Distributional Effects of Globalization in Developing Countries*

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1. Introduction

One of the few uncontroversial insights of trade theory is that changes in a country's exposure to international trade, and world markets more generally, affect the distribution of resources within the country and can generate substantial distributional conflict. Hence, it comes as no surprise that the entry of many developing countries into the world market in the last three decades coincides with changes in various measures of inequality in these countries. What is more surprising is that the distributional changes went in the opposite direction from the one suggested by conventional wisdom: while globalization was expected to help the less skilled who are presumed to be the locally relatively abundant factor in developing countries, there is overwhelming evidence that these are generally not better off, at least not relative to workers with higher skill or education levels. What explains this apparent paradox? Is the theory underlying the conventional wisdom too stylized to capture the reality of the developing world? Or were there other forces at work that may have overridden the effects of globalization? What are the mechanisms through which globalization affected inequality? Did the experience vary across countries, and if so, why? What are the general lessons we can draw from the experience of the last three decades? It is these and other related questions that this article aims to address.

To this end, we present a large amount of evidence from several developing countries regarding their exposure to globalization and the parallel evolution of inequality. While the evidence is subject to several measurement problems that we discuss extensively in this article, two trends emerge clearly from the data analysis. First, the exposure of developing countries to international markets as measured by the degree of trade protection, the share of imports and/or exports in GDP, the magnitude of capital flows -- foreign direct investment in particular, and exchange rate fluctuations has increased substantially in recent years. Second, while inequality has many different dimensions, all existing measures for inequality in developing countries seem to point to an increase in inequality, which in some cases (e.g., pre-NAFTA Mexico, Argentina in the 1990's) is severe.

We next investigate the question whether we can establish a causal link between the increase in inequality and globalization. We examine several mechanisms through which openness is presumed to have affected inequality and discuss related evidence. Our analysis here draws on several empirical studies of globalization and inequality in developing countries as well as existing surveys of related topics (Harrison and Hanson (1999), Wood (1999), Goldberg and

Pavcnik (2004)). We confine our discussion to the experience of developing countries in the last two to three decades. The primary reason for this focus is that measures of inequality are typically computed based on household survey data, and such data did not become available until the late 1970's in many developing countries. In general, the data have become more reliable over time, so that studies focusing on more recent years tend to produce more credible results. The second reason we focus on the last three decades is that during that period many developing countries underwent significant trade liberalization that substantially increased their exposure to international markets. We argue that for many countries, most notably Latin American countries in the 1980's and early 1990's and India in the early 1990's, trade liberalization episodes represent a major part of their globalization. Furthermore, we argue that the trade barrier reductions that occurred during this period can be exploited to establish a causal link between trade openness and changes in inequality. By the mid-1990's the economic landscape had however changed, and factors other than trade liberalization, such as increased capital flows, FDI, exposure to exchange rate fluctuations that in turn affected exports, immigration, etc… became increasingly more important aspects of these countries' integration in the world market. Establishing a connection between these phenomena and inequality is more challenging compared to the case of trade barrier reductions, but we discuss these aspects of globalization when related evidence is available.

From a methodological point of view we explore a variety of possible approaches to identify the impact of globalization on inequality. A common theme across the studies we draw upon is that they focus almost exclusively on the experience of particular developing countries within a relatively short time span. While our survey has a clear comparative aspect as we rely on evidence from a large set of countries, we abstain from relying on cross-country regressions to econometrically identify the effects of trade policy changes, or conducting comparisons of inequality measures over longer time horizons. This focus is primary dictated by data constraints. Inconsistencies in the measurement of inequality across countries, changes in the household survey response rates over time as incomes rise, and frequent changes in the design of household surveys within the same country, make inference based on cross-country evidence, or comparisons of inequality measures over longer periods of time within a specific country, potentially less reliable compared to inference that relies on within-country evidence over shorter periods of time. To delineate the scope of this study we should also point out that we focus our

discussion on inequality alone, and not poverty, as the latter is discussed extensively in a recent article in this journal by Winters et al (2004). Finally, we abstract from effects of globalization on inequality that may have occurred through the growth channel, since the evidence on the causal link between trade openness and growth has been controversial and inconclusive to date. However, this channel is potentially important; the perhaps most significant benefit of globalization is presumed to be that it fosters economic growth, and growth itself brings about distributional changes.

Regarding our conclusions, we identify several channels that may explain why the recent experience of developing countries did not conform to the "naïve" thinking about globalization. We argue that our understanding of the consequences of globalization for inequality has improved as the theoretical framework underlying the empirical work expanded to include trade in intermediate products, international flows of capital, trade-induced skilled biased technological change, short-run factor immobility, and firm heterogeneity. We also find that the effect of globalization on inequality depends on many factors, several of which are country- and time-specific, including: a country's trade protection pattern prior to liberalization; the particular form of liberalization and sectors it affected; the flexibility of domestic markets in adjusting to changes in the economic environment, in particular the degree of within-country labor and capital mobility; and the existence of other concurrent trends (e.g., skill-biased technological change) that may have interacted with or even partially been induced by globalization. Given that different countries experienced globalization in different ways and at different times, it is hardly surprising that the relevant mechanisms through which inequality was affected are case-specific. From a policy point of view this implies that attempts to alleviate the potentially adverse distributional effects of globalization in the short- or medium run need to be grounded in a careful study of the nature of globalization and the individual circumstances in each country.

The remainder of this article is organized as follows. In section 2 we review some basic conceptual issues regarding the measurement of globalization and inequality respectively. In section 3 we present empirical evidence on the evolution of globalization and inequality in developing countries, and identify the main facts and trends that demand explanation. Section 4 discusses the methodological challenges one faces in attempts to causally link globalization to inequality. Section 5, the core section of the paper, examines the channels through which globalization might affect inequality by presenting theory and evidence in parallel. We start by

focusing on the narrowest measure of inequality, the wage gap between skilled and unskilled workers (or skill premium) and investigate the main globalization-related explanations for its documented increase. We then progressively move to discuss the impact of openness on broader concepts of inequality. Section 6 concludes.

2. Conceptual Issues

2.1 Measuring Globalization

Globalization is a broad concept casually used to describe a variety of phenomena that reflect increased economic interdependence of countries. Such phenomena include flows of goods and services across borders, reductions in policy and transport barriers to trade, international capital flows, multinational activity, foreign direct investment, outsourcing, increased exposure to exchange rate volatility, and immigration. These movements of goods, services, capital, firms, and people are believed to contribute to the spread of technology, knowledge, culture and information across borders. Research on the effects of globalization in economics has concentrated on those aspects of "globalization" that are easier to capture empirically. Accordingly, we confine our discussion on the more narrowly defined components of globalization: trade liberalization, outsourcing, flows of capital across borders in the form of FDI, and exchange rate shocks.

Even when one hones in on a narrow dimension of "globalization", measurement challenges abound. The first hurdle is data availability. Detailed information on trade barriers, outsourcing, or foreign direct investment is often not readily available, especially when the analysis requires highly disaggregate data, or longer periods of time that span periods of policy liberalization. For example, in their recent survey of trade costs, Anderson and van Wincoop (2004) note that data on trade policy barriers from UNCTAD's TRAINS data base that is systematically available for a large set of countries only covers years from 1989 onwards. In addition, in a given year, at most 17% of the included countries report both tariff and non-tariff barriers to trade, and trade flows. The lack of reporting is especially pronounced in developing counties. Consequently, researchers have often measured trade liberalization indirectly through more readily available data on trade volumes (i.e., exports and imports). One problem with this approach is that trade volumes are determined not only by (plausibly exogenous) changes in trade policy and transportation barriers, but also by endogenous variables, some of which are in

fact the focus of interest in the globalization and inequality debate (i.e., wages). As a result, more recent studies have mainly relied on national data sources to obtain trade policy information, as well as information on FDI and outsourcing, spanning periods of policy reforms.

Trade liberalization episodes, and in particular reductions in tariff barriers, are perhaps the most commonly studied component of globalization. This focus is determined by practical considerations: tariffs are relatively easier to measure than other forms of globalization. Because tariffs are usually imposed as ad-valorem taxes on imported goods, they represent price based forms of trade protection. As such, they are transparent, relatively easier to measure consistently across industries and over time, and their magnitude reflects the true restrictiveness of the trade barrier. Of course, tariffs are not the only policy instrument through which governments in developing countries regulate imports. Imports into developing countries are also subject to non-tariff barriers to trade (NTBs) such as import licenses and quotas. The information on NTBs is often not available or not available at the same level of product/industry aggregation as tariffs, especially for longer time periods surrounding trade liberalization episodes. Moreover, because many non-tariff barriers to trade are forms of protection that limit the quantity of imports allowed to enter a country (rather than price-based measures), they are more difficult to accurately measure. Researchers usually capture the extent of NTBs at some level of industry aggregation by a non-tariff barrier coverage ratio, which measures the share of products (or total imports, or national production) in an industry aggregate that is subject to NTBs. This measure however does not capture the true restrictiveness of NTBs: for example a certain industry may have the same NTB coverage ratio in two different years, yet the NTB could be more or less restrictive in one of the years because of different demand conditions. As a result, measurement problems are more severe in the case of NTBs, and their comparability across countries, industries and time is more of an issue than in the case of tariffs. While the omission of reliable NTB measures and their changes in empirical studies is a potentially serious limitation, a somewhat encouraging result is that correlations between tariff rates and NTB coverage ratios (and their changes), whenever available, are positive, indicating that tariffs and NTBs have been used in recent years in developing countries as complements and not substitutes[1]. In terms of the interpretation of empirical results such correlations imply that the

[1] See Goldberg and Pavcnik (2005), p. 89-90, for a discussion of this correlation for the case of Colombia.

effect that is typically attributed to a tariff change represents an overestimate of the pure tariff effect, as it reflects the combined effect of the tariff and NTB change.

Even if one limits the analysis to tariffs, measurement concerns remain. One of the most significant ones is aggregation. National governments set tariffs at a very disaggregate level, as detailed tariff lines. Researchers however typically need to aggregate these tariffs to a higher level to match the level of industry aggregation at which the outcome of interest, such as wages or employment, is reported. This requires the use of concordances between tariff lines and industries that are notoriously noisy, so that aggregate industry tariffs are plausibly measured with error. In addition, aggregation discards some potentially important variation in tariffs (or tariff changes) within industry groups and thus precludes the researcher from examining some channels through which individuals/firms adjust to trade liberalization within broadly defined industries.

A further concern is that industry tariffs on final goods do not capture the true extent to which an industry is affected by protection (or liberalization) since they do not account for intermediate good linkages. One could in principle capture such linkages by constructing effective rates of protection, which take into account not only the direct protection granted to an industry through nominal tariffs on final products, but also the indirect one that results from tariffs on intermediate inputs. Unfortunately, effective rates of protection are not readily available for many countries over periods that span trade liberalization episodes. In addition, effective rates of protection present additional measurement/concordance problems stemming from the use of information from the input output tables required in their construction. Fortunately, in cases where both nominal and effective measures of protection are available, they tend to be highly correlated. For example, the correlation between industry effective rates of protection and industry tariffs in Colombia is above .9 in years where both of these measures are available (Goldberg and Pavcnik (2005)).

Naturally, the focus on trade policy in studying the effects of "globalization" on inequality is only useful to the extent that trade policy is an important component of a country's exposure to globalization. This was the case in many of the countries that we discuss in this article, namely Latin American countries such as Brazil, and Colombia, and Mexico during the late 1980's/early 1990's and India during the 1990's. In other settings, most notably Mexico after the implementation of NAFTA, channels other than trade policy, for example, immigration,

foreign direct investment, outsourcing, and the peso crisis have played a potentially more important role. Still, average tariff rates continue to be high in many developing countries, including some that have recently implemented trade reforms. India provides the most striking example. Although India underwent a drastic trade liberalization reform starting in 1991, the average tariff in manufacturing was over 30 percent in 1999 (Topalova (2004a)). Thus, there remains substantial scope for further tariff and NTB reductions and trade policy is likely to continue to be an important component of globalization at least in some of the lower income developing countries.

In addition to the role of trade reforms in fostering trade in final goods, recent work by Feenstra and Hanson (1996, 1997, and 2003) has emphasized the growing importance of trade in intermediate inputs. This phenomenon is also referred to as "outsourcing" or "production sharing". Recent trade liberalizations, coupled with the removal of restrictions on capital flows and technological change, have enabled firms to "outsource" some stages of production to cost-minimizing locations abroad, either through arm's length imports of intermediate inputs or by setting up their own production facilities in a host country. A country can be exposed to outsourcing as a purchaser of outsourcing activities (for example, firms in Hong Kong have been importing relatively labor-intensive intermediate products from China since the 1980's) or as a host of outsourcing activities (for example, Mexico's maquiladoras have been used to assemble intermediate products into final goods made for U.S. markets since the early 1980's).

In empirical work, one would ideally like to rely on a measure of exposure to outsourcing that is related to plausibly exogenous changes in trade and capital controls. From the receiving country's perspective, this is subject to the same data constraints we discussed in the context of effective rates of protection. Consequently, the literature has mainly used the share of imported inputs in total purchased intermediate inputs in an industry as a measure of outsourcing (see Feenstra and Hanson (2003), Hsieh and Woo (2005)). Because direct data on imported inputs by industry are often not available, the above outsourcing measure is constructed by combining information from input-output tables with information on total trade flows of final products. As a result, it is subject to the same endogeneity concerns as trade flows. Furthermore, this measure of outsourcing suffers from the same measurement problems we discussed earlier in the context of tariffs regarding the concordances between trade data, industry data, and input output tables.

