Trade Liberalization and Inequality: Re-examining Theory and Empirical Evidence

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Abstract

This paper re-examines the theoretical and empirical evidence regarding the impact of trade liberalization on income inequality and attempts to identify areas for future research. Since the 1980s, there has been a rise in inequality in both the developed and developing world. This was also the time when many developing countries liberalised their trade regimes, which resulted in an increase in flow of goods and services, and capital and labour flows. Economists argue that trade based on factor proportions theory cannot account for the increasing wage inequality since the 1980s. Through this paper, the author has examined the theory as well as several recent studies that indicate a potential role of international trade in affecting wage inequality that operates through channels other than the Stolper–Samuelson type effects - New trade theory, residual wage inequality, industry wage premiums, skill biased technological change (SBTC), global product sharing and New new trade theories (heterogeneous firms). The main question is - how to isolate the effects of trade from other simultaneous changes in the economic environment that may have induced shifts in the relative demand and supply of skilled labour. Further research needs to be done on how important are these new channels relative to SBTC in explaining growing inequality in these countries. The study can be further extended to include not only the impact of international trade, but also the effect of financial globalization on inequality.

Keywords: *Trade Liberalization, Inequality, New Trade Theory, New New Trade Theories*

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Introduction

One of the resilient trends has been a rise in within-country inequality in a number of countries. This rise in inequality, whether measured in terms of income, wages or assets, has been observed in both the developed and developing worlds (Norris, Kochhar, Suphaphiphat, Ricka & Tsounta, 2015). One possible reason for this rising inequality is trade liberalization. Many developing countries initially chose a strategy of import substitution as a means of industrializing. Since the 1980s, many countries have moved towards global economic integration, and in particular, trade liberalization, as a development strategy. Trade between developed and developing countries has increased tremendously; because of the increasing integration, income distribution is also changing across countries. One of the viewpoints is that since then, many countries have experienced increase in inequality. On the other side, many studies also indicate that trade liberalization in developing countries has raised their aggregate incomes and reduced inequality. One of the major points in favour of trade is that it promotes efficiency. However, theoretically and empirically, trade not only affects economic growth, but has strong effects on distribution of income. This has led to a large debate between policy makers and economists on whether trade liberalization is one of the reasons for rising inequality within countries. The main argument is - to what extent growth in inequality can be attributed to trade liberalization.

The motivation behind the study stems from widening income inequality in developed countries, emerging markets and developing countries, especially since the 1970s. An IMF study by Norris, et al., (2015) shows that income inequality matters for growth and its sustainability. Specifically, if the income share of the top 20 percent (the rich) increases, then GDP growth actually declines over the medium term, indicating that the benefits do not reach the poor. In contrast, an increase in the income share of the bottom 20 percent (the poor) is associated with higher GDP growth. Inequality matters as it may signify lack of income mobility and opportunity—a reflection of persistent disadvantage for particular segments of the society. It also has a significant impact on macroeconomic stability as it can lead to concentration of economic and political power in the hands of few. It could also lead to under-utilization of resources, lower investment and economic growth, and cause political, economic and financial instability. According to Ravallion, high inequality also implies that growth is less efficient in reducing poverty in such countries (Norris, et al., 2015). The period of rising inequality also coincided with the period of greater economic integration through increase in trade in goods and services, capital and labour across countries. Hence, the main argument is - to what extent globalization has contributed to this increase in inequality. The experience of East Asian economies is consistent with the predictions of the model, as inequality declined in these countries after the 1960s and 1970s as these countries liberalised their trade regimes. However, in the 1980s, wage inequality rose as these countries (mainly Latin American countries) moved towards trade liberalization. This finding is clearly contrary to the predictions of the traditional theory of international trade. The main explanation used is the skilled biased technological change incorporated in trade liberalization, which favours the wages of skilled workers in North and South countries. The objective of this paper is to review the existing theory and empirical evidence on the impact of trade liberalization on inequality as well as identify research gaps and find topics for future research.

