

# FDI and wage inequality

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## Abstract

Foreign direct investment may affect wage inequality in developing countries, notably via uneven effects on the wages of skilled and unskilled workers. It may play an important role in transferring technologies from high-income to emerging economies, thereby leading to skill-biased technical change and an increased skill premium. It may also increase production in low-skill intensive industries and lead to growth in demand and higher wages for unskilled workers. This chapter reviews the literature on the effect of FDI on the wage skill premium in developing countries. Out of the 18 studies reviewed, 15 suggest FDI increases wage inequality. However, most of these studies may not capture the heterogeneity across local labor markets, given the level of aggregation (e.g., cross country studies) or unit of analysis (e.g., firms that received direct investment). An extra analysis, combining project-level data on greenfield foreign direct investment with household surveys across sectors and regions and over time in seven emerging economies, suggests that FDI is associated with a lower skill premium in four of the seven countries. The effect of FDI on wage inequality may thus depend on the countries, regions, or industries affected, where different mechanisms may be at play. It concludes with a summary of what is considered state-of-the-art in terms of data and empirical methods, and with possible avenues for future research, such as the identification of mechanisms.

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# 1 Introduction

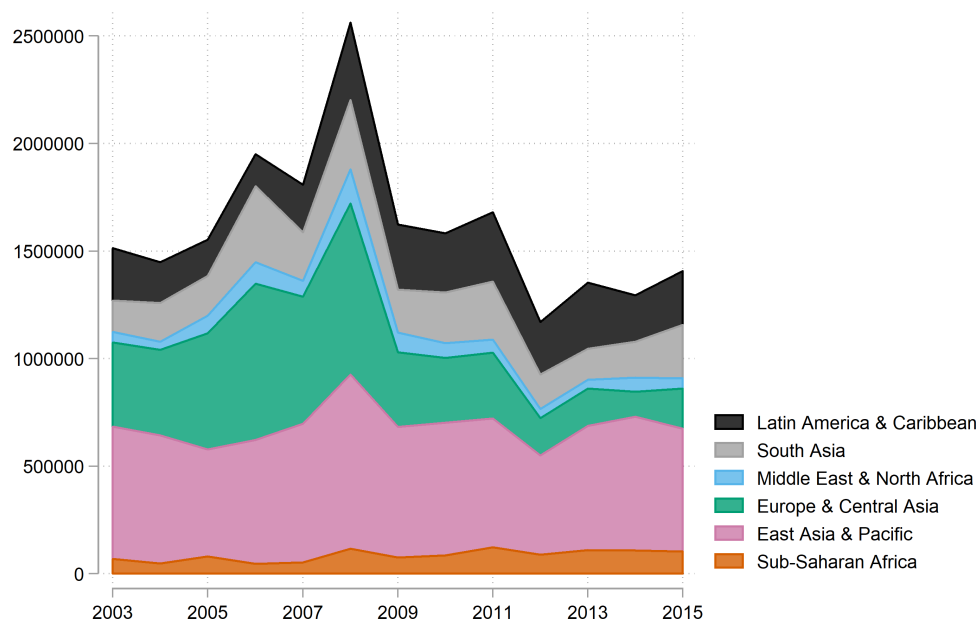
The rise in income inequality within both developed and developing countries in the last decades has preoccupied economists and policymakers alike. International trade and technological change have received significant attention as key explanations for this rise, as they both tend to favor more-skilled workers and thus contribute to the growing wage difference between the educated and the rest, which is often identified as the main reason behind the rise in wage inequality ([Goldin and Katz, 2008](#)). [Goldberg and Pavcnik \(2007\)](#) for example argued that the increase in the skill premium, observed in almost all globalizing developing countries in the 1990s, can be traced back to episodes of trade liberalization in the 1980s and 1990s. The technological aspects of globalization, and in particular skill-biased technical change, have also been usual suspects in the inequality debates (e.g. [Acemoglu \(2002\)](#)).

Less attention has been given to the role of foreign direct investment (FDI) in shaping wage inequality in developing countries. This is surprising since FDI may play a key role in transferring technology from advanced to developing economies ([Baldwin, 2016](#); [Javorcik, 2004](#); [Gorg and Strobl, 2001](#)). And if skill-biased technologies are embedded in new FDI projects, these could lead to increases in the wage gap between skilled and unskilled workers in regions or sectors exposed to foreign multinationals. Alternatively, FDI could reduce the skill premium in developing economies with a comparative advantage in low-skill-intensive activities by increasing the demand for low-skill workers. Moreover, FDI has been a key component of globalization in the 2000s. The data tracked by fDiMarkets suggest that every year between 2003 and 2015, between 1 and 3.5 million jobs were created by new FDI projects in developing countries, mostly in manufacturing and the service sector (Figure 1). FDI to developing countries increased steadily with the wave of globalization in the 2000s and peaked in 2008 when the Global