Related to "global production sharing" is the presence of multinational firms and foreign direct investment in developing countries. Their increased presence stems in part from the recent removal of controls on capital flows in these economies. The information on affiliates of multinational companies in developing countries is usually obtained from national surveys of firms such as the Census of Manufacturers. In some countries, for example Indonesia and Mexico, these surveys provide information on the nationality of the capital sources, so that one can identify whether a particular firm is partly foreign- owned. These surveys are also used to create measures of the presence of multinationals in an industry or region. Such measures usually capture the intensity of multinational activity by computing the share of foreign affiliates in total industry employment or output to capture horizontal linkages, or by additionally applying input-output tables to this information to capture an industry's exposure to FDI through vertical linkages. One concern with this measurement approach, raised recently by Keller and Yeaple (2003) in the context of the U.S., is that measures of an industry's exposure to FDI are highly sensitive to how the economic activity of a foreign affiliate is allocated across the various industries in which it is active (for example, main line of business vs. other lines). Another more general concern with these measures of FDI is that the decision of a multinational to purchase an existing plant or to locate in a country/industry may depend on unobserved wage and worker characteristics in a firm/industry/region, which creates the potential for simultaneity and selection bias.

Finally, the removal of capital controls combined with a shift away from fixed and towards more flexible exchange rate arrangements in many developing countries has exposed these countries to greater exchange rate volatility. To the extent that these exchange rate changes are partially passed through onto prices, the increased exposure to exchange rate volatility impacts firms' incentives to export (or import), and hence presents another channel through which globalization may have affected inequality.[2] The advantage of using exchange rate shocks as a measure of globalization is that they are easy to measure, plausibly exogenous – at least from a single industry's perspective – and large in magnitude. The disadvantage is that they represent aggregate shocks to an economy; they do not exhibit any variation across industries or

[2] The evidence suggests that for exchange rate shocks of the magnitude recently witnessed in several Latin American and Asian economies (for example, Mexico in 1994, Brazil in 1998, and Thailand, Korea, Indonesia, etc. in 1997), the price effects are larger than what is typically observed for more modest shocks. In these cases the exchange rate shocks should be more accurately characterized as currency crises. The fallout from currency crises has potentially its own implications for inequality, but we do not explore these implications in this study.

plants, so that separating their effect from the one of other concurrent macroeconomic shocks or policies can be challenging.

2.2 Measuring Inequality

The ideal measure of inequality would be based on comparisons of individuals' well-being over their entire lifetime. The most appropriate variable for capturing lifetime well-being is arguably consumption (see Deaton (1997) for a related discussion). Compared to income, consumption offers three advantages. First, to the extent that consumers can intertemporally shift resources through lending and borrowing, current consumption better captures life-time well-being. This argument may be less relevant for developing economies characterized by severe capital market imperfections, yet the evidence suggests that even in these countries some borrowing and lending does take place (though this may occur in informal credit markets and at exceedingly high interest rates). Second, reporting problems are less pronounced for consumption than income. Specifically, it is well documented that high income households tend to underreport their income (but not necessarily their consumption), while most surveys collect data on pre-tax, and not after-tax income. Finally, many policies – trade policies in particular – affect the relative prices of consumer goods so that they impact consumers not only through income changes, but also through changes in the purchasing power of their current incomes. Inequality measures based on consumption data are by nature better suited to capture this effect.

Despite these advantages consumption is rarely used as the basis for measuring inequality in empirical studies of the effects of globalization.[3] The reason is that many developing countries do not consistently report expenditures in their household surveys. The Living Standards Measurement Surveys (LSMS) project of the World Banks aims at changing this pattern, so that research in future years may be able to take advantage of expenditure data to measure inequality. To date however, most empirical studies had to contend themselves with employing income based measures of inequality, given that some measure of income is always included in household surveys. The most frequently used inequality indices (such as the Gini coefficient or the coefficient of variation) are based on the second moments of the observed income distribution.

[3]Porto (2006), Nicita (2004), and Topalova (2004a) are notable exceptions.

The suitability of these indices for capturing true changes in inequality, especially over longer periods of time, has been questioned recently for a variety of reasons. First, even though most household surveys include some measure of income, the coverage of income sources and taxes tends to vary both across countries, and, for a specific country, across years; items such as in-kind gifts and government transfers, implicit rent from own housing, and capital income and profits, tend to be particularly problematic. To avoid these problems, many studies have focused on a more narrow measure of inequality, wage inequality. A second set of problems is related to the fact that high income households are known to have higher non-response rates and underreport income, so that the income distribution presented in household surveys is a truncated version of the true one.[4] Mistiaen and Ravallion (2003) and Deaton (2003) have shown that with non-response rates increasing in income, it is *possible* that the variance of the truncated distribution is lower than the variance of the true distribution. In the context of inequality measurement this counterintuitive result implies that indices based on the second moments of the observed (truncated) income distribution may be misleading about changes in inequality; this is especially the case if the comparisons involve long periods of time during which income has substantially increased. On a similar note, Banerjee and Piketty (2004, 2005) document that income data based on Indian tax returns (where underreporting is presumably less of an issue compared to household survey data) indicate that the "very rich" in India, i.e., those who were in the top 0.1 percent of the population, were getting richer faster than anyone else in the 1990's. This group seems to be missing from the Indian household survey (National Sample Survey).[5] Though tax return data provide a superior source of information for the purpose of documenting income inequality, they have not been used in studies of the causes behind changing trends in inequality, since the confidential nature of the data prevents researchers from linking the income figures to other individual-specific variables of interest.

Another potential problem in inequality studies is that household surveys are often redesigned, so that the wage or income data are not comparable across years. Changes in

[4] Szekely and Hilgert (1999) for example report that in many Latin American household surveys the top 10 incomes reported in a given year are about the same as the salary of an average manager in the country under consideration. This suggests that the truly rich households are missing from the surveys.

[5] However, the authors point out that this group is too small for its absence to explain important discrepancies in the measurement of inequality and poverty based on NSS and the national accounts data.

topcoding limits, for example, can affect the range of top incomes reported in the surveys[6]. In addition to these reporting problems, all inequality studies face the conceptual issue of whether to focus on households or individuals. While the primary interest lies in the well-being of individuals, people usually live in households and share resources. To take this into account many studies have focused on some variant of per capita income. The simplest one is obtained by dividing household income by family size; more sophisticated measures take into account consumption scale economies within the household and differences in the needs among individuals of different gender and age to construct scale- and adult equivalent-adjusted versions of per capita income (see Deaton (1997)). The problem with such adjustments is that the constructed index of well-being will ultimately depend on the scale and adult-equivalency parameters, which may be poorly known.

Given the conceptual and measurement ambiguities involved in measuring inequality, cross-country comparisons of inequality figures or investigations of long-term trends in developing countries appear problematic. Studies of the effects of trade openness on inequality have traditionally been narrower in focus, as the majority of them have analyzed concrete trade liberalization episodes or other policy changes in specific countries. Because most of these episodes unfolded over the course of a few (2-3) years and the related studies focus on one country at a time, many of the aforementioned measurement problems are less pronounced here. Furthermore, the increase in inequality documented in many developing countries has been associated with an increase in the so-called skill premium, i.e., the wage gap between skilled and unskilled workers. Motivated by this finding, a substantial amount of related work has focused on an even more narrow measure of inequality than the ones discussed above: the inequality between skilled and unskilled workers.

The definition of skill varies depends on the kind of data employed. Studies that use household survey or labor force survey data define skill based on the education of the household head. Studies that exploit plant- or firm-level data typically differentiate between production and non-production, or blue-collar and white-collar workers. This latter categorization is clearly unsatisfactory, especially since the skill composition of these groups is likely to vary over time. For many countries however plant-level data are more readily available over several years;

[6] This was for example the case in Colombia, where a change in the topcoding procedures used in the Encuesta Nacional de Hogares (National Household Survey) in 1994 affected the reported incomes of the richer households.

moreover, they offer the advantage of providing information about the sector of employment at a more disaggregate level compared to household surveys that in many developing countries report industry information only at the 2-digit level. Fortunately, cross-tabulations of matched worker and employer surveys at the plant level in the U.S. and the U.K. indicate a close relationship between the production/non-production status of workers and their educational level;[7] non-production workers have more years of schooling and appear to be uniformly better paid. Although there is no direct evidence on this issue for developing countries, these correlations are encouraging regarding the suitability of plant-level data for analyzing the differential impact of globalization on workers of different skill level. As with the income or wage based measures of inequality, comparisons over short periods of time within a country are likely to be more credible than cross-country comparisons, or analyses of long time trends.

3. Overview of the Evidence

Despite the difficulties associated with the measurement of globalization and inequality, research in the past 15 years has tried to document their evolution by increasingly relying on new and better data sources. In this section we summarize the existing evidence focusing on the experience of a few representative countries (Mexico, Colombia, Argentina, Brazil, Chile, India, and Hong Kong) during the 1980's and 1990's[8] . Our choice of time periods and countries is dictated by the timing of trade reforms and data constraints. With few exceptions (Chile for example), most developing countries did not liberalize their trade regimes and did not open their borders to foreign direct investment until the 1980's. The countries discussed in this section are representative in that sense, since they all experienced drastic trade liberalization during the past two decades. Furthermore, they all collect the detailed micro data required to generate various measures of inequality that span the period before, during, and after policy changes that increasingly exposed these countries to international markets. Consequently, these countries have

[7] See Berman, Bound and Machin (1997) and Machin, Ryan and Van Reenen (1996).

[8] One obvious omission is the set of South East Asian countries (South Korea, Taiwan and Singapore) that underwent trade reforms in the 1960's and 1970's. Unfortunately, neither detailed data on tariffs nor micro surveys are readily available for these countries. The existing evidence on these countries has been discussed in detail in Wood (1999). We also leave out China because empirical work on the relationship between inequality and globalization has just recently started to emerge for this country. Wei and Wu (2002) is to our knowledge the only study that examines the link between openness and inequality in China.

served as a testing ground for most empirical research investigating the channels through which globalization may have affected inequality.

3.1 Globalization

Table 1 provides an overview of the globalization experience of the countries mentioned above (changes in trade policy and other relevant measures of globalization) along with the reported changes in inequality measures. The same table also lists other major reforms that took place during the 1980's and 1990's in each of these countries.

Let us first focus on changes in globalization measures, starting with trade liberalization episodes. Table 1 indicates that although some countries (i.e., Argentina and Colombia) experimented with short-lived trade reforms during the late 1970's, most countries implemented unilateral trade reforms in the mid- to late 1980's and early 1990's: Mexico 1985-87, Colombia 1985-1991, Argentina 1989-1993, Brazil 1988-1994, India 1991-1994. Chile is an exception as it liberalized its trade regime early, from 1974 to 1979.

An important feature of the above reforms was that they drastically reduced tariffs, which were high prior to liberalization and a crucial component of trade protection. The high tariff rates reflect the lack of participation of most developing countries in the tariff-reducing rounds of the GATT/WTO prior to their unilateral trade reforms: some developing countries were not GATT members (for example, Mexico); others (such as Brazil, Colombia, India) were GATT members on paper, but did not have to reciprocate tariff concessions negotiated with the GATT until the Uruguay Round.[9] Table 2 reports the average tariffs for the manufacturing industries in the countries of Table 1, in a year before and after the reforms.[10] The table illustrates that prior to the reforms tariff levels were high, ranging from 117% in India to 23.5% in Mexico. The comparison of average tariffs before and after the reforms suggests drastic tariff reductions: for example, 85 percentage points in Chile, 73 percentage points in India, and 12.5 percentage points in Mexico. These tariff declines in developing countries are in stark contrast to the low tariff levels and rather minor tariff policy changes in the developed countries during this period. For example, in the Unites States—a country whose tariff policy resembles the policy of most other developed economies— the average tariff was only 4.8 percent in 1982; tariffs declined on

[9]Article XVIII of the GATT granted exemption from tariff concessions to developing countries.
[10]For each country, the actual year used to describe the period before and after the reforms is recorded below the country name in column 1.

average by .6 percentage points to 4.2 percent between 1982 and 1992 (Bernard, Jensen, Schott (2005)).

In addition to tariff reductions, the unilateral trade reforms also reduced non-tariff barriers to trade. Unfortunately, as discussed earlier, the information on exact measures of NTBs is often not available, especially for longer periods surrounding trade liberalization episodes. However, the available data on average NTB coverage ratios in manufacturing industries before and after the reforms (presented in columns 3 and 4 of Table 2) suggest that non-tariff barriers to trade were high prior to trade reforms and that liberalization drastically reduced their levels. For example, in Colombia the NTB coverage ratio declined from 72.2% in 1986 to 1.1% in 1992. In Mexico, the share of manufacturing production subject to import licenses dropped from 92% in 1985 to 23.2 % in 1988. In India, the share of manufacturing imports covered by non-tariff barriers dropped from 80% in 1990 to 17% in 1999 (Mishra and Kumar (2005)). Although we do not have access to measures of NTBs in other countries, non-tariff barriers to trade were virtually eliminated in Chile (Dornbusch and Edwards (1994)) and Brazil (Hay (2001)), while Argentina eliminated all import licenses (Galiani and Sanguinetti (2003)).

Table 1 suggests that subsequent to unilateral trade reforms, several countries also lowered their trade barriers vis a vis specific trading partners through regional trade agreements. The most notable example is Mexico's entry into a free trade agreement with the U.S. and Canada in 1994 (NAFTA). Argentina and Brazil joined Mercosur in 1991, along with Uruguay and Paraguay. These regional trade agreements likely induced changes in the geographic composition of trade in these countries; however, the changes in trade policy implied by these agreements were substantially smaller than the declines in trade barriers observed during the unilateral trade reforms.

Furthermore, several countries (most notably Mexico and Hong Kong) experienced increases in trade in intermediate inputs associated with global production sharing. For example, after the capital control liberalization in Mexico in the mid- 1980's, many U.S. companies shifted relatively low-skill intensive stages of production to Mexico by setting up foreign assembly plants (maquiladoras). Intermediate inputs were imported to Mexico, assembled in maquiladoras, and the final products exported to the U.S. The importance of maquiladoras for the Mexico-U.S. trade was growing during the 1980's and 1990's, so that by 2000, maquiladoras accounted for 35% of Mexico's imports from the U.S., and for 48% of its exports to the U.S.