The rest of the paper is structured as follows. Section II presents theoretical background. The next section covers the literature review, followed by scope for further research. Section V concludes.

Theoretical Background

The standard theory of trade emphasizes the impact of trade on wage inequality between occupations and sectors. In the specific factors model, one or more of the factors of production is immobile between industries and hence, it helps in analyzing short term consequences of trade. The main prediction of the model is that trade benefits the factor that is specific to the export sector of each country, but hurts the factor that is specific to the import competing sectors and has an ambiguous effect on the mobile factor. In the Heckscher Ohlin (H-O) model (Krugman, Obstfeld & Melitz, 2015) trade is based on the assumption that all countries have identical technology, but differ in relative abundance of factors of production. The Samuelson Theorem extends the H-O model by linking product prices with factor prices. This effect indicates that for a given level of technology, trade and wages are linked through the changes in relative prices of skilled and unskilled labour-intensive products. An increase in the relative price of the good is predicted to increase the real return to the factor used intensively in the production of that good, and decrease the real return to the other factor. Consequently, one of the major implications of the Stopler Samuelson theorem is that trade will lower the price of the import competing good and hence, lower the real return to the scarce factor of production. Therefore, according to the H-O model with two factors - skilled and unskilled labour, developing countries will tend to export goods intensive in unskilled labour and developed countries will tend to export goods intensive in skilled labour; hence, wages of the unskilled labour should go up in the developing countries and wages of the skilled labour should increase in the developed countries. Hence, the model predicts that wage inequality increases in the developed world, and decreases in developing and emerging countries since in developing countries, unskilled labour would benefit the most from globalization. The empirical evidence gives mixed results.

The experience of the East Asian newly-industrialised economies was a reduction in wage inequality after openness was introduced in the 1960s and 1970s. This was therefore consistent with "standard" trade theory which predicts that trade liberalisation should benefit the locally abundant factor (Wood 1997). However, this evidence has been challenged by a number of studies for countries that opened up to trade more recently, mostly for Latin American countries where inequality has risen as these countries moved towards trade liberalization. Thus, the evidence on trade liberalisation, which has taken place in the last two decades (mainly, Latin America, but also includes other countries like India and China) indicates a positive relationship between trade liberalisation and wage inequality (Goldberg & Pavcnik, 2007; Topalova, 2005). They argue that this finding is clearly contrary to the predictions of the traditional theory of international trade. There are various theories that explain the rising inequality following liberalization. For example, New Trade Theory (NTT) as explained by Krugman et al. (2015) suggests that the vital factors in determining international patterns of trade are the very substantial economies of scale and network effects that can occur in key industries. These economies of scale and network effects can be so significant that they outweigh the more traditional theory of comparative advantage. Another element of new trade theory is that firms that have the advantage of being an early entrant can become dominant firms in the market. This is because the first firms gain substantial economies of scale, meaning that new firms can't compete against the incumbent firms. This means that in these global industries with very large economies of scale, there is likely to be limited competition, with the market dominated by early firms who entered, leading to a form of monopolistic competition. Therefore, NTT suggests that trade could reduce wages of the unskilled labour in a labour abundant country, thereby increasing the gap between the rich and poor.