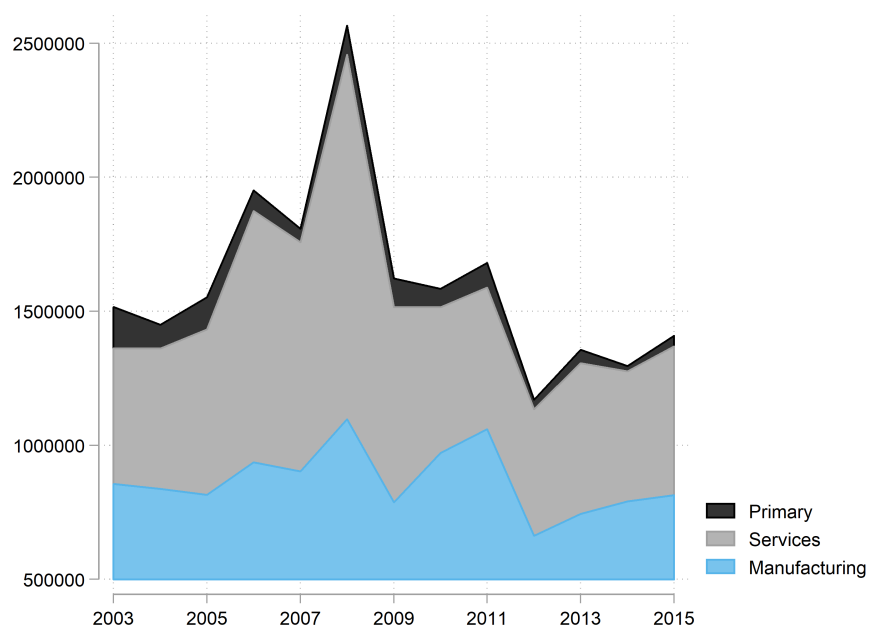
Crisis hit. Still, in the 2010s, new FDI projects directly created more than a million jobs every year.

Figure 1: FDI jobs created in developing countries

(a) By region



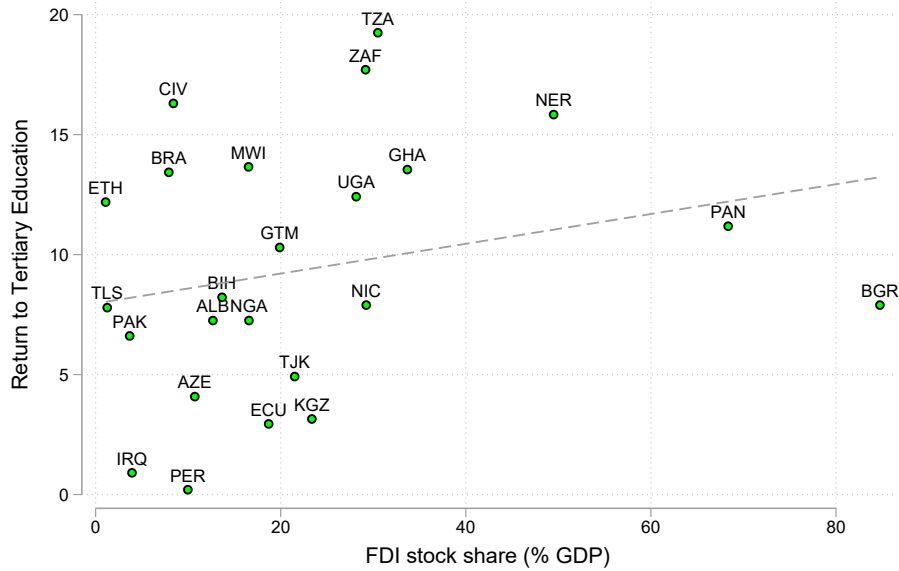
(b) By sector



Note: FDI is from fDiMarkets. Developing countries are defined as non-high income by the World Bank.

Figure 2 illustrates different levels of returns to tertiary education and inward FDI stocks as a share of GDP, among a sample of developing countries for which data on returns to education is available [Peet et al. \(2015\)](#). It shows very high returns to tertiary education in African countries like Tanzania, South Africa, where the stock of FDI was around 30% of GDP, and lower returns in Ecuador or Kyrgyzstan, where the stock of FDI was around 20% of GDP. While it is suggestive of a potential positive relationship across countries, its limitations in terms of data quality and country coverage also highlight the importance of looking at the country-specific studies with high-quality data to get a good understanding of the effects of FDI on wage inequality.

Figure 2: FDI stocks and returns to tertiary education



Note: The dots represent different years around 2007 (between 1986 and 2012), depending on the availability of data on returns to tertiary education. The data on returns to tertiary education is from [Peet et al. \(2015\)](#). The data on FDI stock as a share of GDP is from the World Development Indicators.

This chapter reviews the literature on the effect of FDI on wage inequality and the skill premium in developing countries. Examples include the cross-country studies of [Figini and Gorg \(2011\)](#) and [Jaumotte et al. \(2013\)](#) who showed that in developing countries wage inequality increased with FDI inward stocks, or country-specific studies

like [Feenstra and Hanson \(1997\)](#) who suggests that the growth in FDI in maquiladoras could explain more than half of the increase in the skilled labor wage share in Mexico in the late 1980s. The literature points towards FDI as a cause of rising wage inequality in developing countries, via an increased demand for skilled labor, relative to unskilled labor. Out of the 18 studies on the link between FDI and wage inequality in developing countries reviewed, only 3 suggest that FDI could reduce wage inequality via a reduced skill premium. These focused on FDI to African countries, Poland, Turkey, or on FDI from Japan and Taiwan which was intensive in unskilled labor.