(Hanson (2004)). Similarly, when China liberalized its markets, many firms in Hong Kong shifted their relatively less-skilled labor intensive activities to Chinese border regions, while specializing in higher-skill intensive activities, such as headquarter services at home. As a consequence, the share of intermediate inputs that were imported from China in Hong Kong's total intermediate inputs rose from less than 10% in 1976 to almost 50% in 1996 (Hsieh and Woo (2005)). A related development has been the growing presence of affiliates of multinational companies in developing countries during the 1980's and 1990's following their capital market reforms. This is illustrated by the increased importance of foreign direct investment inflows in the economies of developing countries. Table 2 reports FDI inflows as a share of GDP in select countries and illustrates that, while the share of FDI in total GDP was below 1% in 1980's in these countries, it grew to about 3 % in 2000 for Colombia and Mexico, to 4% in Argentina, and 5% in Brazil. In India however it is still about .5 % of GDP.

Finally, Table 1 indicates that many developing countries experienced large currency fluctuations during the 1980's and 1990's. In some instances, these exchange rate changes may have exposed the relevant countries to international markets more than the trade reforms. Verhoogen (2006), for example, argues that Mexico's 1994 peso crisis, during which the peso lost half of its original value, overshadowed the average tariff changes from NAFTA.

3.2 Inequality

The information on inequality is based on empirical studies that have utilized micro surveys of households or firms from the country in question. The relevant sources are cited in the notes to the table. Table 1 reports several measures of inequality: skill premium, wage inequality, income inequality, and consumption inequality. Note that because of data constraints, some of these measures, most frequently consumption inequality, are missing for many countries.

We begin by examining the evolution of the narrowest measure of inequality: the wage gap between more and less skilled workers (the so-called skill premium). When information on an individual's education is available, we use the returns to completed university degree as a measure of the skill premium, and report evidence based on a Mincerian regression; when data on the educational attainment of workers are not available, as is the case with plant surveys, we use the relative wage of white- to blue-collar workers (or, alternatively, the relative wage of non-

production to production workers), to measure the skill premium. Several broad patterns emerge.

When we consider the 1980's and 1990's as a whole, all countries seem to have experienced increases in the skill premium. The skill premium increases were largest in Mexico, where the return to university education (relative to primary education) increased by 68% between 1987 and 1993 (Cragg and Epelbaum (1996)). In other countries the skill premium increased too, but by less: for example, the return to a university degree increased by 16% (relative to primary education) in Colombia between 1986 and 1998 (Attanasio et. al. (2004)), by over 20% (relative to no complete education) in Argentina between 1992 and 1998 (Gasparini 2004), by 13% in India (relative to primary education) between 1987 and 1999 (Kijima (2006)), and by 10% among men (relative to no complete education) in Brazil (Gasparini (2003)). Given that relatively large skill premium increases have been documented for several countries, it is unlikely that they are all a figment of the measurement problems discussed in section 2, although the exact magnitudes of the changes may be affected by these problems.

A further pattern evident in Table 1 is that the skill premium does not steadily increase throughout the two decades in all countries. Interestingly, the skill premium increases seem to chronologically coincide with the trade reforms in several countries. For example, the skill premium grew steadily during the 1980's and 1990's in Mexico,[11] which implemented a large trade reform in the mid-1980's and was continually exposed to other forms of globalization such as outsourcing or FDI for the next two decades. On the other hand, skill premium increases in Colombia, Brazil, Argentina, and India were mainly confined to the 1990's; the latter countries implemented the bulk of their trade reforms in the early 1990's. In Chile, where the reforms took place during the 1970's, the skill premium increased during the 1970's and 1980's, declined in the early 1990's (Robbins (1996), Beyer et. al. (1999)), and then increased again between 1990 and 2000 (Gasparini (2003)). These time-series patterns have led many casual observers to conclude that globalization was the main source of growing inequality in these countries. As we argue in the next section, inference based on these before and after comparisons can be misleading.

[11] Most evidence on Mexico points to a rising skill premium, at least until the mid-1990's. Gasparini (2003) and Hanson (2004) document skill premium increases over the entire decade using nationally representative household survey and population census data, respectively. However, Robertson (2004) argues that the skill premium declined (or remained relatively stable) after the mid-1990's in urban areas.

Finally, note that changes in the education-based measure of the skill premium and the relative wage of white-collar to blue-collar workers tend to move in the same direction in countries and periods for which both measures are available. For example, in Mexico the average relative wage of non-production workers increased almost by a factor of 1.5 between 1987 and 1995 (Robertson 2000). This parallel movement is reassuring for studies that rely on the white-collar/blue collar distinction (or non-production/ production worker distinction) as a measure of skill.

The observed changes in the skill premium are generally (but not always) reflected in changes in the wage inequality (usually measured by the Gini coefficient of log wages, or the 90-10 log-wage differential). As with the skill premium, wage inequality increased in Mexico[12] in the 1980's and early to mid-1990's, in Chile during the 1970's and 1980's, and in Colombia, Argentina, and India during the 1990's. Interestingly, increases in the skill premium are not mirrored in increases in wage inequality in Brazil, where the Gini coefficient remains remarkably stable during 1980's and 1990's (Sanchez-Parama and Schady (2003), Green et. al (2001), Gasparini (2003)). Green et al. (2001) attribute this finding to the small share of university graduates in total population. Unfortunately, studies that decompose changes in wage inequality into changes in the distribution of observable skills (such as education), changes in the prices of observable skills, and changes in unobservables, which are common in the literature on the evolution of inequality in the U.S., rarely exist for developing countries. Kijima (2006) provides an example of such decomposition. She formally shows that most of the increase in the post-liberalization wage inequality in urban India can be attributed to increases in the prices for observable skills, and in particular to the return to tertiary education. However, the wage inequality increase of the 1980's (when returns to tertiary education remained relatively stable), was largely due to changes in the quantity of observed skill. Similarly, Gasparini (2004) finds that wage inequality increases during the 1990's in Argentina can be to a large extent attributed to the rising skill premium, while changes in the educational composition of the workforce importantly contributed to growing wage inequality in the 1980's (when the skill premium actually slightly declined).

[12]Increases in wage inequality in Mexico during the 1990's are more pronounced in the first half of the decade, especially in urban areas.

Income-based measures of inequality have been used less widely in the literature on globalization and inequality. As mentioned earlier, this is partly due to the lack of reliable survey data on non-wage sources of income (especially in Latin American countries). Surveys that contain such information are more recent and often less frequently conducted than labor market surveys. The limited information available in Latin American countries (mainly drawn from Gasparini (2003)) suggests that income inequality and wage inequality move in the same direction, although changes in income inequality are at times less pronounced than changes in wage inequality or the skill premium (for example, in Mexico and Colombia during the 1990's). Finally, a consumption-based measure of inequality is to our knowledge available over this period only for India, which has a nationally representative consumer expenditure survey that spans the 1980's and 1990's.[13] In urban areas, consumption inequality moves in the same direction as income and wage inequality; it is relatively stable during the 1980's (a period prior to major liberalization), but it increases during the 1990's. Although this pattern cannot be generalized to other countries, it is reassuring that at least in the one case where both income and consumption inequality measures are available, they both move in the same direction.

In summary, the evolution of various measures of inequality suggests that most of the developing countries experienced an increase in inequality during the past two decades. More importantly, we find no evidence that any measure of inequality decreased over this entire period when compared to earlier periods characterized by less globalization. As we note in the introduction to this section, our discussion abstracts from several potentially important countries, most notably China. Branstetter and Lardy (2006) provide an excellent detailed review of the process through which China increasingly liberalized its trade and foreign direct investment policies during the 1980's and 1990's, culminating with the country's entry into WTO in 2001. During this period, income inequality in China has increased (Wei and Wu (2002)), so that China's experience is consistent with the positive correlation between inequality and exposure to globalization noted above.

The survey of the evidence confirms Wood (1999), who noted that inequality increased in several middle-income Latin American countries that liberalized their trade regimes during the 1980's and 1990's. It further suggests that this positive relationship also holds in the cases of

[13] There is however a large debate on whether these survey data allow for over time comparisons during the 1990's given the changes in the survey questionnaire. See Deaton and Dreze (2002) for an excellent discussion.

India, China, and Hong Kong. As noted previously by Wood (1999), the experience of developing countries that globalized during the 1980's and 1990's contrasts with the experience of several South East Asian countries (South Korea, Taiwan, Singapore) that underwent trade reforms in the 1960's and 1970's. The latter observed a *decline* in inequality as they opened up their economies to foreign markets. We discuss the possible explanations proposed by Wood (1999) for the differences in these correlation patterns between countries that globalized in the 1960's and 1970's and countries that globalized in the 1980's and 1990's in section 5.1.1. Unfortunately, neither detailed data on tariffs nor micro surveys are readily available for the early globalizers during the periods of reform, to allow us to examine whether the declining inequality in these countries was *caused* by globalization as opposed to being just coincidental.

In general, one needs to be careful drawing conclusions regarding the link between globalization and inequality simply based on before and after comparisons. Table 1 lists other important reforms that took place during periods of external liberalization in selected countries. Perhaps the most striking feature of these reforms is the fact that not a single country implemented trade reforms or FDI liberalization in isolation from other policy changes. For example, the most drastic trade policy liberalization in Colombia in 1990/91 coincides with changes in labor market regulation that substantially increased the labor market flexibility. Mexico's 1985 trade reform took place amidst privatization, labor market reform, and deregulation. These concurrent policy reforms combined with the simultaneous change of several globalization measures make it particularly difficult for the researcher to disentangle the effects of trade liberalization (or other aspects of globalization) from the effects of other policies.

4. Identification of Trade Policy Effects

The previous section documents that many developing countries experienced an increase in inequality as they became more exposed to various dimensions of globalization. But establishing a causal link between globalization and inequality by providing credible empirical evidence poses several challenges beyond the measurement issues discussed in section 2. We highlight these issues for the case of trade policy below, however similar concerns exist with respect to other aspects of globalization

Although there are several channels through which trade policy can affect inequality within a country (we discuss these channels in detail in the next section), a common theme in

many of the mechanisms discussed in the theoretical literature is that trade policy affects wage inequality by changing the relative demand for skilled workers. The main empirical challenge is how to isolate the effects of trade from other contemporaneous changes in the economic environment that may have induced shifts in the relative demand and supply of skilled labor. Governments in developing countries often implement trade reforms concurrent with other economy-wide policy changes, ranging from labor market reform to industrial de-licensing, tax reforms, and privatization; Table 1 illustrates the prevalence of reforms that may have had confounding effects on wage inequality.

4.1 A General Equilibrium Approach

Any study that attempts to address the ambitious question of "what is the *overall* effect of trade liberalization on inequality in a country" thus requires strong modeling and identification assumptions. Porto (2006) is an example of such a study. He examines the implications of the Argentinean trade reform for the distribution of household welfare in a general equilibrium model of trade. In his framework, trade policy influences household welfare by changing the relative prices of goods, which in turn affect labor income and consumption. Because households in different parts of the pre-reform welfare distribution differ in the composition of their consumption bundles and their education endowments, they will be differentially impacted by price changes. For example, households in the left tail of the welfare distribution spend a higher share of their budget on basic items such as food, and are less educated than richer households. The model, combined with predictions about the changes of traded good prices, estimates of wage-price elasticities, and estimates of the responsiveness of the non-traded good prices to traded good prices, can be used to simulate the effect of trade policy changes on the distribution of household welfare (i.e., household expenditure per capita).

The main advantage of this approach is that it ultimately yields an answer to the important question of how trade reform affects the welfare distribution within a country in a general equilibrium setting that explicitly accounts for intermediate good linkages and non-traded goods. However, the predictions of the model depend in a crucial way on estimates of parameters that are typically not known: the wage-price elasticities; the elasticity of non-traded good prices with respect to traded good prices; and the degree of pass-through from trade policy changes to product prices. These parameters are difficult to estimate consistently with time-

series data on wages and prices in a setting when many other policies change contemporaneously with trade. Moreover, if labor and capital are assumed to be mobile within a country, as is often the case in long-run general equilibrium trade models, then the level of industry aggregation needed to empirically implement the general equilibrium approach is very high, implying that there is not enough variation in the data to identify the relationship between trade policy and the variables of interest (prices, wages, etc.). For example, in the Hecksher-Ohlin model, both skilled and unskilled labor are assumed to be perfectly mobile, so that – no matter what the cross-sectional pattern of trade protection or liberalization is - the wages for skilled and unskilled wages should be equalized across different sectors in an economy. If this were true, it would eliminate the prospect of exploiting any cross-sectional variation in trade barriers and wages in order to identify the relationship between trade and wage changes.

4.2 Differential Exposure Approach

An alternative approach to identifying the effects of trade liberalization on the wage or income distribution is taken by several recent studies that have focused on cross-sectional variation in changes in trade protection; such studies examine whether within a country, industries or regions that were more exposed to trade liberalization, experienced smaller or bigger changes in wage or income inequality than less-exposed industries/regions (Topalova (2004a), Hanson (forthcoming), Goldberg and Pavcnik (2005), Wei and Wu (2002)). The empirical framework in this line of work usually exploits household survey data that include information on individuals' industry of occupation, wage, region of residence, and various demographic characteristics such as age, education, etc., to construct measures of average wages by industry (after controlling for relevant worker, industry and job characteristics) or measures of wage or income inequality by region. These measures are then related to trade policy changes over the span of a trade liberalization episode to identify the effect of trade barrier reduction on inequality. To the extent that the tariff changes differ across industries/regions *and* are exogenous (or can be instrumented for), the differential exposure of various industries/regions to tariff changes enable the researcher to separate the effects of trade liberalization from the effects of concurrent policy changes. The underlying premise of this line of work is that labor is not perfectly mobile across industries and/or regions (or at a minimum that certain skills are sector-specific and not easily transferable across industries), so that wages are not equalized across

sectors/regions. This premise is plausible in the short- and medium-run, but questionable in the long run. At any rate, it is important to note that failure of this premise to hold in practice does not invalidate the approach; it simply implies that one would *not* find any differential trade policy effects across industries/regions in this case, as wages are equalized across industries/regions. However, studies that have exploited industry or regional variation in developing countries do find effects, suggesting that the assumption of constrained labor mobility is more appropriate in the context of developing countries.