Goldberg & Pavcni (2007) and Hanson & Harrison (1999) argue that trade in final goods based on factor proportions theory cannot account for the increases in growing wage inequality since the 1980s. Instead, skilled biased technological change (SBTC) was the dominant driving force in the growth in inequality. Trade can indirectly affect inequality through this channel if technological change was itself an endogenous response to more "openness"; this implies that the trade reforms were indirectly responsible for the increase in the skill premium. The hypothesis of "defensive innovation" by Woods (1995) explains how intensified competition from abroad may induce firms to engage in R&D, or at a minimum, take advantage of existing new technologies that they may have had little incentive to adopt prior to liberalization. Acemoglu (2003) explains another mechanism through which trade liberalization can accelerate SBTC, that is, through a model of endogenous technological change. According to him, technological change in developing countries may take the form of increased imports of machines, office equipment and other capital goods that are complementary to skilled labour. Trade liberalization affects the demand for skilled workers by reducing the prices of the relevant capital goods and hence, increasing their imports. In addition, several recent studies indicate a potential role for international trade in affecting wage inequality via residual wage inequality, which has contributed to growing skill premium in both developed and developing countries (Pavcnik 2011). Residual inequality refers to the recent increases in wage inequality between people with the same observable characteristics. One of the ways in which international trade could affect residual inequality is through industry premiums. Industry wage premiums represent part of the workers' earnings that cannot be explained by worker demographic characteristics (such as education, age, gender, and so on), but can be assignable to workers' industry affiliation. It could reflect industry-specific human capital, industry-specific rents, efficiency wages or compensating differentials. There are various channels through which international trade could affect these industry premiums (Goldberg & Pavcnik 2007). If the 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 because of limited labour mobility across industries in developing countries. Another channel through which trade could affect industry wage premiums is labour productivity. The empirical findings indicate greater productivity improvements for industries with larger declines in tariff if firms pass on some of these productivity improvements to workers in the form of higher wages. In that case, declines in industry tariffs would be associated with increases in wage premiums. Therefore, trade liberalization could either increase or decrease industry wage premiums.

Recent empirical evidence also points out that only a minority of highly productive firms within an industry engage in exports. A situation in which Firm A in a given industry exports while Firm B in the same industry does not, cannot be explained by the standard trade model or the New Trade Theory which assumes at least within an industry, representative firms equal in productivity (i.e., firms are qualitatively the same). Melitz & Redding (2012) explain why firms of varying levels of productivity do co-exist through "New New Trade Theories" (NNTT). He describes that in the presence of fixed costs of exporting, initially, only more productive firms select to become exporters and expand, in response to increased export market profitability, while less-productive firms contract. Product quality upgrading is another channel through which trade could increase inequality in developing countries (Pavcnik, 2011). The firms in developing countries must produce higher quality products for their export markets relative to domestic markets

because of greater competition in world markets. This, in turn, would tend to increase wage inequality, by increasing wages of workers in more-productive firms relative to the wages of those employed in less-productive firms. Hence, firm heterogeneity is another important channel through which trade affects wage inequality. And lastly, the growing share of trade in intermediate inputs (global product sharing) has also added to the increase in wage inequality by increasing the wage gap between skilled and unskilled workers (Feenstra & Hanson, 1996; Hsieh & Woo, 2005). Research by Feenstra (2008) shows that the divergence of the labour force during the 1990s and 2000s could also be explained by the growing significance of service outsourcing, where low wage countries like India carry out middle-skilled routine tasks. Recently, many non-tradable services have now increasingly become tradable. This has led to growth in imports of business, professional and technical services, typically associated with white-collar jobs in the United States. There is little empirical evidence on how trade in services affects wage inequality. One of the major reasons for this is that data is difficult to measure. Liu and Trefler (2008) investigate the relationship between the effects of offshoring/inshoring on wages in the United States to low-wage countries; their empirical findings suggest very small effects of offshoring/inshoring on wages in the United States.