While a positive relationship between FDI and the skill premium in developing countries is not what classical trade theory would predict, i.e. FDI should reduce the skill premium in developing economies with a comparative advantage in low-skill-intensive activities, it would be in line with FDI as a skill-biased technology effect. Indeed, as much evidence pointed to a positive association between trade and the skill premium ([Goldberg and Pavcnik, 2007](#); [Brambilla et al., 2012](#); [Meschi and Vivarelli, 2009](#); [Green et al., 2001](#)), economists suggested technology may be the key factor behind the relationship. In their survey of the literature on globalization and inequality, [Harrison et al. \(2011\)](#) suggested that offshoring of tasks and firm selection could be other channels through which trade increased income inequality in low-income countries. This link was also made by [Acemoglu \(2003\)](#), [Burststein and Vogel \(2010\)](#), and [Raveh and Reshef \(2016\)](#) who suggested that skill-biased technology may take the form of imports of capital goods from high-income countries. FDI could also affect the skill premium through other mechanisms, even if foreign firms do not trade and do not bring in new technologies. Foreign firms could simply provide better outside options for local skilled workers. Or they could drive out of the market the least productive firms, intensive in low-skill labor, thus increasing the relative demand for skills. Alternatively, wage inequality could decrease via the creation of backward and forward linkages and technology spillovers as well as the transfer of labor and managerial practices. Finally, foreign firms could also affect wage inequality through the transfers of norms, i.e. FDI firms could be more likely to hire and appropriately compensate skilled females and

individuals from ethnic minorities.

To re-visit the evidence, this chapter also takes a fresh look at the relationship between FDI and the skill premium in seven emerging economies, i.e. Brazil, Colombia, Ethiopia, Mexico, the Philippines, South Africa, and Vietnam, by merging greenfield project-level FDI data with household surveys. The aim is to use a novel FDI data set and a novel empirical approach to check whether in these countries, across regions and sectors and over time, FDI affects income inequality via differential wage effects on skilled and unskilled workers. The data suggests that greenfield FDI is associated with higher wages for unskilled workers, relative to skilled workers, in 4 out of 7 countries. The results from this selected group of countries contrast with the previous literature that has most often suggested that FDI had effects similar to that of skill-biased technical change on the skill premium. The evidence from this selected group of emerging economies is however in line with low-skill-intensive production rewarding less-skilled workers in skill-scarce countries, which is also in line with the anecdotal evidence that FDI in manufacturing in emerging markets might create large amounts of low-skill employment, and these jobs might provide higher wages than informal jobs such as rural farm work, thereby lowering the skill-premium. It is nonetheless surprising, given the previous evidence on the positive link between FDI and the skill premium, e.g. [Figini and Gorg \(2011\)](#); [Head and Ries \(2002\)](#); [Lee and Wie \(2015\)](#); [Feenstra and Hanson \(1997\)](#), that in these countries FDI is associated with a reduction in the skill premium rather than an increase.

A large majority of studies have found FDI to be associated with an increase in wage inequality via a higher skill premium in developing countries. Yet some studies suggest otherwise, and the data exploration in this paper suggests that FDI inflows do not necessarily contribute to inequality by increasing the skill premium in developing countries. These opposite findings might depend on the countries studied, even if at the same level of development, or on the sectors targeted by FDI, whether the FDI is in new projects or in acquisitions, or on the current level of skills in the workforce, for

example. It could be due to the inclusion of wage information for informal workers, which are included in household survey data but often not available in industry or firm level data. The sign and magnitude of the effect may also depend on whether it captures only direct employment effects by FDI firms or if it includes spillovers across industries or within cities. It may also depend on the different sources of FDI data or different empirical approaches, such as variation across sectors or locations. As we detail in our chapter discussion, the heterogeneous effects and the specific mechanisms through which FDI affects wages could be examined more carefully in future research.

The rest of the paper is organized as follows. The next Section provides an overview of the literature on FDI and the skill premium in developing countries, Section 3 analyzes the effects of FDI on wage skill premia within 7 countries, Section 4 provides a discussion of future research potentials and Section 5 concludes.

## 2 FDI and the skill premium in developing countries

While globalization has received significant attention as a key explanation for the rise in income inequality within both developed and developing countries in the last decades, the focus has been mostly on trade liberalization. [Goldberg and Pavcnik \(2007\)](#), for example, argued that the increase in the skill premium, i.e. the growing wage difference between the educated and the rest, observed in almost all globalizing developing countries in the 1990s, can be traced back to episodes of trade liberalization in the 1980s and 1990s. As much evidence pointed to a positive association between trade and the skill premium ([Goldberg and Pavcnik, 2007](#); [Meschi and Vivarelli, 2009](#); [Green et al., 2001](#)), economists suggested technology may be the key mechanism linking globalization and the skill premium. [Verhoogen \(2008\)](#) suggested that taking part in international trade might favor more-skilled workers as it requires firms to use state-of-the-art technology to produce high-quality products, thus linking globalization to

skill-biased technical change, and in turn explaining the positive link between trade and the skill premium. Using data on over seven million workers from 16 countries in Latin America, [Brambilla et al. \(2012\)](#) confirmed that exports were positively correlated with the skill premium across industries. In their survey of the literature on globalization and inequality, [Harrison et al. \(2011\)](#) suggested that offshoring of tasks could be a channel through which trade increased income inequality in low-income countries. This link was also made by [Acemoglu \(2003\)](#), [Burstein and Vogel \(2010\)](#), and [Raveh and Reshef \(2016\)](#) who suggested that skill-biased technology may take the form of imports of capital goods from high-income countries.