The main advantage of approaches that exploit differential time-changes in trade protection across cross sectional units is that they require much weaker identification assumptions than the general equilibrium approach described above, so that the causal link between trade and inequality is perhaps more convincingly established. On the other hand, such approaches can only identify industry- or region-specific deviations from aggregate trends that could in principle in part be due to trade policy. This limitation is discussed in Topalova (2004a) who exploits the differential exposure of Indian districts to trade liberalization to identify the effects of trade on poverty. Her results indicate that districts that were more exposed to liberalization experienced a *relative* increase in poverty (or, more accurately, a smaller decrease in poverty). However, poverty declines dramatically in India over this period. While her approach can plausibly identify the role of trade in explaining district-specific deviations from this aggregate trend, it cannot identify the role of trade liberalization in explaining the trend itself.

An additional limitation of the aforementioned studies is that their usual focus on nominal rather than effective tariff rates implies that they ignore intermediate input linkages, so that they are ultimately partial equilibrium in nature. This focus is however not inherent in the nature of the identification approach, but rather dictated by data constraints; effective rates of protection are available for a few, isolated years at best, and even then, they tend to be noisy. Fortunately, for the few years for which effective rates are available, the correlation between nominal and effective rates of protection appears to be positive and high, so that the findings based on nominal tariff rates are likely to be robust to using effective tariff rates as a measure of protection. At any rate, this latter shortcoming could in principle be addressed with better data that would allow one to compute effective rates of protection.

4.3 The Endogeneity of Trade Policy

Another challenge facing the literature on trade and inequality is that trade policy is the outcome of a political process and thus endogenous. While there is a large theoretical and empirical literature on the determinants of the protection structure across industries, empirical work on trade and wages has only recently focused on the endogeneity of trade protection and liberalization. The concerns about the endogeneity of trade policy and political economy of protection apply to all studies. For example, in studies focusing on the overall effects of trade reform, the political economy of protection might affect the assumptions on the expected price changes subsequent to the reforms and the consistency of the estimates of wage and cross-price elasticities.

Similarly, studies that exploit cross-industry or cross-regional changes in the pattern of protection have to answer the question, is it valid to treat such changes as exogenous? Fortunately, the nature of the tariff reforms in several developing countries such as Colombia, Brazil, Mexico, and India makes the usual concern about the endogeneity of trade policy in the context of these countries' trade liberalization potentially less severe. Their governments' goal in implementing trade reforms was to lower tariff levels across industries to more uniform levels that were negotiated with the WTO, rather than cater to special lobby interests; as a result, industries with initially higher level of protection experienced greater tariff declines. Thus, trade liberalization did not simply lower tariff levels, but also changed the structure of protection across industries. In fact, studies document that industries with larger pre-reform tariffs experienced larger tariff changes in Colombia (Goldberg and Pavcnik (2005)), Brazil (Pavcnik et. al. (2004)) and India (Topalova (2004a)). This pattern suggests that industry lobbies may have had less influence on the magnitude of the tariff *changes* during the reform period.

With these methodological issues in mind, we now examine the existing evidence on various channels through which trade policy has affected inequality.

5. The Relationship between Globalization and Inequality

Globalization affects individuals through three main channels: changes in their labor income, changes in relative prices and hence consumption, and changes in household production decisions. Consistent with the income- or wage-based measurement of inequality, most research to date has focused on the first channel. The first five parts of this section are therefore devoted

to summarizing the evidence related to the effects through the labor income channel. Since the increase in the skill premium has been identified as one of the main contributing factors to rising wage inequality, we start by reviewing the main explanations for the widely documented increase in the skill premium (part 5.1). Next we discuss other ways through which globalization may have impacted the income distribution: transitional unemployment (part 5.2); changes in industry wages (part 5.3); uncertainty (part 5.4) and potential effects on labor market standards (part 5.5). The sixth part of this section focuses on the effects of globalization on household production and consumption decisions.

5.1 Explanations for the Increase in the Skill Premium

Whatever explanation for the widening wage gap between skilled and unskilled workers in many developing countries one adopts, there seems to exist wide agreement that the skill premium increase was driven by an increase in the demand for skilled workers. The main evidence on this issue comes from studies that have documented that wages and employment in various skill categories have moved in the *same* direction implying that demand shifts dominated (Robbins 1996, Sanchez-Paramo and Schady (2003)). The related arguments are similar to the ones used in the context of the inequality debate in developed countries, but appear even more convincing when applied to developing countries, as many of them (Latin American countries in particular) did not experience the same increase in the supply of educated workers as the U.S. and East-Asian economies (Attanasio and Szekely (2000), Sanchez-Paramo and Schady (2003)). The causes of the increased demand for skilled workers have however been the subject of intense debate.

(1) Stolper-Samuelson Effects

The most direct link between trade openness and changes in the skill premium is provided by the best known general equilibrium model of International Trade, the Heckscher-Ohlin model. This model has shaped thinking about the distributional effects of trade openness in the last decades, even though the theoretical and empirical shortcomings of the model are widely recognized by now[14]. In its simple 2x2 version the model predicts that countries that are relatively rich in unskilled labor will specialize in the production of goods that are unskilled-labor intensive. The

[14] On the theoretical side, the model rests on extremely restrictive assumptions such as perfect competition, perfect labor and capital mobility within a country and fixed technology. On the empirical side, there has been no support for the predictions of the model, at least not in its strict version.

connection to the income distribution is provided by the model's companion theorem, Stolper-Samuelson, that links changes in product prices to changes in factor returns. A trade-liberalization-induced increase in the price of unskilled-labor-intensive products should according to Stolper-Samuelson increase the return to the factor that is intensively in the production of these products, unskilled labor. In contrast, the expected decrease in the price of the skilled-labor intensive imported products should lead to a decline in the wage of skilled labor. Based on this theorem and the empirical evidence suggesting that developing countries are richly endowed with unskilled labor[15], one would expect the distributional changes induced by trade liberalization in developing countries to favor the unskilled workers.

The general equilibrium nature of the Heckscher-Ohlin model makes it extremely hard to bring it to the data. Given that the model's predictions refer to economy-wide factor returns, one has only one observation per year to work with. In theory one could try to identify Stolper-Samuelson effects by relating trade-policy-induced relative price changes to factor returns over time, but in practice this approach is fraught with problems. Price data are often incomplete, while the changing mix of goods produced with different factor proportions within statistically defined product categories makes price comparisons over time less informative than one would have hoped. Furthermore, prices are determined endogenously and may change for reasons unrelated to trade. For these reasons a direct link between goods and factor prices as suggested by general equilibrium trade models has been empirically elusive.

Despite the lack of direct evidence on Stolper-Samuelson effects, it seems safe to say that the widening wage gap between skilled and unskilled workers in the last two decades in many developing countries that are presumed to be relatively abundant in unskilled labor seems inconsistent with the spirit of the Hecksher-Ohlin theory. In principle it is possible to reconcile the evidence on wage inequality with the theory by considering various extensions of the original model. However, several other patterns documented in developing countries seem inconsistent with Hecksher-Ohlin.

[15] The most influential paper on this issue has been the study by Krueger et al (1981) that calculated the factor content of trade in manufactures for several developing countries in the 1970's and showed that the exporting sectors were less skill-intensive than the import-competing sectors. These results have been confirmed in several other studies (see Wood (1999) for an overview). The only caveat is that most of these studies do not cover the last two decades (they typically include data up to the mid-1980's) and do not differentiate between higher-skilled and lower-skilled trading partners for each developing country.

First, a fundamental prediction of factor endowment based trade theories is that the adjustment process to trade reforms would involve labor reallocations from sectors that experience price declines, and hence contract, towards sectors that experience relative price increases and hence expand. However, most studies of trade liberalization in developing countries find little evidence in support of such reallocation across sectors. The lack of labor reallocation following trade reform has been documented by Revenga (1997), Hanson and Harrison (1999), and Feliciano (2001) for Mexico; by Attanasio, Goldberg, and Pavcnik (2004) for Colombia; by Currie and Harrison (1997) for Morocco; by Topalova (2004a) for India, and by Wacziarg and Seddon (2004) in a cross-country study of trade liberalization, where, however, trade liberalization is captured only through a time dummy. These studies attribute the lack of labor reallocation in response to trade reform to either rigid labor markets (so that the adjustment to trade liberalization occurs through relative wage adjustments (Colombia, Mexico, India)), or to the existence of imperfect product markets (so that firms respond by lowering of profit margins (Mexico, Morocco) and not through labor reallocation across sectors). An alternative line of explanation for the lack of labor reallocation is suggested by recent work by Munshi and Rosenzweig (2005), who also document very low spatial (and social) mobility in India.[16] They argue that the social insurance provided by sub-caste networks creates a disincentive to migrate or out-marry, out of fear of losing the services of these networks. Interestingly, the increase in inequality (possibly due to the Indian reforms) is shown to lower mobility (which was low to start with) even further, as sub-castes successfully coped with the consequences of rising inequality. In contrast, Grossman (1986) and Revenga (1992) find greater employment than wage sensitivity to trade shocks for the U.S. These differences in the adjustment mechanisms are consistent with greater labor mobility in the United States compared to the developing economies.

A second piece of evidence that seems inconsistent with Stolper-Samuelson effects is that empirical work on developing countries typically finds that the share of skilled workers has increased substantially within *most* industries in the last two decades. Within-industry increases in the share of skilled workers have been reported for Argentina, Brazil, Mexico, Chile, and

[16] Further evidence on this issue includes Topalova (2004a), who documents little spatial mobility across districts in India during the 1980's and 1990's, and Chiquiar (2004), who finds little mobility of individual across Mexican regions in 5-year intervals surrounding the Mexican trade reforms in the late 1980's and 1990's (see Table 5 in his paper).

Colombia (Robbins (1996), Sanchez-Paramo and Schady (2003), Attanasio, Goldberg, Pavcnik (2004)), Hong-Kong (Hsieh and Woo (2005) and India (Kijima (2006)). The higher share of skilled workers in most industries has often been interpreted as evidence in favor of skilled-biased technological change.[17]

Given these patterns, several explanations for the increase in the skill premium have been suggested in the literature. The first one is to consider simple extensions of the model that would reconcile the theory with the evidence. Specifically, the simple Stolper-Samuelson predictions may be overturned if one introduces non-traded goods or additional factors in the model. Suppose for example that there are three factors of production, skilled labor, unskilled labor, and land (or natural resources, or primary factors). Suppose further that some developing countries are relatively abundant in land (as is the case with many Latin American countries), and that land is a complement to skilled labor. Then greater trade openness will favor land-intensive goods in these countries. If production of these goods requires a higher ratio of skilled to unskilled workers, trade openness will benefit skilled workers. A similar argument can be applied to the role of non-traded goods. Such arguments rest however on the rather implausible assumption that land, or natural resources, require a higher ratio of skilled workers; to our knowledge, there has been no evidence supporting this claim. Moreover, even in that case, one would expect labor reallocation to be the mechanism through which the changes in the wage distribution are transmitted, and as noted above, the evidence on such reallocation has been lacking for developing countries.

Another line of explanation for the increase in the skill premium focuses on the pattern of protection prior to trade liberalization in many developing countries, and the skill intensity of the sectors that were impacted the most by trade reforms. Several studies have noted that, contrary to expectations, it was the unskilled labor-intensive sectors that were protected the most prior to trade reform. This protection pattern has been reported for Mexico (Hanson and Harrison (1999), Robertson (2000, 2004 for pre-NAFTA period), Morocco (Currie and Harrison (1997)), and Colombia (Attanasio, Goldberg, Pavcnik (2004)). The same studies document that it was in fact the unskilled-labor intensive sectors that were impacted the most by tariff cuts. Given this evidence, the increase in the skill premium is exactly what Stolper-Samuelson would predict:

[17] This interpretation is not uncontroversial. We discuss it in more detail under "skill-biased technological change" in one of the following subsections.

since trade liberalization was concentrated in unskilled-labor-intensive sectors, the economy-wide return to unskilled labor should decrease – at least in the period immediately following the reforms. In fact, the only study that has to our knowledge exploited price data, Robertson (2004), documents that relative prices and relative wages in Mexico are closely related along the lines suggested by the Stolper-Samuelson theorem (see Figures 4 and 5). This argument demonstrates the advantages of exploiting the sectoral variation in tariff changes, as opposed to relying on time variation alone to identify the effects of trade policy changes. Studies that simply use "before-after-comparisons" to uncover the effects of trade liberalization miss the important fact that – unlike in textbooks of International Trade – the comparison is not between autarky and free trade, but rather between protection and "less-protection", so that the pattern of protection across sectors prior to liberalization is crucial in determining the effects of trade reforms.

Still, this argument is not completely satisfactory as it again implies sectoral labor reallocation – a prediction that no empirical study of trade liberalization in a developing country has found strong support for. Moreover, the initial pattern of protection that favored unskilled-labor intensive sectors seems a puzzle by itself. Why did countries abundant in unskilled labor find it desirable to protect the low-skill intensive sectors, when the pattern of comparative advantage would have suggested otherwise? One possible answer is that the protection patterns reflected political economy considerations that had little to do with comparative advantage. Another is that high tariffs in low-skill-intensive industries, such as textiles or footwear, were left over from a time in which these sectors were capital and high-skill intensive, and when the protection of these sectors would have been compatible with the patterns of comparative advantage. Naito (1999) offers an alternative explanation from a public finance perspective: He argues that, contrary to the view of traditional trade theory, tariffs imposed on unskilled-labor-intensive products can Pareto-improve welfare in a small open economy that uses a redistributive non-linear income system; this is because the tariffs change the unskilled/skilled wage ratio, which in turn reduces the incentive problem of income redistribution (Naito (1999), p. 181). Since the unskilled earn more, the tax burden of the skilled can be reduced; the reduction of the tax burden has a first order effect on welfare, while the distortion introduced by the tariff is only second order. This argument applies even to developed countries with flexible income tax systems, but much more so to developing countries that have fewer alternative means of

redistribution. A trade liberalization then sacrifices this redistribution in the hope of achieving enough growth to eventually compensate the less skilled.