Literature Review

There is no clear cut empirical evidence on the relationship between trade liberalization and inequality. Examining the cross country evidence, Gourdon (2011) analyses the cross section data for a large sample of developing countries. It breaks down unskilled labour into two components - non-educated and primary educated workers. The results show that trade liberalization increases inequality in highly educated abundant countries whereas it decreases inequality in primary educated abundant countries. However, it increases inequality in non-educated abundant countries, suggesting that this part of the population does not benefit from trade openness since it is not included in export oriented sectors. Likewise, in another paper, Lee (2014) examines the effects of globalization on inequality and poverty, using cross country regressions. He finds that financial globalization increases income inequality and poverty in general, while there is a conditional relationship between trade openness and inequality and poverty. Using a sample of 73 countries, Chakrabarti (2000) investigates the empirical validity of the linkage between trade-GDP ratio and Gini coefficient of income inequality. Results indicate a) Increasing amount of participation in trade significantly reduces income inequality b) The strong negative association between trade and inequality does not arise because countries that have a more egalitarian distribution of income for reasons other than trade engage in more trade c) growth provides a channel through which trade lowers inequality by raising both initial income and subsequent growth. Contrary to this, Meschi and Vivarelli (2008) find that technologies transferred from more advanced countries are more skill-intensive with respect to those domestically in use in the developing countries and thus, trade-induced technology upgrading may result in a shift in labour demand in favour of skilled labour, ending in a generalized increase in the skill premium and hence, in a more unequal income distribution. They cover 65 developing countries over the period 1980 to 1999.

In another cross section study, Jaumotte, Lall & Papageorgiou (2013) argue that the observed rise in inequality across both developed and developing countries over the past two decades is largely attributable to the impact of technological change. The contribution of increased globalization to inequality has, in general, been relatively minor because it has two opposing effects on inequality - while increased trade tends to reduce income

inequality, foreign direct investment tends to exacerbate it. Both globalization and technological progress tend to increase the relative demand for skills and education. They find that while incomes have increased across all segments of the population in virtually all countries in the sample, incomes of those who already have higher levels of education and skills have risen disproportionately. Gourdon's (2007) empirical findings point out that increase in wage inequality is more due to the South-South trade liberalization than to the classical trade liberalization with northern countries. Most of the South-South trade is in skill intensive sectors, and hence, increase wage inequality for all developing countries. In another paper, Aradhyula, Rahman & Seenivasan (2007) use panel data to analyse the impact of trade on levels and distribution of income. The balanced panel of country level data shows that trade openness increases income, while results using an unbalanced panel data set revealed that trade openness increases income inequality in the overall sample. However, when the sample is split into two groups, trade increases inequality in developing countries but it reduces inequality in developed countries though the coefficient is not statistically significant. Raychaudhuri & De (2010) investigate the inter-linkages and inter-connections among infrastructure, trade openness and income inequality, using panel data of 14 Asia-Pacific countries at different levels of development. The empirical results clearly indicate influence of trade openness and infrastructure on income inequality, but the reverse is not necessarily true. Further, dynamic panel estimates reveal the importance of initial values of both income inequality and trade openness as important determinants in the evolution of these variables, apart from the positive influence of infrastructure as a determining variable.

In individual country studies, Barua & Chakraborty (2010) show that regional inequality in India has been increasing in all components of income except for the primary sector. Their findings indicate a decline in both income and manufacturing inequality since India adopted liberalization policies (1997-98). And the regression results show that trade lessens both income and manufacturing inequalities; however, it increases inequalities in agriculture inter-regionally. There are various studies that provide support for the theory that SBTC was itself an endogenous response to trade liberalization. Attanasio, Goldberg & Pavcnik (2004), in their study on Columbia during 1984-98, show that the increase in demand for skilled workers was largest in those sectors that experienced the largest tariff cuts. Likewise, Robbins & Gindling (1999) investigate the changes in relative wages and in the supply and demand for skilled labour in Costa Rica before and after trade liberalisation. Their empirical results also indicate that the skill premium rose after liberalisation as a result of changes in the structure of labour demand. In another paper, Hanson & Harrison (1999) also examine the changes in both wages and employment of skilled and unskilled workers after trade liberalisation in Mexico. They find little variation in employment levels, but a significant increase in skilled workers' relative wages. They also show that foreign companies and those heavily involved in export markets pay higher wages to skilled labour, which is again consistent with the trade induced skill biased technological change. Another channel through which trade liberalization can induce SBTC is through increased imports of machines, office equipment and other capital goods that are complementary to skilled labour. Hanson & Harrison (1999) investigated this hypothesis for Mexico and found that firms that import machinery and materials are more likely to employ a higher share of white-collar workers than firms that do not import these inputs. Conversely, Pavcnik's (2002) empirical findings on the Chilean plants in the early 1980s shows that increased relative plant demand for white-collar workers cannot be attributed to the use of imported materials and foreign technical assistance to these plants as one

controls for the time-invariant plant characteristics.