Less attention has been given to the role of foreign direct investment (FDI) in shaping wage inequality in developing countries. This is surprising not only because FDI is a key aspect of globalization but also as it may play a key role in transferring technology from advanced economies to developing nations ([Baldwin, 2016](#); [Javorcik, 2004, 2015](#); [Gorg and Strobl, 2001](#)).

## 2.1 Cross-country evidence

The cross-country evidence suggests mostly a positive association between FDI and wage inequality in developing countries. [Figini and Gorg \(2011\)](#) and [Jaumotte et al. \(2013\)](#), for example, showed that wage inequality in developing countries increased with FDI inward stocks. Other cross-country studies showed that FDI increased the GINI coefficient across countries during 1993-2002 ([Choi, 2006](#)), increased income inequality in Latin America ([Herzer et al., 2014](#)) and in transition countries ([Alili and Adnett, 2018](#)), but overall lowered income inequality in 16 African countries ([Kaulihowa and Adjasi, 2018](#)).

These studies all use panel data with measures of FDI and GINI aggregates that vary across countries and years. While the periods and countries studied vary, most cover the 1980s, the 1990s and the early 2000s. For example, [Figini and Gorg \(2011\)](#) look at 100



developing countries for the period 1980–2002, [Jaumotte et al. \(2013\)](#) at 51 countries, both high- and low-income groups, from 1981 to 2003, ([Choi, 2006](#)) at 119 countries from 1993 to 2002, ([Herzer et al., 2014](#)) focuses on Latin American countries during 1980–2000, ([Alili and Adnett, 2018](#)) at 19 transition countries during 1993–2008, and ([Kaulihowa and Adjasi, 2018](#)) at 16 African counties during 1980–2013. The econometric methods are similar across these studies, using mostly linear regressions with country and year fixed effects. Some of the studies look into non-linear relationships. [Figini and Gorg \(2011\)](#) and ([Kaulihowa and Adjasi, 2018](#)) suggest that the effect of FDI diminishes as the FDI stock gets larger, even while the former suggests it increases inequality while the latter suggests it decreases it. Another difference across these studies is the use of FDI stocks, flows, or FDI as a share of GDP on the right-hand side. The correct choice of FDI measure here may depend on the way researchers frame their econometric specifications, yet the conclusions we draw from these different measures should not necessarily be compared directly.

The positive correlation between FDI and wage inequality across developing countries may be explained by the fact that multinationals’ transfer of technical know-how via FDI may be skill-biased, and skill-biased technical change is a usual suspect in the inequality debates ([Acemoglu, 2002](#)). But there might be exceptions, notably in Africa and in cases where the FDI is intensive in unskilled labor.

While the cross-country evidence points towards a positive correlation between FDI and wage inequality across developing countries, this observed relationship could be driven by unobservable factors related to globalization or openness, or by other institutional features that are hard to capture with data. In other words, these cross-country studies do not allow for the identification of a causal relationship between FDI and the skill premium, nor of the mechanisms driving this relationship. Some studies have instead focused on specific countries, using variation across firms, industries, or cities, to provide a different perspective on the relationship between FDI and inequality.

## 2.2 Country-specific evidence

A few studies also looked at the effect of FDI on the skill premium in specific countries. Again most evidence points to FDI being associated with an increase in wage inequality, mostly via the skill premium. This is true in the case of Uruguay ([Peluffo, 2015](#)), across Indian firms ([Baranwal, 2019](#)), across Indonesian firms ([Steenbergen et al., 2020](#); [Lee and Wie, 2015](#)), and across Chinese industries ([Zhang et al., 2021](#)) or Chinese cities ([Johannson and Liu, 2020](#)). [Feenstra and Hanson \(1997\)](#) looked at US FDI in Mexico's maquiladoras and also found similar relative effects on wages, suggesting that the growth in FDI to maquiladoras could explain more than half of the increase in the skilled labor wage share in the late 1980s. [Te Velde and Morrissey \(2003\)](#) also suggest that FDI increases the skill premium in five African countries. [Tomohara and Yokota \(2011\)](#), using an establishment-level panel dataset for Thailand between 1999 and 2003, also suggested that FDI increased the skill premium in Thailand, but not FDI from Japan and Taiwan as that FDI is vertical and intensive in unskilled labor. There are some exceptions also for studies focusing on Eastern European economies. ([Bruno et al., 2012](#)) found significant heterogeneity in the FDI effect on wage premium across Hungary, where the effect is significantly positive; Poland, with weakly negative effects; and Czechia, with negligible effects. [Ucal et al. \(2016\)](#), also found that FDI was negatively associated with the GINI coefficient in Turkey.

A recent study of multinationals in Costa Rica also suggests that FDI increases wage inequality ([Urena et al., 2021](#)). Importantly, this study is the first to combine employer-employee data with information on all firm-to-firm relationships to study the effects of multinationals on the local labor market of an emerging economy. It finds that affiliates of multinationals pay a higher wage premium relative to domestic firms to college graduates than to other workers.