Another possibility is that the recent entry of China and other low-income developing countries (India, Indonesia, Pakistan, etc.) in the world markets shifted the existing patterns of comparative advantage in middle-income countries. This possibility is examined in detail in Wood (1999). Wood postulates that while in the 1960's and 1970's middle-income countries had a comparative advantage in goods of low-skill intensity, in the 1980's and 1990's, when low-income developing countries started exporting to the rest of the world, the comparative advantage of middle-income countries shifted to goods of intermediate skill intensity. This shifting pattern of comparative advantage might explain why many middle-income countries found it necessary to protect their low-skill intensive sectors from imports from low-income countries. It would also explain why greater openness in these countries would not necessarily benefit low-skill workers, as the trade barrier reductions in low-skill intensive sectors (such as textiles) may lead to an increase in the imports from China, rather than increase of domestic production and exports. While this argument is a-priori plausible, there has been no direct empirical investigation of its implications to date. A more disaggregate analysis of imports and exports of middle-income countries that would differentiate between "more skilled", high-income trading partners and "less skilled", low-income trading partners might shed light into this question in the future.

A final explanation for the apparent tension between the increase in the skill premium and theoretical predictions is that trade affected the wage distribution through channels other than the ones suggested by simple Hecksher-Ohlin theory, or that there were other forces at work (some of which may have interacted with, or even been induced by, trade openness). A common theme in subsequent research on alternative channels through which trade affects inequality is to focus on the mechanisms that lead to increased relative demand for more educated labor within industries (as opposed to across industries). We consider these arguments next.

(2) The Role of Intermediate Goods and Outsourcing

Most trade models assume that all trade occurs in final goods: this assumption was also implicit in the above discussion of the Hecksher-Ohlin mechanism. However, recent work by Feenstra and Hanson (1996, 1997, 1999, 2003) has challenged this assumption and emphasized the

growing importance of trade in intermediate goods, the so called "outsourcing" or "global production sharing". They argue that the rapid expansion in "global production sharing" over the past two decades can explain part of the observed increase in demand for skilled workers in both developed and developing countries.

The basic framework in Feenstra and Hanson relies on the premise that production of final goods can be split into intermediate stages and that intermediate inputs differ in their skill intensities. Consequently, firms find it optimal to "outsource" some of the production stages to cost-minimizing locations abroad. Trade liberalization, coupled with a removal of capital controls opens new opportunities for firms to shift the production of some of these intermediate goods from developed to developing countries. While products shifted to developing countries would be characterized as unskilled-labor-intensive from a developed country's perspective, they appear skilled-labor-intensive when compared with existing domestic production activities from the developing country's point of view. As a result, "outsourcing" increases the average skill intensity of production in both the developed and developing economies, inducing an increase in the skill premium in both places.

While descriptive statistics on trade flows suggest that outsourcing is a potentially important phenomenon in the developing world (especially in South East Asia), the impact of outsourcing on wage inequality in developing countries has so far been examined only for Mexico and Hong Kong. Feenstra and Hanson (1997) found strong support for the "global production sharing" hypothesis for Mexico, where many U.S. firms export intermediate inputs to maquiladora plants, which assemble the inputs into final products. Similarly, Hsieh and Woo (2005) document a large increase in the relative demand for skilled workers in Hong Kong after firms reallocated much of the (relatively unskilled-labor intensive) production facilities from Hong Kong to China following China's FDI liberalization in the late 1970's. Hong Kong, in turn, specialized in skill-intensive manufacturing activities and outsourcing-based services such as marketing and distribution.

The lack of empirical work on other developing countries is partly explained by the predominant interest in the role of outsourcing in developed rather than developing countries. But it may also reflect the fact there are few developing countries that have received as large FDI flows as Mexico, or that have outsourced as big a share of their production as Hong-Kong. However, it is unlikely that outsourcing affects wage inequality only in Mexico and Hong Kong,

due to the proximity of these two countries to the U.S. and China, respectively. Evidence from South East Asia (Head and Reis (2002)), Central America (Rodriguez Clare (2002)), and Eastern Europe (Marin (forthcoming)) suggests that many other developing or transition economies engage in production sharing with developed economies. In fact, a recent study by Lorentowicz, Marin, and Raubold (2005) confirms the importance of outsourcing as an explanation for wage inequality in a transition economy setting. They find that outsourcing activities of foreign multinationals in Poland are associated with a large increase in the relative demand for skilled workers in Poland. Examining the relationship between outsourcing and wage inequality in other developing countries remains a topic for future research.

(3) Increase in Capital Flows and Complementarity of Capital with Skilled Labor

A basic premise of the Stolper-Samuelson mechanism is that capital and labor, while perfectly mobile within a country, are immobile internationally. This premise is clearly inconsistent with the recent adoption of outward-oriented policies in developing countries that has been in many cases associated with substantial increases in international capital flows. If globalization leads to an increase in capital inflows into developing countries, and if the utilization of capital requires the use of a higher share of skilled labor, then the increase in capital flows will be associated with higher demand for skilled workers. This argument is put forward in Cragg and Epelbaum (1996) for pre-NAFTA Mexico, and Behrman, Birdsall, and Szekely (2000) for several Latin American countries; both studies focus on the role of trade reforms in reducing the price of capital goods as the mechanism that generates higher demand for both capital goods and skilled labor. Similar arguments are developed in theories of endogenous technological change (e.g. Acemoglu (2003)), since new technology is often embodied in capital good imports. Since these theories are most frequently used in the context of (endogenous) skill-biased technological change, we discuss them in more detail in the next subsection.

(4) Skill-Biased Technological Change

The main alternative explanation for the increased demand for skilled labor has been skill-biased technological change. “Skill-bias” is inherently hard to measure, and because most of the measures commonly employed in the literature are based on endogenous outcome variables (e.g., the share of skilled workers in a firm’s wage bill) rather than exogenous technology shocks, there

exists no uncontroversial measure of skill-biased technological change. Nevertheless, the repeated finding of an increase in both the share of skilled workers and their relative wage within fairly narrowly defined industry categories in both developed and developing countries has been interpreted as evidence for a world-wide skill bias in new technologies.

As with the evidence on Stolper-Samuelson effects of trade, it is possible to come up with alternative explanations for this well documented empirical phenomenon. However, none of these explanations seems entirely convincing. Leamer (1998) for example, argues that *sector*-bias and not *factor*-bias determines changes in the wage distribution: skilled-biased technological change that is concentrated in unskilled-intensive sectors benefits unskilled workers in the general equilibrium, while skilled-biased technological change concentrated in skilled-intensive industries benefits skilled workers. This argument however requires that product prices do not change, which is unlikely to be true during a period of trade reforms. Moreover, the (admittedly very scant) empirical evidence does not support this theory; Attanasio, Goldberg, and Pavcnik (2004) do not find any statistically robust evidence that skill-biased technological change in Colombia was concentrated in skilled-intensive industries; if anything the (statistically insignificant) point estimates of their regressions suggest that skilled-biased technological change was concentrated in low-skill sectors, which would have generated a *decrease* in the skill premium in the general equilibrium.

The past decade witnessed an intense and lively debate between those who favored the trade-openness-based explanations for the increase in the skill premium, and those who considered skilled-biased technological change as the primary force behind the documented changes in the wage distribution worldwide. By now it has been recognized that the most credible explanations for the distributional changes witnessed in the past few decades would most likely involve interactions of trade openness with skilled-biased technological change. Along these lines, several recent papers have postulated that even though skilled-biased technological change may have played a greater role in increasing the skill premium that particular trade policy changes, technological change was itself an endogenous response to more "openness", so that globalization was indirectly responsible for the increase in the skill premium.

One of the earliest studies in this vein is Wood (1995), who introduced the term "defensive innovation" to describe firms' response to trade openness. According to his hypothesis, intensified competition from abroad may induce firms to engage in R&D, or take

advantage of existing new technologies that they may have had little incentive to adopt prior to liberalization. This theory is developed further in Thoenig and Verdier (2003). While this argument seems more suitable to explaining the increase in inequality in the developed world, it may be applicable to middle-income developing countries, such as Colombia or Brazil, that underwent significant trade reforms in the 1980's and 1990's. By that time low-income developing countries (e.g., China) had entered the world markets, and the import competition middle-income countries faced from the new entrants in their low-skill-intensive sectors may have induced faster technological change in these sectors. On the empirical side, a common implication of these models is that in the short- and medium-run, skill-biased technological change should be more pronounced in the sectors that liberalized more. Attanasio, Goldberg, and Pavcnik (2004) indeed document that during 1984-1998, the increase in demand for skilled workers in Colombia was largest in those sectors that experienced the largest tariff cuts. This provides some support for the theory that skilled-biased technological change was itself an endogenous response to trade liberalization.

A different mechanism through which trade liberalization can induce (or accelerate) skill-biased technological change is suggested by Acemoglu (2003) who develops a model of endogenous technological change, and argues that in the case of developing countries this technological change may take the form of increased imports of machines, office equipment, and other capital goods that are complementary to skilled labor. Trade liberalization affects the demand for skilled workers by reducing the prices of the relevant capital goods and hence increasing their imports. From an empirical point of view, this model has two distinct implications: first, following a trade liberalization episode in a developing country, total imports for office equipment and advanced machinery from developed countries should increase; and second, the increase in the demand for skilled workers should be more pronounced in sectors that import more foreign machinery. This second implication is investigated for the period surrounding the 1980's Mexican trade liberalization by Harrison and Hanson (1999), who find that within each Mexican industry, 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. Pavcnik (2003), on the other hand, finds that the increased relative plant demand for white-collar workers by Chilean plants in early 1980's cannot be attributed to the use of imported materials and foreign technical assistance to these plants, once one controls for time-invariant plant

characteristics. Muendler (2004), reports that the use of imported intermediate products plays only a minor role for productivity improvements by Brazilian firms following the trade reform, while Fernandes (forthcoming) notes a positive association between the use of imported intermediate products and productivity of domestic plants in Colombia. The evidence on the role of machinery and office equipment imports in transmitting new technology and creating demand for skilled workers is therefore mixed.

An alternative mechanism through which trade liberalization can affect technological change and thus indirectly inequality is suggested by Aghion, Burgess, Redding and Zilibotti (2005). In their model firms' response to trade liberalization depends on how close they are to the technology frontier. Firms that are sufficiently close to the frontier can survive or deter entry of (foreign) competitors by innovating; firms that are far from the frontier may not be able to fight external entry. Hence, the average effect of trade liberalization will depend on the fraction of firms and sectors that are sufficiently close to the frontier to fight for their survival. In addition, Aghion, Burgess, Redding, and Zilibotti emphasize the role of domestic institutions, labor market restrictions in particular, and their interactions with technology adoption for the distributional effects of trade policy. In the empirical part of their paper, Aghion, Burgess, Redding and Zilibotti (2003) look at the Indian trade liberalization of 1991 for support of their theory. Consistent with their theoretical arguments, productivity and profits increased by more in industries that were close to the Indian productivity frontier and in states that had more flexible labor market institutions. This differential impact of trade liberalization across industries with different proximity to the technology frontier and states with different regulatory regimes had strong inequalizing effects. These conclusions find less support in Topalova (2004b), who documents, using firm-level data and detailed information on Indian industry tariffs from India, that tariff declines were associated with productivity improvements in firms with both high and low productivity prior to the trade reform.

Overall it seems fair to say that, even though the premise that trade openness has interacted with skill-biased technological change to increase the demand for skilled labor seems both a-priori plausible and theoretically well founded, the empirical evidence on the role of particular mechanisms through which this increase occurred, is mixed and inconclusive. Clearly, more evidence from other developing countries is needed before one can draw general conclusions. There is also very little empirical work linking skilled-biased technological change

in developing countries to the rise in exports. Given that exchange rate re-alignments have affected exports in many developing countries in recent years, this is a promising area for future research.

(5) Compositional Changes Within Industries: Exporting and "Quality" Upgrading of Products, Plants and Workers

Recent literature has emphasized the importance of firm heterogeneity in international trade (see Tybout (2003) for a survey). In particular, studies of the effects of trade reforms on productivity that exploit plant- or firm-level data typically find major market share reallocations towards more efficient plants (often within the same industry) in the aftermath of liberalization. This finding seems to contrast with the documented lack of labor reallocation across-industries in response to trade shocks. One possible explanation for these seemingly conflicting findings is that the documented reallocations are in reality simple "revenue-share" reallocations that could potentially result from changes in firms' market power, rather than factor reallocations. This is due to the fact that the plant level surveys that are typically employed to measure productivity do not contain data on physical output or inputs, neither on plant-specific prices, so that the above variables are measured in value terms, while the price indices that are used to deflate them are *sector-specific*. Another possibility is that due to the factors discussed earlier on page 28, labor market regulation in particular, labor is in many developing countries less mobile than capital. Finally, it is also possible that there is in fact a lot of labor movement across firms, often within the same industry, but this movement is not visible at the aggregation level at which the industry of employment is reported in household surveys. In fact, one recent study by Haltiwanger, Kugler, Kugler, Micco and Pages (2004) finds substantial labor reallocation *within* sectors in several Latin American countries.

This latter possibility suggests a re-orientation of empirical analysis away from countries or industries, towards firms or plants, as the relevant units of observation, a movement that parallels recent developments in international trade theory. The focus of traditional trade theory and empirics on sectors, or industries, abstracts away from the substantial heterogeneity of products and firms that are included in statistically defined aggregates. Products that fall into the same two- or three-digit SIC category may be produced with different factor proportions, while individual firms may vary both in terms of their efficiency or "quality", and in terms of the type

of workers they employ. Recent work has made this heterogeneity the main focus of the analysis, by stressing the importance of compositional changes within industries in response to trade liberalization, which may induce reallocation of both capital and labor towards "better" firms.

The basic idea is that trade openness induces a "quality" upgrading of firms, where quality can mean either "firm productivity" or "product quality". The quality upgrading in response to trade openness can itself arise either because firms in import competing sectors try to avoid competition from cheaper countries by differentiating themselves, or because trade can shift resources from non-exporters to exporters (see Melitz (2003) for a related argument), and there is ample empirical evidence that exporters tend to be more "productive" than non-exporters. Despite the theoretical appeal and plausibility of these arguments that emphasize firm and plant heterogeneity within an industry, the empirical evidence on how this channel affects inequality is still scant and mostly indirect.