Empirical studies have also found support for the "global production sharing hypothesis" wherein technology transfer to developing countries through foreign direct investment from developed countries, as well as autonomous technological progress in developing countries tends to narrow the technology gap between developed and developing countries in all sectors. It can partly explain the growing wage gap between skilled and unskilled workers in both developed and developing countries. Hsieh & Woo (2005) show that demand for skilled workers increased in Hong Kong after the relocation of unskilled-intensive parts of production from Hong Kong to mainland China after China's liberalization of foreign activities in the early 1980s. Likewise, in another study, Feenstra & Hanson (1997) point out to various US plants exporting intermediate inputs to Maquiladora plants (in Mexico) and then assemble these inputs into final goods. This had effects on skill premium in Mexico.

Empirical evidence suggests that trade induced increase in skill premiums cannot fully account for the growing wage inequality. Recent studies indicate that increases in wage inequality are partly driven by increased inequality in wages between people with the same observable characteristics, the so-called residual wage inequality. For example, industry wage premiums could increase or decrease due to trade. Helpman, Itskhoki, Muendler & Redding (2013) use linked employee-employer data for Brazil to study the overall wage inequality that arises within sector-occupations and for workers with similar observable characteristics; this within-component is driven by wage dispersion between firms, which, in turn, is related to firm employment size and trade participation. The empirical results indicate that around two-thirds of overall wage inequality occurs within sector-occupations. Most of this within-sector-occupation inequality is residual wage inequality. Between-firm wage dispersion accounts for a substantial proportion of this residual wage inequality within sectors and occupations. These between-firm differences in wages are systematically but imperfectly related to trade participation: exporters, on average, pay higher wages than non-exporters even after controlling for employment. This is consistent with an increase in the industry wage premiums. Likewise, Kumar & Mishra (2005) evaluate the impact of 1991 trade liberalization on the industry wage structure. Their empirical findings suggest increase in the industry wage premiums in the sectors that employed a larger share of unskilled workers. This is consistent with the liberalization-induced productivity increases at the firm level, which get passed on to industry wages. Their findings indicate reduced wage inequality in India due to trade liberalization. Contrary to this study, Goldberg & Pavcnik, (2005) show that for Columbia, tariff declines were associated with declines in industry wage premiums.

Another mechanism through which trade affects wage inequality is explained by the theory of heterogeneous firms. 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 & Redding, 2012). 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 & 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 (Hanson & Harrison, 1999 for Mexico). They further show that much of the increase in within-industry demand for skilled labour is driven

by employment shifts across firms, toward exporting firms. In addition, more-productive firms also upgrade product quality and production technology in response to new export opportunities (Verhoogen, 2008). 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 wage inequality. Verhoogen (2008) confirms the predictions of this model with firm-level panel data from Mexico.

Therefore, 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.