The country-specific evidence thus also largely points towards a positive correlation between FDI and wage inequality across firms or industries. An interesting aspect of this body of research is that the relationship between FDI and the skill premium can

be investigated at different levels, e.g., across firms, industries, or across cities within countries. Finding similar patterns at these different units of analysis certainly adds robustness to the results that FDI might increase wage inequality. At the same time, they do not all capture the same extent of effects. Showing that foreign firm pay a skill premium, for example, is different from identifying the geographic or sectoral spillovers of FDI on wage inequality. Moreover, most of these studies lack detailed information on worker characteristics, such as skill level, education, occupation, age and so on. This constrains estimating the impact of FDI on wage inequality to only two skill groups, omitting other dimensions of worker heterogeneity.

The country-specific studies also reveal that there might be some heterogeneity in the FDI effect on wage premium across countries. Country-specific findings may thus lack external validity and the specific countries covered may not be representative of the world as a whole.

In general, what is missing from both cross-country and country-specific studies, is an in-depth exploration of the mechanisms that explain the relationship between FDI and wage inequality; whether FDI firms pay higher wages because of their technology level and their management organization, or whether FDI has geographic or sectoral spillovers, for example.

## **2.3 Evidence from rich countries**

The effects of FDI on wage inequality have also been investigated in rich countries. For example, [Chintrakarn et al. \(2012\)](#) used state-level panel data to show that FDI has a robust negative effect on income inequality in the US, although they suggest heterogeneous effects across States. [Wang et al. \(2019\)](#) also found a negative effect of FDI on inequality in US across occupations in manufacturing. [Blonigen and Slaughter \(2001\)](#) found no effect of FDI on the skill premium within industries in the US during 1977-1994, and suggest instead that the wave of Japanese FDI to the US in the 1980s was

associated with a lower demand for skilled labor. More recently, [Setzler and Tintelnot \(2021\)](#) found, using data from tax records, that the skill premium increased with the foreign-multinational share of commuting-zone employment. Evidence suggests that in the case of the UK, FDI increased wage inequality via the skill premium ([Taylor and Driffield, 2005](#); [Driffield and Taylor, 2000](#)), while the relationship between FDI and the skill premium was found to be U-shaped in Ireland ([Figini and Görg, 1999](#)). The evidence for rich countries is thus mixed and suggests that FDI effects on inequality can go both ways.

[Davies and Desbordes \(2015\)](#) looked at the other side of the coin, i.e., the effects of FDI outflows to developing countries on job polarization in 17 developed countries. Their results suggest that greenfield FDI in support services benefited high-skilled workers at the expense of medium-skilled workers, thereby polarizing wages in source countries. Similarly [Becker et al. \(2013\)](#) found that foreign expansions by German multinationals were associated with increased skill demand at home. [Head and Ries \(2002\)](#) similarly showed that a rise in employment in affiliates of Japanese firms in developing countries, namely Japanese FDI, was associated with an increase in non-production wages (skilled wages) relative to production wages at home. These effects would be in line with an opposite effect in developing countries, where low-skill-intensive FDI jobs would reduce the skill premium. There are hence important lessons from this research on the effect of FDI on wage inequality in rich countries to understand the corresponding effect in developing countries.

## **2.4 Discussion: Stolper Samuelson-like effects**

The literature thus tends to point towards FDI as a cause of rising wage inequality in developing countries, via an increased demand for skilled labor, relative to unskilled labor. However, it is worth noting that the empirical evidence on the association between globalization and the skill premia, and inequality, in developing countries is not conclusive. This line of research has been motivated partly by classical trade theory.

In particular, the Stolper-Samuelson theorem suggests that in developing economies with a comparative advantage in low-skill-intensive activities, increased trade openness should reduce the skill premium and thus income inequality. Recent studies using regional variation in trade liberalization within countries do point towards trade reducing the skill premium. [Dix-Carneiro and Kovak \(2015\)](#) found trade liberalization to be associated with a small decline in the skill premium across Brazil regions; [Topalova \(2007\)](#) suggested that it was associated with higher poverty yet had no effect on income inequality across India regions, while [Amiti and Cameron \(2012\)](#) suggested that lower import tariffs on intermediate goods reduced the skill premium across Indonesian regions. Studying the development of household income in Brazil, [Castilho et al. \(2012\)](#) found that trade liberalization triggered an increase in income inequality in urban areas but a decline in income inequality in rural ones. They also suggested that exposure to exports was associated with a reduction in income inequality. Similarly, [Fukase \(2013\)](#) showed that provinces in Vietnam that were more exposed to a trade agreement with the United States saw an expansion of manufacturing exports and, at the same time, experienced relatively high wage growth for unskilled workers. These more recent studies thus point towards trade reducing the skill premium in some settings. It is thus surprising in some ways that the evidence for FDI points in the other direction, i.e., FDI increasing the wage skill premium in developing countries. [Figini and Gorg \(2011\)](#), for example, find that wage inequality increased with FDI in developing countries, while it decreased with FDI in developed countries. This is the opposite of what trade theory would have predicted. Indeed, in a simple world where the factors of production are skilled and unskilled workers, where developing countries have a comparative advantage in low-skill intensive industries, FDI inflows should cause a shift of production towards the comparative advantage sector, the same way trade openness does via its effect on goods prices.