What is essential for establishing a connection between compositional changes within an industry and the inequality debate is that "higher quality" firms have a higher demand for skill, so that quality upgrading leads to an increase in the skill premium. For example, one dimension along which firms within an industry differ is their exporting status. If production for export markets is relatively more skill-intensive than production for developing countries' domestic markets, increased demand for exports will increase the relative demand for skilled workers within industries and lead to a higher skill premium. Empirical evidence from the United States suggests that exporting is indeed a skill-intensive activity (see Bernard and Jensen (1997)). Harrison and Hanson (1999) also find that exporters employ a higher share of white-collar workers than non-exporting plants in Mexico.

Production of higher quality products may be one reason why exporting firms in developing countries may require relatively more skilled labor than domestic firms. In addition, "product quality" varies significantly across exporters from different countries. Schott (2004) provides strong evidence of *complete* specialization by countries within product categories, with the skill- and capital-abundant countries specializing in the production and export of higher unit value products, and unskilled-labor-abundant countries specializing in the production and export of low-unit value products. If one accepts his premise that unit values within very narrowly defined product categories reflect differences in product "quality", then the implication of

Schott's findings is that developed countries specialize in higher quality products while developing countries specialize in lower quality products within the same product category. While these findings do not directly tell us how countries adjust to trade liberalization, it seems plausible to assume that as middle-income developing countries become more open to trade, they start upgrading their products like the more developed countries. If higher quality products indeed require a higher share of skilled workers, then the shift towards higher quality products will benefit skilled workers. Recent findings by Zhu (2005) are consistent with this idea. She finds that wage inequality has increased by more in countries and industries that (because of product cycles) shifted the within-industry composition of exports away from low-skill-intensive exports that were historically associated with less developed countries towards more sophisticated products that had been exported by richer countries in the past.

A somewhat different mechanism involving upgrading is discussed in a recent paper by Verhoogen (2006). In Verhoogen's study trade openness leads to an upgrading of the average product quality in exporting plants, which in turn generates demand for a better qualified workforce. The upgrading of the workforce can however be satisfied by upgrading the existing workforce in each plant, rather than hiring of new, better qualified workers, so that trade openness does not necessarily generate labor reallocation across plants. Rather than focusing on trade liberalization, Verhoogen exploits a major exchange rate depreciation episode (the 1994 peso crisis in Mexico) to study the response of firms to increased openness. The peso depreciation clearly benefited exporters. Instead of focusing on the effects of an increase in *aggregate* exports on productivity or demand for skilled workers, Verhoogen considers the effects of the exchange rate depreciation on firms of different productivity. More productive firms produce higher quality products and export; lower productivity firms produce lower quality products and sell in the domestic market only. The basic hypothesis is that the increase in exports was associated with a differential quality upgrading within Mexican manufacturing, as higher-productivity, exporting plants shifted their within plant product-mix towards higher quality varieties in order to appeal to U.S. consumers. But this shift towards higher quality products required an upgrading of the workforce. As a result, the peso depreciation induced quality upgrading benefited skilled workers.

The increased demand for "skill"[18] within exporting plants could be met either by attracting new, better educated workers, or by increasing the productivity of the existing workforce. In a subsequent paper, Verhoogen and Kaplan (2005) argue that it was the second mechanism that was at work: the higher demand for "skill" in exporting plants translated to higher efficiency wages in these plants, rather than changes in the proportions of white-collar and blue-collar workers within each plant. Higher efficiency wages could in turn reflect additional training or effort by the white-collar workers employed in exporting plants. This finding implies that there was little labor reallocation across plants in the aftermath of the peso depreciation.[19] The higher demand for "skill" was instead satisfied by increasing the wage premia of the workers already employed in exporting plants.

The main challenge of this literature is to define "quality" in an operational way. As Erdem and Tybout (2004) have pointed out, a separation of "firm productivity" and what we typically mean by "product quality" is not possible given the available data sets. Moreover, the term "quality" is itself elusive from an empirical point of view, especially in the context of a horizontal differentiation model, in which consumers value products differently. Schott (2004) tries to circumvent this problem by implicitly assuming a vertical differentiation model, so that higher unit-values correspond to higher quality. Verhoogen (2006) uses a set of proxy variables (for example, a plant's total sales), or, alternatively, a latent variable approach to capture "product quality". However, from the perspective of the inequality debate, it does not matter what definition of "quality" one adopts. What matters is the proportion of skilled and unskilled workers that is required to produce goods *before* and *after* a trade liberalization, or currency depreciation episode. If the demand for skill increases *within* firms, this is going to induce an increase in the skill premium. Hence, rather than resorting to particular interpretations of product "quality" that may be controversial, empirical work in this area could directly examine how within-firm relative demand for skill is affected by trade liberalization, and whether this

[18] We use the term "skill" here in the most general sense of the word to include general human capital as reflected in a worker's educational attainment; specific human capital; motivation and effort. Importantly, this interpretation does *not* match the white- /blue-collar worker dichotomy often used in the literature to differentiate between skilled and unskilled workers. The mechanism discussed in Verhoogen (2006) demonstrates the limitations of this latter narrow definition in capturing the true quality of the workforce.

[19] Kaplan and Verhoogen (2005) exploit matched employer-employee data from the Mexican social security agency, so that they can follow workers and their wages over time. A potential caveat of their analysis is that the data do not contain information on worker education so that one cannot be sure that within-plant changes of worker wages do not reflect changing returns to a particular worker characteristics, such a education, during that period.

effect is different for firms with initially low versus high skill-intensity (where "initial" refers to the skill-intensity observed prior to the trade reform or exchange rate depreciation episode).

The second challenge facing this literature is that for the results to be relevant for the inequality debate, it is important to have accurate measures of skill. Unfortunately, the information on worker and job characteristics provided in firm level data sets is much more limited that what is usually provided in household surveys, so that researchers have to resort to the familiar dichotomy between production and non-production, or white- and blue-collar workers. In the absence of more detailed information, there is little one can do in the short run. In the longer run more information about the characteristics of workers employed by different firms (or plants) will be essential for establishing a connection between firm heterogeneity and changes in the wage distribution.

(6) Changing Returns to Skill-Intensive Occupations

In some developing countries the increase in the skill premium has been linked to the increase in the returns to particular occupations that require a higher level of education. Cragg and Epelbaum (1996) find strong support for this hypothesis in the case of pre-NAFTA Mexico, for which they document a rapid increase in the occupational premia of professionals and administrators (including public administrators)[20]. The authors attribute the increase in these occupational premia to the rapid changes introduced in the economy by reforms that increased the demand for individuals who could enact these reforms: managers and professionals. The link to globalization is indirect: trade reforms impacted these changing returns to occupation only to the extent that they were part of the general reforms that generated demand for highly educated individuals. In related work, Kijama (forthcoming) finds that increases in the returns to tertiary degree were especially pronounced for individuals in managerial, professional, and technical job in urban India subsequent to 1991 reforms. Studies on other countries have however found less support for rapidly changing returns to skill-intensive occupations[21].

[20] These changing premia to skill-intensive occupations account for a significant fraction of the estimated skill premium increase: controlling for occupation compresses the original estimate of the change in the premium of post-secondary to secondary education from 67% to 40%. Similarly, the increase in the premium of post-secondary to primary education drops from 70% to 42% once occupation is controlled for.

[21] In Colombia for example, Attanasio, Goldberg, and Pavcnik (2004) document that occupational returns remained relatively stable over the 1986-1998 period, with the exception of 1992, for which there was a short-lived spike in the returns to "managers and other professionals".

5.2 Transitional Unemployment

Perhaps the most commonly expressed concern regarding globalization in developing countries is that trade openness will lead to transitional unemployment as the economy adjusts to new conditions. To the extent that this unemployment disproportionately affects the poor, it will have important consequences for income inequality.

Despite the prominence of this concern in the public debate there is remarkably little theoretical or empirical work on its relevance. On the theory side, unemployment is absent in the mainstream models of international trade, which typically assume full employment. A notable exception is the work of Neary (1978, 1982) that explores the consequences of factor specificity in the short run. In Neary's framework it is possible that labor markets are at disequilibrium in the short run as the economy adjusts to a terms-of-trade shock. This framework seems particularly relevant for developing countries that are often characterized by severe labor market rigidities (see also Matusz and Tarr (1999) for a discussion).

On the empirical side, the lack of evidence on the relationship between trade and transitional unemployment is mainly due to the absence of appropriate data. Aggregate statistics on total unemployment by year seem to suggest that macroeconomic recessions have a larger impact on unemployment than tariff reductions, but inferences based on macroeconomic trends can be misleading, as they do not indicate which industries and which population groups are most affected, what the causes of unemployment and chances of re-employment are, and how long the duration of unemployment spells are. Such information is important for relating unemployment to measures of well-being and inequality. The link between trade policy, unemployment, and inequality could be better identified by relating detailed industry tariff changes to changes in industry unemployment. The difficulty in pursuing such an approach stems from the fact that household surveys in developing countries typically do not report in which industries the currently unemployed used to work, and in which industries they seek new employment; even when they do (as is the case in the Colombian NHS for example), they report the industry at a very aggregate level (1-digit ISIC). As a result, it is not possible to relate industry unemployment to more disaggregate tariff changes. Furthermore, empirical work in this area needs to deal with truncation issues, as workers who are employed in any given survey

interval, can only be assumed to be employed up to the end of the particular survey interval, and, similarly, unemployed workers can be assumed to be unemployed only to the extent that they have not found a new job before the end of that survey period.

An attempt to relate trade liberalization to transitional unemployment was undertaken by Attanasio, Goldberg, and Pavcnik (2004) in the context of the Colombian trade liberalization. The authors examine whether the increase in the probability of being unemployed was greater for workers in the manufacturing sector (where tariff cuts were the largest) than for workers with the same observable characteristics in non-traded-good sectors (such as wholesale and retail trade, restaurants, hotels, construction, etc.) in urban Colombia. They find that increases in the probability of unemployment before and after tariff reductions were not larger in manufacturing than in non-traded sectors. However, this evidence is based on a very aggregate industry definition, while the information on unemployment is not directly linked to changes in trade policy. Moreover, no attempt is made to link changes in probability of unemployment to inequality.

5.3 Industry Wages

Among those who are and remain employed, our discussion so far has focused exclusively on the impact of trade openness on changes in the economy-wide skill premium. We now turn our attention to other ways in which globalization may have affected wage and income inequality. The first one is through changes in industry wage premia.

Industry wage premia are the part of worker wages that cannot be explained by observable worker characteristics such as gender, age, education, experience, etc., but can be attributed to workers' industry affiliation. While studies have found that industry wage premia account for a significant portion of individual wage variation, there is less agreement as to whether these premia reflect compensating differentials, efficiency wages, industry rents, or returns to industry-specific skills.

There are several plausible channels through which trade policy changes may affect industry wage premia. In short- and medium-run models of trade where workers cannot easily move across sectors, tariff cuts translate into proportional declines in the wage premia of those

industries that experience larger than average tariff declines[22]. This possibility is particularly important in developing countries characterized by labor market rigidities (Heckman and Pages (2000)). These rigidities may be irrelevant in practice because of the existence of informal labor markets and the vast non-compliance with labor market regulation. However, the lack of labor reallocation across sectors in the aftermath of dramatic tariff declines in several countries that we discussed earlier supports the premise of rigid labor markets. A further channel through which trade may affect industry wages is suggested by models of imperfect competition and union bargaining. If profitable industries share part of their rents with workers because of union bargaining power, tariff cuts in these industries may lead to lower wages, as the industry rents stemming from protection disappear. Moreover, industry wage premia may be affected in cases where unions share in industry rents through employment security guarantees rather than wages, and where employment security is obtained through higher trade protection (Grossman (1984)).

Finally, trade policy could affect industry wage premia via industry-level productivity changes. Several recent empirical studies have found that trade liberalization was associated with productivity improvements in developing countries.[23] If these improvements are passed on to workers in the form of higher wages, trade could increase wage premia in the sectors that experienced higher productivity gains due to their higher exposure to trade liberalization. A related argument is presented in the two studies by Verhoogen (2006) and Kaplan and Verhoogen (2005) we examined earlier, although the (efficiency) wage increases in their mechanism are not generated by trade liberalization, but rather a peso-crisis induced increase in exports destined for the U.S. market.

The empirical evidence on the response of industry wage premia to trade reforms is mixed: no association between tariff reductions and industry wage premia (Feliciano (2001) for Mexico, Pavcnik, Blom, Goldberg, and Schady (2004) for Brazil), positive association (Goldberg and Pavcnik (2004) for Colombia), and negative association (Mishra and Kumar (2005) for

[22] If such industries had lower wage premia in the pre-reform period, then such changes will further increase the wage dispersion, making those who received lower relative wages to start with even worse off. This turns out to be in fact the case with the trade reforms in Mexico in the 1980's and Colombia in the 1990's.

[23] See Harrison (1994) for Cote d'Ivoire, Krishna and Mitra (1998), Aghion, Burgess, Redding, Zilibotti (2003), and Topalova (2003) for India, Kim (2000) for Korea, Pavcnik for Chile (2002), Fernandes for Colombia (2003), Muendler (2004) and Hay (2001) for Brazil.

urban India).[24] Feliciano (2001) reports a positive association between declines in import licenses and industry wage premia. The heterogeneity of findings in the above studies is perhaps not surprising given the large number of possible channels through which trade could affect industry wage premia. Kaplan and Verhoogen (2005) present evidence based on panel data that the wage increases in plants with higher productivity Verhoogen documented in his earlier work are due to an increase in the efficiency wages of the workers employed in these plants, rather than higher wages of new hires.

