporters and expand, in response to increased export market profitability, while less-productive firms contract. In addition, more-productive firms also upgrade product quality or production technology in response to new export opportunities. Both changes tend to raise demand for relatively skilled labour, as well as wage disparities across heterogeneous firms, leading to increases in residual wage inequality. Studies such as Bernard and Jensen (1997), Amiti and Davis (2008) and Verhoogen (2008) show that firms' engagement in international trade in part explains the observed increases in skill premiums, as well as wage differences across heterogeneous firms, which contribute toward increases in residual wage inequality.

How important are these new trade channels relative to SBTC in explaining the observed increases in wage inequality? Feenstra and Hanson (1999), for example, find that outsourcing accounts for up to 25 per cent of the increase in the relative wage of skilled workers in the United States during the 1980s, while SBTC accounts for 30 per cent. Attanasio et al. (2004) find that trade influences residual wage inequality through channels such as industry wage premiums, but that trade-induced changes in wages account for a small share of the increase in inequality observed in Colombia during the 1980s and 1990s. Michaels et al. (2010) find that information and communication technologies (ICT) account for one-quarter of the increase in the relative demand for college-educated workers between 1980 and 2004 in OECD countries. Interestingly, trade (as measured by imports and exports as a share of total industry output) also plays a role, but the effect of trade is not robust to controls for differences in R&D intensity across industries. However, the study does not consider the role of trade through channels such as outsourcing or firm heterogeneity. Overall, while the new trade channels clearly affect wage inequality, future research has to focus more on how much of the overall increase in inequality can trade in intermediate inputs/outsourcing and trade with heterogeneous firms explain, relative to factors such as SBTC. Similarly, the literature on SBTC needs to take into account the new channels highlighted by the trade literature when assessing the overall importance of SBTC for wage inequality.

The recent work on trade and wage inequality also provides further evidence that exposure to international trade, technology adoption and SBTC might be closely interlinked. Several earlier studies suggest that trade openness is potentially closely linked with SBTC (see Goldberg and Pavcnik, 2007). The more recent studies by Bustos (2007, 2011) and Verhoogen (2008) find that firms might upgrade technology and product quality in response to increased access to export markets. The mechanism highlighted in their papers provides an additional channel through which trade might influence firms' technology choices in developing countries and, thus, SBTC. Bloom et al. (2011) find that firms in developed countries respond to intensified competition from China by increasing innovation and introducing skill-biased technologies. These studies suggest that trade and SBTC might be closely linked, so that it might be difficult to identify separately their contribution to changes in wage inequality.

The current chapter has focused on only one aspect of globalization, namely international trade, and has not considered the potential role of international financial integration and immigration on wage inequality. To my knowledge, no existing study provides a unified framework to assess the relative importance of SBTC, international trade, international financial flows and immigration for wage inequality. However, a report published by the IMF (2007) uses cross-country analysis to examine the relative importance of international trade globalization, financial globalization and technology for within-country inequality as measured by the Gini coefficient.¹¹ The report finds that the largest contributor to wage inequality is technological progress. Interestingly, the study shows that trade has reduced inequality, while increased flows of capital across countries have increased it.

The IMF study finds FDI to be important in explaining the growing wage inequality within countries since the 1980s. These findings are related to a large literature that uses detailed firm- and worker-level panel datasets to examine how foreign multinationals affect the wages of workers in host countries. This literature, summarized by Harrison and Rodriguez-Clare (2009), suggests that foreign-owned firms tend to increase the demand for relatively skilled labour in host countries. Moreover, foreign-owned firms tend to pay a wage premium of about 5–10 per cent, once one accounts for differences in worker and firm characteristics between foreign and domestic firms. These differences in worker earnings across foreign and domestic firms might have contributed toward the growth in residual wage inequality in the host countries.

Finally, the topic of how labour market institutions affect the relationship between globalization and inequality is also outside the scope of this chapter. A survey by Freeman (2005) argues that the large literature on how labour market institutions affect inequality and other aggregate outcomes has so far not reached a consensus,

in part due to data constraints. The question of how globalization and labour market institutions interact to affect inequality is potentially even more difficult to answer, especially with cross-country data. Differences in labour market institutions, especially across countries, are difficult to quantify and might also reflect other country characteristics that influence globalization and inequality. Chapter 5 of this book overcomes some of these measurement challenges by focusing on the relationship between institutions, inequality and labour market insecurity in the OECD countries, where comparable data on labour market institutions and outcomes is more readily available. Others have examined the link between globalization, labour market institutions and inequality with micro surveys from within countries, where the issue of how to measure labour market institutions might also be less problematic.¹² These recent studies foresee that the topic of the link between globalization, labour market institutions and inequality will remain an active area of research.

Endnotes

1. Bourguignon and Morrison (2002) discuss between-country inequality.
2. To the extent that this group accounts for a large share of national income, this is nonetheless a very important statistic.
3. See Atkinson et al. (2011) for detailed discussion of each of these issues.
4. More recently, researchers have also relied on firm-level data (often confined to manufacturing sectors) and administrative data such as matched employee–employer data.
5. Argentina, Australia, India and Switzerland are exceptions. We discuss them further below.
6. Because of the lack of data, one cannot pinpoint the exact timing of the start of growing inequality in Argentina.
7. The authors note that the relative shares of wage and capital income from household tax records need not be identical to factor shares of labour in capital in gross national product (GNP) due to institutions such as pension funds, the government and corporations.
8. See the discussion in Goldberg and Pavcnik (2007) for how international trade affects transitional unemployment and the implication of this relationship for inequality.
9. Other pieces of evidence further suggest that international trade – via Hecksher–Ohlin mechanisms – probably did not play an important role. For example, Lawrence and Slaughter (1993) show that prices of relatively skilled-labour-intensive goods did not increase during the 1980s in the United States, which counters the logic of the simple version of the Stolper–Samuelson theorem.
10. The economy-wide skill premiums declined in several economies in Asia (such as the Republic of Korea and Chinese Taipei) subsequent to trade reforms (Wood, 1999). However, these economies observed an increase in the relative supply of educated labour during that same period.

This increase in the relative supply of educated workers (rather than international trade) could account for the declines in skill premium.

11. The authors measure trade with the sum of imports and exports as a share of GDP and the average tariff rate. Financial globalization is measured as the sum of total cross-border assets and liabilities over GDP. These include FDI, portfolio equity, debt, financial derivatives and total reserves minus gold.

12. For example, Topalova (2010) considers how India's trade liberalization in 1991 affects poverty across Indian states that differ in their labour market institutions. Although poverty during this period declined in India, Topalova (2010) finds that relative poverty increased with trade in Indian states with more pro-worker institutions in rural India. She finds no relationship between labour market institutions, trade and inequality.

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