It would thus not be totally surprising to find FDI to reduce the skill premium in developing economies with a comparative advantage in low-skill-intensive activities. This would also be in line, as counterintuitive as it may sound, with the general anti-

globalization sentiment from the 1990s and 2000s and the negative press coverage multinationals have received in the past few decades. Bashing multinationals for poor working conditions in sweatshops has clearly highlighted that these huge factories create a large number of jobs for less-skilled workers, and often these are mostly women. For example, a 2011 article in The Guardian ([Bunting, 2011](#)) explains how garment factories that produce for top brands like Ralph Lauren, Nike, Gap, or Converse are sweatshops. While the article focuses on how multinationals are often breaking every labor right, it also suggests that a combined workforce of 100,000 surveyed in factories in the Philippines, Indonesia and Sri Lanka are 76% poorly paid, and hence most-likely low-skilled. The same is said about Foxconn, which hires an army of 500,000 workers to assemble iPhones in Shenzhen and Chengdu ([Chamberlain, 2011](#)). A Reuters article ([Guilbert, 2018](#)) also suggests that women who make around \$102 a month account for 80% of workers in the garment sector, which produces for Nike and Adidas. [McVeigh \(2017\)](#) suggest that the same is true for Nike and Puma in Cambodia, with as many as 600,000 mostly female workers making very low wages. [Bernard et al. \(2010\)](#) note that in Mexico, maquiladoras exist for the labor-intensive assembly of manufactured goods and hence locate in regions with a high proportion of less-skilled workers.

This anecdotal evidence suggests a low-skill-intensity of FDI-related manufacturing activity in emerging markets. As long as these wages are higher than those paid by local firms or by informal agricultural work, manufacturing FDI jobs should reduce the skill premium by creating mostly low-skill employment. In fact, [Cornia \(2016\)](#) find that FDI in labor-intensive manufacturing in Ethiopia, Ghana and Mozambique, reduced inequality through employment growth in these sectors. More work is thus needed to understand if and how FDI, especially if in labor-intensive manufacturing, reduces the wage skill premium in developing countries.

## 2.5 Discussion: Foreign-owned firms and wages

A large literature suggests that foreign-owned firms do pay higher wages. [Strobl and Thornton \(2004\)](#) for example, show that a foreign wage premium does exist in five African countries, albeit only for those workers that receive on-the-job training. [Lipsey \(2004\)](#) shows that foreign plants in Indonesia pay higher wages than local plants. [El Badaoui et al. \(2008\)](#) also suggest that there is a gross wage gap of around 18% for working in the informal sector in South Africa. [Zhihong Chen and Lai \(2011\)](#) document a significant wage premium in foreign-invested enterprises in the Chinese manufacturing sector. [Bedi and Cieslik \(2002\)](#) show that industries with greater foreign presence in Poland enjoyed higher wages and higher wage growth. [Girma and Gorg \(2007\)](#) find a sizable post acquisition wage effect on unskilled wages in the UK following an acquisition by a US or EU multinational firm. Using data from Sweden, [Heyman and Tingvall \(2007\)](#) show a considerably smaller wage premium in foreign-owned firms than what has been found in studies conducted at a more aggregate level. [Lipsey and Sjöholm \(2004\)](#) shows that after controlling for differences between foreign and domestic plant characteristics, the wages in foreign-owned plants are about 12% and 20% higher than in private domestic plants for blue- and white-collar workers, respectively. Identifying the causal impact of FDI on wage outcomes is complicated by the selection bias induced by the non-random pattern of foreign ownership of firms in host economies. Foreign-owned subsidiaries typically pay higher wages to workers compared with their domestic counterparts because they hire more productive workers or select firms that have higher growth prospects. Such firms may be characterized by higher wages, with or without MNC affiliation. And these higher wages may persist over time in order to retain more productive workers ([Javorcik, 2015](#)).

This suggests that more work is needed to understand the ways in which FDI might affect wages and consequently increase, or decrease, wage inequality in developing countries. A recent report from the International Monetary Fund ([Angana Banerji, 2018](#)) suggests that rapid structural change in Vietnam has led many female workers

to join the foreign direct investment sector. If job creation by foreign multinationals means large shifts of workers from the informal to the formal sector, it should indeed lower the skill premium by raising the wages of less-skilled workers. To put it bluntly, FDI-related jobs might be pro low-skill labor because while these jobs may not appear to pay well, they are likely better than existing alternatives. Higher wages paid by foreign affiliate firms may also be attributable to higher global profits that are shared across borders within multinational firms (Egger and Kreickemeier, 2013).

## 2.6 Discussion: Wrapup

Table 1 provides a summary of key features of the reviewed literature, including country coverage, period, unit of analysis, and sector. Much of the previous evidence on the link between FDI and the skill premium, e.g. Figini and Gorg (2011); Head and Ries (2002); Lee and Wie (2015); Feenstra and Hanson (1997) shows that FDI is associated with an increase in the skill premium. While FDI increasing the skill premium in developing countries would be against Stolper-Samuelson-like effects, it would be in line with FDI as a skill-biased technology effect. One interesting avenue of future research would thus be to identify this technology effect of FDI on wages.