Scope for further Research

Many studies have analyzed the effect of trade on income and income inequality, but the empirical evidence shows divergent outcomes. The most striking point is that the distributional changes in developing countries went in the opposite direction to the one suggested by the conventional theories of trade. Since developing countries are relatively abundant in less skilled labour, they were expected to gain, but the findings suggest the opposite. What explains this paradox? After reviewing the theoretical and empirical studies on the impact of trade liberalization on inequality, the author has attempted to evaluate reasons why the empirical findings do not confirm to the conventional theories of trade. The channels through which trade affected inequality are country and time specific, and hence, the impact of trade liberalization, must be investigated along with the other policy changes that have taken place in these countries. This makes it difficult to isolate the impact on inequality attributable to trade. A number of mechanisms have been discovered that may have led to increasing inequality due to trade. One of the areas that can be further examined is the impact of "global production sharing" or "outsourcing" on inequality in developing countries. Most of the studies have focussed on trade while excluding this important aspect. Another related area would be to examine the impact of FDI in different sectors, as each sector would have a divergent impact on inequality (Jaumotte et al., 2013). Another related area where more empirical work needs to be done is the effect of trade in services on inequality. Trade in services has significantly grown as many non-traded services are now increasingly traded. It includes growth in imports of business, professional and technical services. However, there are few studies on how it affects wage inequality. One of the main reasons cited by Jensen (2009) is that trade in services is difficult to measure. Because trade in services is something that will continue to grow in future as well, the impact of trade in services on wage inequality remains a topic for future research. And lastly, one needs to examine the extent to which inequality within a country can be explained by skill biased technological change on one hand and new channels of trade (other than the standard trade theory) on the other hand. One of the major challenges lies in segregating the technology effects from the trade effect in measuring their impact on inequality. And hence, this can be investigated further. This can be further analysed for each sector. The study can be further widened to include not only international trade, but also effects of financial integration on inequality. Most of the studies have concentrated on narrow measures of inequality such as wage inequality; this can be further extended to studies using broader measures of inequality - consumption and income based measures. Another

area that can be investigated is the impact of trade on transitional unemployment that affects less skilled workers much more severely than other workers. Another potential area of research is the trade policy and its impact on child labour in developing countries. The opponents argue that, since trade leads to demand for goods and services, it may lead to increase in earning opportunities and hence, to an increase in demand for child labour. On the other hand, proponents are of the view that since trade increases standard of living, this may lead to a fall in demand for child labour.

Conclusion

There has been an increase in inequality in both developed and developing countries, whether measured in terms of income, wages or assets (Norris, Kochhar, Suphaphiphat, Ricka & Tsounta, 2015). One possible reason for this rising inequality is trade liberalization. Going by the traditional theories of trade, it should have benefitted the relatively abundant factor (less skilled labour) in developing countries. However, the empirical findings show different results. Most of the developing countries experienced an increase in income inequality in following trade liberalization. Through this study, the author has attempted to evaluate the role trade liberalization has played in the increasing inequality experienced by various developing and developed countries since 1980s and means through which globalization affects income inequality - capital flows, SBTC induced by trade, trade in intermediate products, firm heterogeneity and country specific factors. Since different countries liberalized different sectors and at different times, this partially explains the conflicting empirical findings. The experience of the East Asian newly-industrialised economies was a reduction in wage inequality after openness was introduced in the 1960s and 1970s. This was therefore consistent with "standard" trade theory, which predicts that trade liberalisation should benefit the locally abundant factor (Wood 1997). However, Goldberg & Pavcnik (2007) and Topalova (2005) argue that the experience of various Latin American countries as well as countries like China and India has been completely opposite to the predictions of the standard model of trade where inequality has risen as these countries moved towards trade liberalization. Thus, the evidence on trade liberalisation initiated in the last two decades indicates a positive relationship between trade liberalisation and wage inequality. Initially, the increase in skill premium was attributed to Heckscher-Ohlin-Samuelson effect. However, most academicians are of the view that factor proportions theory can't account for the increase in wage inequality since the 1980s (Goldberg & Pavcni, 2007; Hanson & Harrison, 1999). The main reason for the growing inequality was skill biased technological change (SBTC). The main question is - to what extent trade is responsible for increase in wage inequality that operates through channels other than Heckscher-Ohlin-Samuelson effects. The empirical evidence gives mixed results.