These findings have potentially important implications for the effects of trade openness on wage inequality. Interestingly, both in Colombia and Mexico, studies that have documented a decline in industry wages in response to trade liberalization also find that the sectors that experienced the largest tariff cuts had the highest shares of less educated workers and the lowest wages to start with (see, for example, Attanasio, Goldberg, and Pavcnik (2004)). As a result of trade liberalization, the initially low wages declined even further increasing wage inequality. In this sense, one could argue that less educated workers were hit twice: not only did the skill premium increase during that period, but the wages in industries that employed a proportionately higher share of unskilled workers declined relative to the average wage in the economy. Kaplan and Verhoogen's results go in the same direction: even though wages increase in absolute terms in the aftermath of the peso crisis, the wages of white-collar workers employed in high productivity plants increase by more, thus contributing to an increase in wage inequality.

While these effects go in the direction of increasing wage inequality, their magnitude is estimated to be small, and so it is questionable whether they are the primary force behind increases in wage inequality. In Colombia, for example, the estimates suggest that the average tariff reduction in manufacturing sector of 37 percentage points would be associated with 4% decline in industry wage premium. Industry wage premia account for about 2% of explained variation in log hourly wages conditional on workers' observable characteristics in this country. Thus, while changes in industry wages contribute to the increase in wage inequality, it seems unlikely that the change in industry wage premia is a first order effect. One potential explanation for the relatively small magnitude of industry wage responses and the simultaneous lack of labor reallocation across sectors is the existence of an informal sector in many developing countries.

[24]Studies that rely on average firm or industry wages rather than industry wage premia also report mixed results: Currie and Harrison (1997) find no association between changes in industry wages and tariffs in Morocco; Revenga (1997) on the other hand reports a positive association for Mexico.

This sector offers an additional margin through which firms can adjust to trade shocks. We investigate this explanation in section 5.5.

5.4 Uncertainty

A body of research has examined the idea that globalization not only affects income levels, but also exposes workers to increased economic uncertainty through less secure employment and more volatile income. Conceptually, most empirical work in this literature relies on a simple labor demand and supply framework with a stochastic labor demand (see Scheve and Slaughter (2002) for an in depth review of this literature). In this setting, trade reform might increase wage uncertainty in two ways.

First, trade liberalization can lead to greater price volatility and productivity shocks (as in Rodrik (1997, 1998)), which in turn generates greater volatility in wages and employment. Scheve and Slaughter (2002) convincingly argue that empirical studies do not reach a consensus on whether trade liberalization increases price variation. This state of affairs is perhaps not surprising. While trade liberalization exposes domestic consumers and producers to the volatility of world prices, at the same time the exposure to foreign markets mitigates the effects of potentially large domestic shocks on prices. Theoretical work by McLaren and Newman (2002) makes a similar point, suggesting that the relationship between globalization and risk is ambiguous.

Second, Rodrik (1997) argues that trade reforms may increase wage uncertainty not only through potentially greater demand volatility, but also by increasing the (absolute value of) the own-price elasticity of labor demand. The reasoning is as follows. For a given vertical shift of the labor demand curve (arising from productivity, or product demand shocks), a more elastic labor demand implies greater variation in wages and employment. In this case greater openness increases the uncertainty faced by individuals only indirectly, not by exposing them to greater demand volatility, but by magnifying the effects that *any given* demand shock will have on their wages and employment.

One way in which trade reform can increase the elasticity of labor demand is by intensifying product market competition (and thus increasing the elasticity of product demand from which the labor demand is derived). In fact, Levinsohn (1993), Harrison (1994), and Currie and Harrison (1997) find empirical support for increased product market competition following

trade reforms. They show that domestic firms lowered their markups following the trade reforms in Turkey, Ivory Coast, and Morocco, respectively. Alternatively, trade liberalization may make labor demand more elastic by providing firms with increased access to substitutes for domestic labor such as imported intermediate products. Our discussion in section 5.1.2 emphasizes the rapid expansion of trade in intermediate goods.

Unfortunately, the empirical work that links trade reforms to wage uncertainty is scarce, especially in the context of developing countries. Most studies examine the link between trade and wage uncertainty indirectly, by studying the relationship between trade reform and labor demand elasticity. The results of these studies are mixed. Krishna, Mitra, and Chinoy (1998) find no evidence that trade liberalization increased (the absolute value of) labor demand elasticity in Turkey. Hasan, Mitra, and Ramaswamy (forthcoming) find that labor demand becomes more elastic following the 1991 Indian trade reforms and that more protected industries have lower labor demand elasticities. Their study is particularly interesting because it also examines the differential effects of trade reform on labor demand elasticities in sectors with differential tariffs located in states with different labor market regulation. The study finds that labor demand elasticities are greater in Indian states with more flexible labor laws and that trade reforms increased labor demand elasticities by greater degree in states with more labor market flexibility. To our knowledge Krebs, Krishna, and Maloney (2005) is the only study that directly examines the link between trade reform and income variability. Using longitudinal income data on workers before and after the Mexican trade reforms in the 1980's and 1990's, they find that tariff declines are associated with increased income uncertainty.

To the extent that globalization increases income uncertainty, risk averse individuals might be worse off even if trade reform does not affect or increases their expected incomes. That said, the question still remains open whether and how increased uncertainty affects inequality. To the extent that increases in uncertainty and/or risk aversion vary across individuals of different education and/or ages, globalization induced uncertainty could add to greater inequality across individuals. Yet, we are not aware of any study that links liberalization- induced increases in uncertainty to inequality.

A different but related point is that a more uncertain product demand may induce firms to adapt hiring practices that increase a firms' flexibility to hire/fire workers in response to changing product demand. For example, a firm that operates in a more variable product market

may find it beneficial to rely more heavily on informal or temporary labor to maintain flexibility. This, in turn could lead to greater wage variability. We are not aware of any empirical work that examines how greater product demand uncertainty affects firms' choice of workers and contract types, and ultimately inequality. However this issue is partly related to a broader line of work that examines the effects of globalization on the use of informal labor, and compliance with labor market standards. We examine this issue next.

5.5 Labor Market Standards

Many globalization opponents have argued that globalization may have adverse effects on inequality in the broader sense, by inducing noncompliance of firms with labor market standards and by increasing the proportion of workers in the informal sector of the economy. The informal sector is generally defined as the sector of the economy that does not comply with labor market regulations such as minimum wage or minimum working age laws, and it is associated in the public's mind with lower pay and worse working conditions. It accounts for a sizable share of the labor market in developing countries: for example, 50 to 60% of the labor force in urban Colombia is employed in the informal sector during the 1980's and 1990's.

The claim that the informal sector offers worse working conditions is controversial. On one hand, several studies (Marcouiller, Ruiz de Castilla, and Woodruff (1997), Goldberg and Pavcnik (2003), Pavcnik et. al (2004)) document that workers with otherwise comparable observable characteristics are paid lower wages in the informal sectors of Peru, El Salvador, and Brazil, and Colombia; moreover, workers employed in the informal sector are considerably less likely to receive non-wage benefits, and in household survey questionnaires they express less satisfaction with their working environment and job quality. On the other hand, some individuals may choose to work in the informal sector because they value the greater flexibility in work arrangements offered by this sector; to the extent that this is true, the observed differences in pay between formal and informal jobs may be partly driven by selection of individuals based on unobservable tastes or characteristics.

The usual argument that trade liberalization will increase informality is that foreign competition forces firms to cut costs, which they in part do by employing a higher proportion of informal workers. Goldberg and Pavcnik (2003) present a model that formalizes this idea and shows that under certain theoretical assumption, firms within an industry may find it optimal to

hire relatively more informal workers after a permanent decline in industry tariffs. To the extent that jobs in the informal sector are associated with relatively lower pay and worse working conditions, the relative expansion of the informal sector following a trade liberalization episode, could contribute to growing inequality, especially since the informal sector tends to employ a higher proportion of less-educated workers. Alternatively, it is possible that the expansion of the informal sector in the aftermath of trade liberalization reflects the entry of new firms into the market in response to new opportunities created by the reforms. Such firms are likely to start small and informal, especially in countries with rigid labor markets, and shift into the formal sector only later, if they are successful.

Evidence on the link between informality and trade reform is scarce, due to the lack of data on informality and labor market regulation compliance of firms. The few studies on these issues yield mixed results. Currie and Harrison (1997) find that firms in Morocco started hiring more temporary workers (who are not entitled to benefits) in the period following the trade reform. Goldberg and Pavcnik (2003) focus on Colombia and Brazil, two countries that experienced expansions of their already large informal sectors in the years following the trade reforms, and examine whether trade liberalization can explain the documented increase in informality. Interestingly, most of the observed increase in the share of informal workers in the total labor force occurred through within-industry increases, rather than through shifts in employment across industries with different informality intensity. However, the association between within-industry tariff changes and probability of employment in the informal sector varies across countries and time and seems to be related more to the flexibility of the labor market than to trade policies. In Brazil (a country with a relatively flexible labor market according to Heckman and Pages (2000)), industry tariff declines were not associated with changes in the probability of employment in the informal sector. In Colombia (a country with more rigid labor market institutions), industry tariff cuts were associated with increased probability of informal employment, but only in the period prior to the implementation of labor market reforms that substantially increased the flexibility of labor markets.

Related work has examined firms' compliance with minimum wage laws. This aspect of the labor market regulation is particularly relevant in the globalization and inequality debate, because minimum wages affect primarily workers at the bottom of wage distribution. Harrison and Scorse (2004a, 2004b) study differences in compliance with Indonesian minimum wage

legislation across exporters, foreign-owned firms, and domestic firms using Indonesian surveys of manufacturers from the 1990's. In their study they consider a firm to be compliant with the legislation if the average wage of production workers in the plant exceeds the minimum wage. They find that foreign owned plants are actually more likely to have production wages above the minimum wage. The use of *average* wages as a measure of compliance may also conceal individual instances of wages below the legislated minimum wage. Unfortunately, data constraints preclude them from examining whether foreign-owned plants subcontract to domestic establishments that may pay below the minimum wage. Relying on information on wages of individual workers, Goldberg and Pavcnik (forthcoming) find no association between the likelihood of industry compliance with minimum wage laws and industry tariff reductions in Colombia.

Overall, existing studies provide little evidence that trade liberalization or FDI contribute to growing inequality by expanding the size of the informal sector and inducing non-compliance with minimum wage laws. However, more work is needed in this area. For example, the results in Goldberg and Pavcnik (2003) suggest that the relationship between trade reform and informality depends on the institutional setting in which trade reforms take place. To investigate this possibility further one would ideally exploit the heterogeneity of labor market institutions over time and across administrative areas within a country such as India, where labor market regulation varies across states. In addition, a disadvantage of the within-country analysis presented above is that it cannot by its nature shed light on the empirical relevance of "race-to-the-bottom" arguments; that is arguments that suggest that firms that have the option of relocating their plants, will choose, everything else being equal, the country with the lowest labor standards. This induces competition among countries for footloose firms and leads to further degradation of labor standards. Bernard and Jensen (2003) and Bernard and Sjoholm (2003) present some evidence for the United States and Indonesia that suggests a higher propensity of multinationals to relocate; after accounting for the fact that foreign affiliates are typically larger and more productive than domestic firms, foreign affiliates are more likely to shut down than domestic firms in the host country. Determining whether these shut-down decisions (and the set up of new operations elsewhere) are driven by labor market regulation remains a topic for future research.

5.6 Household Production and Consumption

Our discussion so far has focused on the labor market effects of globalization. Two additional channels through which globalization may affect inequality are household production and consumption. These channels are particularly relevant in poorer developing countries, yet they have received little attention in the literature, perhaps because the main focus of the globalization related research to date has been middle-income developing countries.

Many individuals in poor countries are not employed in the formal labor market for wages, but instead work in their household business or family farm, and devote a substantial amount of time to production of goods/services used for own consumption (Rosenzweig (1988)). For example, in Vietnam in 1993, about 19 percent of adults age 20-64 report working for wages, while 90 percent of adults report working within their own household (Edmonds and Pavcnik (2006)). Similarly, in Indonesia, less than 30% (45%) of rural (urban) men and less than 12% (20%) of rural (urban) women worked in wage work before the Indonesian crisis (Smith et. al (2002)). In India, 46% of the labor force (rural and urban) works for wages (Tendulkar 2003).

The main reason for the limited amount of empirical work on within household production and consumption is data constraints. Specifically, many surveys focus only on the formal labor market and thus exclude the self-employed. To the extent that the self-employed are surveyed, measures of profits or net earnings associated with their businesses are often missing or, to the extent that they are available, they tend to be noisy. Moreover, because labor market surveys do not contain information on household expenditures or consumption, the implicit value of products produced by households for their own consumption cannot be captured. Abstracting from household production and consumption may be defendable when one studies the consequences of manufacturing tariff declines on urban households in a middle income country such as Mexico or Colombia. However, it is substantially more problematic to ignore these channels in poor economies such as India, Indonesia, or Vietnam, especially in rural areas and in cases when trade liberalization affected the agricultural sector.

The only study that has included household production in studying the relationship between trade reforms and inequality is to our knowledge Topalova (2004a), who derives measures of inequality and poverty based on household expenditure data. As mentioned earlier, her results suggest that poverty declined less in districts that liberalized more, but the findings regarding inequality are less clear-cut: the point estimates in most of her specifications suggest

that bigger tariff cuts were also associated with bigger increases in inequality within a district, but these findings are never statistically significant.

Other work has investigated how households allocate their time between formal wage markets and within household work, but has not explicitly examined the relationship between this allocation decision, globalization and inequality. The general lesson from this work is that adjustment of household production is an important way through which families in poor countries respond to economic shocks. Smith et al (2002) and Frankenberg, Smith, and Thomas (2003) show that Indonesian families coped with the 1998 crisis by increasing their within household production. Along the same lines, Edmonds and Pavcnik (2006), find that households allocated time away from household production towards wage work following the rice market liberalization in Vietnam. Determining how these adjustments affect inequality remains a topic for future research.

Household consumption is equally important as a channel through which globalization may impact inequality. Most international trade models assume that individuals have identical and homothetic preferences. In these models, trade-policy- induced changes in relative prices of goods change the consumption of individuals with different incomes in proportional terms; as a result, trade does not affect people's relative position in the welfare distribution through the consumption channel. However, a large literature in development economics has shown that poorer households devote a disproportionately large share of their household expenditures to basic items such as food. To the extent that household consumption depends on the relative position of households in the welfare distribution, globalization-induced-price changes may affect inequality through consumption. Furthermore, the increased availability and lower prices of traded goods may shift demand away from non-tradable services (e.g., household services, such as housekeeping, cooking, etc.) towards tradable goods (washing machines, dryers, microwaves, etc.), further depressing the earning prospects of the poor.