However, most of the available literature assessing the potential effects of inward FDI on wage premium is based on cross-country or sectoral aggregated-level indicators. The papers focusing on country-specific level mostly use firm- or sectoral-level data with focus on manufacturing. While firm-level analysis might be able to more clearly identify the direct effect of FDI on wage premia, it may not capture the potential spillover effects, both within localities and linkages across firms and industries. It may also lack detailed information on worker characteristics. An exception to this approach is the recent work from Johannson and Liu (2020), which takes into account different data sources (city, firm, and worker's level). Their results suggest an increase in wage premium associated with FDI liberalization, rather than effective investment, but also find a positive spillover effect of FDI liberalization on wages of unskilled workers. One



aspect that is less prevalent in this literature is the use of household-level data to measure wage inequality outcomes, which often covers informal workers as well. In general, the current body of research on FDI and wage inequality is characterized by the lack of high-quality datasets, especially relative to studies focused on the effect of trade. These are especially useful to identify the specific mechanisms through which FDI might affect wage inequality. Another weakness is the lack of attention paid to the heterogeneous impacts of FDI on wage inequality owing to differences in the type, motivation, ownership structure, and sectoral focus of the underlying FDI. Finally, the evidence so far does not have a strong focus on causal identification. While it is hard in this context to provide experimental evidence, other study designs such as policy or natural experiments, or even high-quality panel data that allow for the inclusion of high-dimension fixed effects and credible difference-in-differences designs, could add to the claim that the effect of FDI on wage inequality is causal.

Table 1: Summary of the literature referred to in Section 2

Reference	Country	Period	Data (level)	Sector	Variable	Effect
1 <a href="#">Figini and Gorg (2011)</a>	Cross-country (100)	1980-2002	sectoral	Manufacturing	Wage inequality	Increase*
2 <a href="#">Jaumotte et al. (2013)</a>	Cross-country (51)	1981-2003	country	All	Income inequality	Increase*
3 <a href="#">Choi (2006)</a>	Cross-country (119)	1993-2002	country	All	Income inequality	Increase*
4 <a href="#">Herzer et al. (2014)</a>	Cross-country (23, LAC)	1980-2011	country	All	Income inequality	Increase*
5 <a href="#">Alii and Adnett (2018)</a>	Cross-country (EU transition)	1993-2008	country	All	Wage inequality	Increase*
6 <a href="#">Kaulihowa and Adjasi (2018)</a>	Cross-country (16, AFR)	1980-2013	country	All	Income inequality	Decrease*
7 <a href="#">Tomohara and Yokota (2011)</a>	Thailand	1999-2003	firm	Manufacturing	Wage premium	Increase*
8 <a href="#">Peluffo (2015)</a>	Uruguay	1997-2005	firm	Manufacturing	Wage premium	Increase*
9 <a href="#">Bruno et al. (2005)</a>	Eastern Europe (3 countries)**	1994-2002	sectoral	Manufacturing	Wage premium	Heterogenous*
10 <a href="#">Baranwal (2019)</a>	India	2001-2015	firm	Manufacturing	Wage inequality	Increase*
11 <a href="#">Steenbergen et al. (2020)</a>	Indonesia	2007-2015	firms/worker	Manufacturing	Wage premium	Increase*
12 <a href="#">Lee and Wie (2015)</a>	Indonesia	1990-2009	worker	Manufacturing	Wage premium	Increase*
13 <a href="#">Zhang et al. (2021)</a>	China	2002-2016	sectoral	Manufacturing	Income inequality	Increase
14 <a href="#">Johannson and Liu (2020)</a>	China	1997-2005	city-firm-workers	All	Wage premium	Increase*
15 <a href="#">Feenstra and Hanson (1997)</a>	Mexico	1975-1988	state-industry	Manufacturing	Wage premium	Increase*
16 <a href="#">Ucal et al. (2016)</a>	Turkey	1970-2008	country	All	Income inequality	Decrease*
17 <a href="#">Te Velde and Morrissey (2003)</a>	Africa (5 countries)**	1990s	firm	Manufacturing	Wage premium	Increase*
18 <a href="#">Urena et al. (2021)</a>	Costa Rica	2006-2017	Worker-firm	All	Wage premium	Increase*

Note: This table summarizes key pieces of information of the cross-country and country-level literature analyzing the potential effects of (inflow) FDI on wage inequality referred to in Section 2. Country refers to the country coverage. (\*\*\*) refers to Poland, Czechia, and Hungary. (\*\*) refers to Cameroon, Ghana, Kenya, Zambia, Zimbabwe. Period refers to the main period of analysis as specified in the paper. Data (level) refers to the use of aggregated data (e.g., country, city, or sectoral) or individual (firm, workers, individual level data). Sector refers to the sectoral coverage for the analysis. Variable refers to the main variable of interest. Effect refers to the observed association between FDI and the main variable of interest.

### 3 New evidence from 7 emerging economies

This section takes a fresh look at the relationship between FDI and the skill premium in 7 emerging economies. It uses a novel approach, namely merging greenfield project-level FDI data with household surveys, that allows to exploit both regional and sectoral variation in FDI and skill premia within countries and across time. This approach may capture some heterogeneity across local labor markets that are not observed in most studies in the literary, either because of their unit of analysis at the country level or the limited universe of workers restricted to firms that received FDI.