According to Pavcnik (2011), one of the channels through which trade could affect wage inequality is residual wage inequality and growing skill premium in both developed and developing countries. Residual inequality refers to the recent increases in wage inequality due to increased inequality in wages between people with the same observable characteristics. One of the ways in which international trade could affect residual inequality is through industry premiums. There are various channels through which international trade could affect these industry premiums (Goldberg and Pavcnik 2007). The elimination of trade barriers could reduce industry wages through increases in product-market competition because of limited labour mobility across industries in developing countries. Another channel through which trade could affect industry wage premiums is labour productivity. The empirical

findings indicate greater productivity improvements for industries with larger declines in tariff. In this case, declines in industry tariffs would be associated with increases in wage premiums. Therefore, reduction in tariffs could either increase or decrease industry wage premiums.

The theory of heterogeneous firms (new new trade theories) explained by Melitz & Redding (2012), where firms of varying levels of productivity co-exist, explains the differential effects trade has on wages of workers. They state that in the presence of fixed costs of exporting, initially, only more-productive firms decide to become exporters and expand, in response to increased export market profitability, while less-productive firms contract (Krugman, Obstfeld & Melitz, 2015). In addition, product quality upgrading is another channel through which trade would increase inequality in developing countries (Pavcnik 2011). The firms in developing countries must produce higher quality products for their export markets relative to domestic markets because of greater competition in world markets. This, in turn, would tend to increase wage inequality, by increasing wages of workers in more-productive firms relative to the wages of those employed in less-productive firms. Hence, firm heterogeneity is another important channel through which trade affects wage inequality. And lastly, the growing share of trade in intermediate inputs (global product sharing) has also added to the increase in wage inequality by increasing the wage gap between skilled and unskilled workers (Feenstra & Hanson, 1996; Hsieh & Woo 2005). Feenstra (2008) indicates that the divergence of the labour force during the 1990s and 2000s could also be explained by the growing significance of service outsourcing, where low wage countries like India carry out middle-skilled routine tasks.

The main question is the importance of these new channels of trade relative to SBTC in explaining the growing inequality in developing and developed countries. A study on US by Feenstra & Hanson (1999) indicates that outsourcing accounts for up to 25 per cent of the increase in the relative wages of skilled workers in the United States during the 1980s, while SBTC accounts for 30 per cent. Likewise, Attanasio et al. (2004) find that trade influences residual wage inequality through channels such as industry wage premiums, but trade-induced changes in wages account for a small share of the increase in inequality observed in Colombia during the 1980s and 1990s. A recent IMF study (Jaumotte et al., 2013) investigates the relative importance of international trade globalization, financial globalization and technology for within-country inequality as measured by the Gini coefficient. The empirical findings suggest that the largest contributor to wage inequality is technological progress. The study also shows that trade has reduced inequality, while increased flows of capital across countries have increased it. Therefore, the new channels of trade certainly impact inequality. Further research needs to be done on how important are residual inequality, trade in intermediate inputs and the theory of heterogeneous firms relative to SBTC in explaining growing inequality in developing and developed countries. The study can be widened to include not only international trade but also effects of financial integration on inequality.

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Appendix

Table A: Summary of the recent country studies

Study, Author, Date	Measure of Trade / Openness	Measure of Inequality	Data Description	Identification Strategy	Key Findings
Gourdan (2011)	Adjusted Trade Openness (Hiscox and Kastner)	Gini coefficients	91 countries 1960-2000	OLS, Panel data	-Trade increases inequality in highly educated & non-educated abundant countries -Decreases inequality in primary educated abundant countries