The consumption channel has been largely ignored in empirical work for the reasons discussed in detail in section 2.2 of the paper. Porto (2006) is the only study that explicitly considers how trade policy affects the welfare distribution through consumption.[25] As we discussed in section 4, he examines the implications of the Argentinean trade reform for the

[25] To the extent that consumption responses to trade reform differ across districts in India, this channel is also captured by Topalova (2004a).

distribution of household welfare using a general equilibrium framework. Porto's analysis yields two interesting insights. First, his model implies that the structure of the Mercosur-induced tariff cuts translated into increases in the prices of relatively low-skill-labor-intensive goods such as food and beverages. These goods have a larger share in the budget of households in the bottom tail of the welfare distribution. Second, his model also implies that changes in the prices of traded goods lowered (through general equilibrium effects) the prices of non-traded goods such as health, education, and leisure goods, which are consumed in greater proportion by the rich. Consequently, the consumption channel implied an *increase* in inequality in the case of Argentina's entry into Mercosur. Although these findings are subject to the same caveats discussed earlier in section 4, Porto's study nicely illustrates the importance of the consumption channel. Furthermore, the pattern of predicted price changes serves as a reminder that it is impossible to make general statements about the impact of trade liberalization on inequality, as the effects depend crucially on the specifics of the reform in question, in particular the structure of tariff changes across industries.

Interestingly, at the end of the study Porto concludes that the impact of the Argentinean trade reforms on inequality via the consumption channel was substantially smaller in magnitude than its impact through the labor income channel. Porto attributes the difference in the magnitude of the two effects to the underlying assumption of perfect factor mobility and the associated magnification theorem that states that changes in relative goods prices generate more than proportional changes in factor prices. Based on Porto's results, it is tempting to conclude that the usual neglect of the consumption channel in the globalization and inequality debate may not be a first order concern. However, more work needs to be done to establish whether his findings generalize.

6. Conclusions

The substantial amount of evidence we reviewed in this article suggests a contemporaneous increase in globalization and inequality in most developing countries. However, establishing a causal link between these two trends has proven more challenging. Despite the ambiguities involved in identifying the relationship between openness and distributional changes, it seems fair to say that the evidence has provided little support for the conventional wisdom that trade openness in developing countries would favor the less fortunate (at least in relative terms).

Our survey has identified several channels which may explain why the recent experience of developing countries did not conform to the "naïve" thinking about globalization. Our understanding of the consequences of globalization for inequality has improved as the conceptual framework used in empirical work expanded to include trade in intermediate products, international flows of capital, trade-induced skilled biased technological change, short-run factor immobility, and firm heterogeneity.

Overall, there is little support for the premise that adjustment to changing economic conditions would occur through labor reallocation from declining to growing sectors of the economy, at least at the aggregate industry level usually considered in traditional international trade models of comparative advantage. A common finding of studies of the effects of trade reforms in developing countries is the lack (or small magnitude) of *sectoral* labor reallocation (although it is possible that there is re-allocation across firms *within* sectors that is not visible at the relatively high level of aggregation used in labor market surveys).[26] In some instances, the data also suggest that the wage response to trade barrier reduction is more pronounced than the employment response.

While these findings are subject to many caveats – the high level of industry aggregation being the perhaps most important one – the cumulative evidence seems to point to constrained labor mobility as one plausible explanation for the lack of sectoral reallocation. Indeed, the strict labor market regulation that many developing countries had in place prior to the recent reforms is a potential source of labor market rigidities. The importance of these rigidities is likely to diminish in the long run, especially since many developing countries have by now significantly liberalized their labor markets. Still, from an empirical point of view, the distinction between short- and long-run has always been elusive. We have surprisingly little knowledge as to how long it takes an economy to adjust to external shocks, and what time frames we should use in practice when we consider the short- versus long-run effects of particular policies.

The lack of sectoral reallocation could also reflect that most of the adjustment to trade reform occurs *within* industries, but at a level of detail that cannot be detected in the household, or firm level surveys usually used in this line of work. Our survey highlights several globalization-based explanations for the increased relative demand for more educated workers within industries. In some cases, trade reforms liberalized in addition to goods flows, factor

[26] Recent evidence on constrained spatial mobility in developing countries is also in line with these findings.

flows, most importantly capital, that may have generated additional demand for skilled workers. In other instances, globalization affected not only trade in final goods, but also and foremost trade in intermediate goods that from the developing country perspective were skill-intensive. Even in those cases where liberalization was concentrated on final goods, the highest trade barrier reductions were often concentrated – contrary to conventional wisdom – on low-skill sectors that had originally enjoyed a higher level of protection. Technological change that favored skilled workers may have interacted with trade reforms to further depress the demand for low-skilled workers. Increased exposure to currency fluctuations boosted exports from developing countries in some cases and provided incentives to upgrade the product-mix of their domestic plants. These compositional changes may have fostered a quality upgrading of plants that further contributed to the widening of the wage gap between skilled and unskilled.

Overall, it appears that the particular mechanisms through which globalization affected inequality are country-, time- and case-specific; that the effects of trade liberalization need to be examined in conjunction with other concurrent policy reforms; and that implementation details of particular policies matter. This conclusion may seem disappointing, as it offers no simple predictions regarding the distributional impact of globalization and hence no straightforward recipe for remedial measures to alleviate potentially adverse impacts. Yet, it is hardly surprising given the heterogeneity of countries, reforms, and overall globalization experience within the developing world.

Finally, we should emphasize that most of the existing evidence refers to narrow measures of inequality such as the skill premium, or wage inequality. Broader concepts of inequality that focus on consumption and general well-being have received substantially less attention. The very scant evidence that exists on these issues however seems to suggest that the labor market effects of globalization dominate its effects on consumption through relative price changes, so perhaps the focus on wages alone is not as limiting as one would have thought. Along the same lines, we know surprisingly little about one of the most frequently voiced concerns regarding globalization: its potential to generate transitional unemployment that might disproportionately affect less skilled individuals. It would be tempting to characterize these open questions as areas of future research, but the truth is that the same factors that have inhibited research on these topics in the past (lack of appropriate data being the primary one), are likely to

do the same in the future. The most pressing research priority in this regard is the collection of additional data and the improvement of existing collection methods.

As the nature of globalization keeps changing, the channels through which the distribution of resources within countries is affected changes too, and so does the research agenda investigating the relationship between globalization and inequality. In recent years it has become increasingly apparent that trade is more than the flow of goods between countries as traditionally modeled in international trade theory. Trade represents exchange between firms that are located in different countries. As traditional cross-border restrictions are disappearing, the focus of the analysis is shifting from the country to the firm, as the relevant unit of observation. Accordingly, questions such as what type of firms produce what goods and for which markets, which firms export and which ones produce for the domestic market, what are the characteristics of workers employed by different types of firms, etc., are becoming more prominent in the literature. Mechanisms that emphasize compositional effects of globalization, quality upgrading in response to intensified import competition from lower-income countries or, alternatively, to higher export demand by more developed economies, and reallocation of resources across firms or plants *within* a sector, or even across products of different quality *within* a firm, seem more relevant to developing countries these days. The main challenge facing the empirical literature in this area is that the heterogeneity of firms, plants, products and workers emphasized in the theoretical arguments implies the need for highly disaggregate data. Such data are typically available for plants, and contain fairly detailed information on many plant characteristics, including occasionally their product lines. However, what is missing from such data sets is information on the characteristics of the workers employed by each plant/firm, which is the crucial step needed for establishing a connection to distributional questions. Hence we do not know for sure whether plants that are more productive employ better educated workers; or whether the production of higher quality products requires a more skilled labor force; or whether changes in the product mix or product quality are accompanied by changes in the characteristics and compensation of the workforce. It is these kinds of questions that future research will need to address in order to provide insight into how ongoing globalization will impact inequality in developing countries.

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Table 1: Globalization and Inequality in Select Developing Countries

	1970's	1980's	1990's
Mexico			
Globalization Measures		Unilateral trade liberalization 1985-87 (WTO entry) Devaluation Maquiladoras liberalization (1983) FDI liberalization (1989) Immigration	NAFTA (1994) Peso Crisis Maquiladoras expansion FDI Immigration
Inequality			
Skill premium		Increased	Increased until mid 1990's Stable/declined after mid 1990's Increased between 2000-1990
Wage white collar /Wage blue collar	Declined 1965-1980	Increased	Increased until mid 1990's Stable after mid 1990's
Wage Inequality			
90-10 log wage differential	N.A.	Increased	Increased up to 1996 Stable/decline after mid 1990's
Gini of log wages		Increased	Increased up to mid 1990's Stable/decline after mid 1990's
Income Inequality (Gini)	Declined	Increased	Stable/decline
Other Reforms		Privatization Labor Market Reform Deregulation	Banking Crisis
Colombia			
Globalization Measures	Partial Trade Reform starting 1979	Gradual trade liberalization starting 1985	Trade liberalization 1990-91 Devaluation
Inequality (urban)			
Skill Premium		Slightly Declined	Increased

Wage Inequality			
90-10 log wage differential		Slightly Declined 1986-1990	Increased
Gini of log wages		Stable/ slight decline	Increased
Income Inequality (Gini)	Declined	Stable/Increased	Stable
Other Reforms			Labor market reform 1990 Banking reform 1993
Argentina			
Globalization Measures	Short Trade Reform (1976-82) Appreciation	Unilateral Trade Liberalization (1989-93) Appreciation	Trade liberalization cont. Mercosur 1991
Inequality (urban)			
Skill Premium		Decreased	Increased
Wage Inequality			
Gini of log wages		Increased	Increased
Income Inequality	Increased	Increased	Increased
Consumption	N.A.	N.A.	N.A.
Other Reforms		Macroeconomic crisis (88-89) Deregulation, Privatization, Financial Liberalization in late 1980's	Deregulation Privatization Financial liberalization in early 1990's Convertibility Plan
Brazil			
Globalization Measures		Partial unilateral trade liberalization (1988 onwards)	Unilateral trade liberalization (ends 1994) Mercosur 1991 Currency Crisis 1998
Inequality (national)			
Skill Premium	N.A.	Stable/Slight Increase	Increased
Wage Inequality			

Mean log deviation of wage	N.A.	Stable/Increased	Stable
Gini of log wages		stable	Stable/small decline
Income Inequality	Stable	Increased	Stable/Small decline
Other Reforms		Labor market reform	
Chile			
Globalization Measures	Trade Liberalization	Devaluation	
Inequality			
Skill Premium	Increased	Increased	Declined early 1990's Overall increased 1990-2000 (national data)
Wage white collar /Wage blue collar		Increased	
Wage Inequality			
Gini of log wages	Increased	Increased	Decreased relative to late 1980's Stable during the 1990's
Income Inequality (national)	Increased	Increased	Stable/Small increase late 1990's
Consumption Inequality	N.A.	N.A.	N.A.
Other Reforms	Structural Reforms Privatization Deregulation Tex reform Labor Market Reform	Devaluation Macroeconomic crisis	
India			
Globalization Measures		Limited Removal of Import Licenses	Unilateral Trade Liberalization 1991 FDI liberalization
Inequality (urban)			
Skill Premium		Relatively stable	Increased

Wage Inequality			
90-10 log wage differential		Increased	Increased more rapidly
Income Inequality			Increased
Consumption inequality		Stable/slight increase	Increased
Other Reforms		Industrial delicensing	Tax Reform Financial Reform
Hong Kong			
Globalization Measures		Outsourcing to China	Outsourcing to China
Inequality			
Skill Premium (return to education)	Slight decline	Increased	Increased
Wage non-production /Wage production workers	Declined	Increased	Increased
Other Reforms			

Notes: General sources on Latin American countries: Schady and Paramo-Sanchez (2003), Gasparini (2003), Robbins (1996)
Sources for information on specific countries are: Argentina: Gasparini (2003); Brazil: Dickerson, Green, Dickerson, Arbache (2001);
Chile: Ferreira and Litchfield (1999), Robbins (1995), Beyer et al. (1999), Pavcnik (2003);
Mexico: Robertson (2004), Hanson (2004), Cragg and Eplebaum (1996); India: Kijima (2006), Topalova (2004a), Deaton and Dreze (2002);
Colombia: Attanasio et al (2004); India: Kijima (2006), Topalova (2004a), Deaton and Dreze (2002); Hong-Kong: Hsieh and Woo (2005).

Table 2: Globalization in Selected Developing Countries

	Trade Liberalization				Trade Flows (% GDP)				FDI inflows (%GDP)	
	Average Tariff		Average NTB		Exports		Imports			
	Before	After	Before	After	1980	2000	1980	2000	1980	2000
Argentina	45	12	n.a.	declined	5.1	10.8	6.5	11.4	.88	4.09
Brazil	58.8	14.4	n.a.	declined	9.1	10.9	11.3	12.1	.81	5.50
Chile	105	10	n.a.	declined	22.8	31.8	27.0	30.8	.77	5.21
Colombia	50	13	72.2	1.1	16.2	21.9	15.6	20.4	.47	2.92
Hong Kong	n.a.	n.a.	n.a.	n.a.	89.9	150.0	90.8	145.3	n.a.	n.a.
India	117	39	82	17	6.1	14.0	9.7	16.6	.04	.51
Mexico	23.5	11	92	23.2	10.7	31.4	13.0	33.2	.96	2.31

Notes: The following years are specific dates refered above as before and after trade liberalization: Argentina (1988, 1994), Brazil (1987, 1994), Chile (1974, 1979), Colombia (1984, 1992), India (1991, 2000), Mexico (1985, 1988). Information on trade liberalization in selected countries is from Galiani and Sanguinetti (2003), Pavcnik et. al. (2004), Dornbusch and Edwards (1994), Goldberg and Pavcnik (2005), Mishra and Kumar (2005), and Revenga (1996). World Development Indicators CD is the source of Trade Flow and FDI data.