Study, Author, Date	Measure of Trade / Openness	Measure of Inequality	Data Description	Identification Strategy	Key Findings
Lee (2014)	Value of export and import divided by GDP, stock of total external assets and liabilities divided by GDP	Gini coefficients, WDI	Cross country, 1976 to 2004	OLS	-Financial globalization increases income inequality -There is conditional relationship between trade openness and inequality
Chakrabarti (2000)	Trade-GDP ratio	Gini coefficients	73 countries, 1985	OLS, Instrument Variable	-Trade reduces inequality
Meschi & Vivarelli (2008)	Total trade - imports and exports as share of GDP	EHHI (estimated household inequality index)- D&S Gini coefficients and UTIP-UNIDO data	65 developing countries (DCs) 1980-1999	Panel data	-Trade with high income countries worsens income distribution in DCs
Jaumotte, Lall & Papageorgiou (2013)	Average tariff rate, non-oil exports and non-oil imports to GDP, Chinn-Ito index	Gini coefficient	51 countries, 1981-2003	Panel data	- Technological progress has a greater impact on inequality than globalization -Trade reduces inequality and financial globalization increases inequality.
Gourdon (2007)	Ratio of shares of trade to north and to south	Wage inequality- standard deviation of log wage	68 developing countries, 1976-2002	Panel data	-The main cause of rising wage inequality is South-South trade liberalization rather than north-south trade
Aradhyula, Rahman & Seenivasan (2007)	Total trade - imports and exports as share of GDP	Gini coefficient	60 countries, 1985-1994	Panel data	-Balanced panel data reveals trade increases income -unbalanced panel data shows that trade increases inequality
Raychaudhuri & De (2010)	Trade-GDP ratio	Gini coefficient	14 Asia-Pacific countries 1975-2006	Panel data	-Trade openness affects inequality but the reverse is not true
Barua & Chakraborty (2010)	Trade-GDP ratio, Exports-GDP ratio & Manufacturing trade-GDP ratio	Theil measure	26 Indian states, 1981-2000	OLS	- Trade reduces both income and manufacturing inequality but increases inequalities in agriculture inter regionally
Attanasio, Goldberg & Pavcnik (2004)	Std Deviation log wages - wage 90th decile / wage 10th decile Industry dummies in wage equation	Trade Liberalization by imports and exports in each industry and Industry Tariffs	Columbia, 1984-98	Two stage estimation WLS, Panel data	-Trade Liberalization increases inequality through increase in demand for skilled workers, and through growing informal sector

Study, Author, Date	Measure of Trade / Openness	Measure of Inequality	Data Description	Identification Strategy	Key Findings
Robbins & Gindling (1999)	Standard Deviation of log wages - wage 90th decile / wage 10th decile	Trade Liberalization by Average Tariff rate	Costa Rica 1974-95	Panel data	-Trade Liberalization and Technological change explains increase in inequality
Hanson & Harrison (1999)	Wage skilled worker / wage unskilled worker	Trade Liberalization by Industry Tariffs rate	Mexico 1984-1990	Panel data	-Wage inequality rises after trade Liberalization, FDI and Technological change.
Pavcnik's (2002)	Tariff, real exchange rate, imports-Output ratio	Wage skilled worker / wage unskilled worker	Chile manufacturing plants 1976-1986	Panel data	-Capital deepening increases wage premium but adoption of foreign technology has no effect
Hsieh & Woo (2005)	Change in outsourcing in the industry	Change in the wage-bill share of skilled workers in an industry	Hong Kong, 1981-96	OLS	-Increase in demand for skilled workers in Hong Kong (increase in inequality)
Feenstra & Hanson (1997)	Share of imported intermediate inputs in the total purchase of non-energy material.	Relative non production wage share	32 states in Mexico 1975-1988	OLS, Instrument Variable	-FDI increases non producer wages' share; hence, inequality
Kumar & Mishra (2005)	Tariff rate	Industry dummies in wage equation	72 three-digit manufacturing industries (NIC-1987), India 1983-2000	Two stage estimation, WLS	-Tariffs reduction increase wages, since tariff reduction is highest in unskilled worker intensive industries, trade liberalization reduces wage inequality
Goldberg & Pavcnik, (2005)	Industry dummies in wage equation	Trade Liberalization by Industry Tariffs	Columbia 1984-1998	Panel data	-Relative wages declined in sectors with larger tariff reductions, that is, trade liberalization led income inequality.

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