It also uses a unique data set that has not yet been used to study the effect of FDI on the skill premium. It combines worker-level information from household surveys from the World Bank's International Income Distribution Data Set (I2D2) with FDI project-level information from fDiIntelligence. The latter has been tracking and verifying individual cross-border greenfield investment projects since 2003. The database provides project-level information on the value of investments and the estimated jobs created. The granularity of the data allows to conduct the analysis both at the sub-national level and at the industry level, as well as to focus on the number of greenfield projects and the number of jobs created by such projects.

The expansion and diversification of FDI projects that came with the wave of globalization in the 2000s makes it all the more important to understand its consequences. Across the 7 countries we look at, new FDI projects have increased over 2004-2015, despite ups and downs. Brazil saw a steady rise in FDI from 2006 to 2012, culminating with around 550 projects in 2011. Colombia saw a steady rise in FDI from 2003 to 2013, culminating in around 175 projects. South Africa and the Philippines saw similar increases until 2013 reaching around 200 projects, whereas Vietnam peaked earlier in 2008 with around 350 projects. In Mexico and Ethiopia, FDI projects have been growing since 2003 and have shown more resilience in the last years covered with no observed decline. In 2015, the last year in the sample, Mexico received the highest

number of FDI projects with more than 400, while Ethiopia got the fewest with less than 100 projects.

The extent of FDI diversification, both at the geographical and sectoral levels, that took place over the period of study in these 7 countries, is quite remarkable. The share of regions receiving FDI projects, the average number of FDI projects per region, and the average number of sectors with FDI projects per region have increased in 6 of the 7 countries. In Mexico for example, the average number of FDI projects per region went from 6.5 in 2004 to 29.3 in 2012. Ethiopia's experience has also been remarkable, with only 10% of its regions hosting FDI in 2004 but 55% in 2014.

The I2D2 data contain harmonized information on wages, gender, sector of activity, location, and education. It can be used to compute skill premia, defined as the ratio of skilled to unskilled wages, adjusted for years of experience. Skilled individuals are defined as those who have at least a complete post secondary education. A striking observation is that for both men and women the skill premium has been declining in most countries in the sample. The general downward trend in the wage premium was also documented by [Cruz, Milet, and Olarreaga \(2020\)](#). Vietnam is an exception but the last year observed is 2008. In the Philippines it has not changed much over the years. In Ethiopia it has declined for men but increased slightly for women from 2004 to 2012. Hence, at least according to this metric, these emerging economies have not seen major increases in inequality as measured by the skill premium in the last decade. Another interesting fact is that the skill premium is much higher for women than men. In Ethiopia for example, skilled women make 3 times more than unskilled women in 2014, down from 5 times in 2004. Skilled men make only 2 times more than unskilled men, down from 2.6 times more in 2004.

To examine the relationship between greenfield FDI and skill premia, the following wage equations are estimated for each country:

$$(1) \quad y_{isrt} = \eta(FDI_{srt} \times e_i) + \gamma FDI_{srt} + \lambda e_i + X'\beta + \delta_{rt} + \alpha_{st} + \theta_{rs} + \varepsilon_{isrt}$$

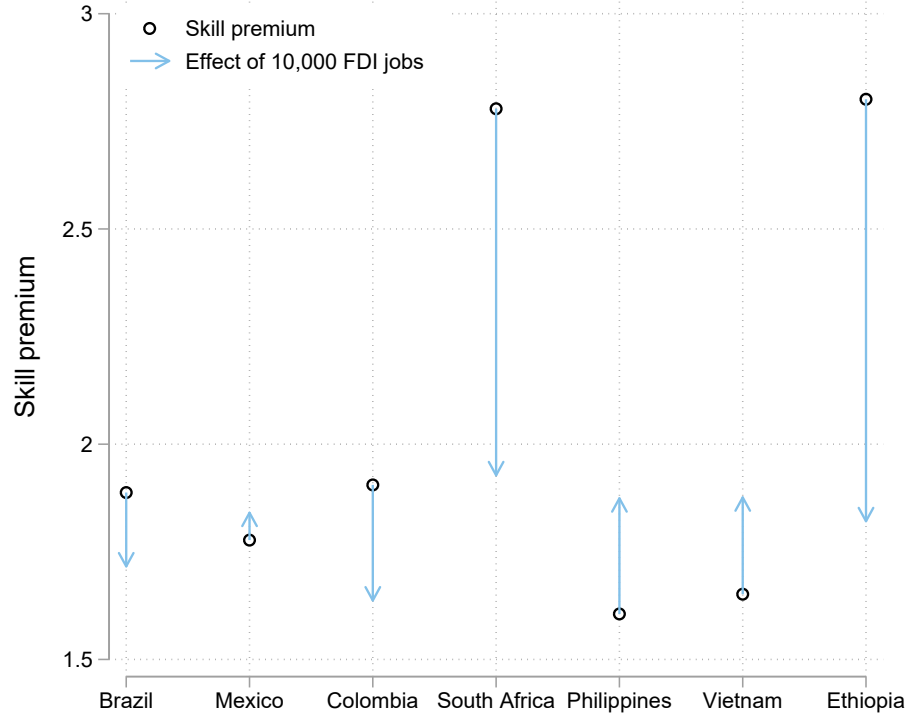
where  $y_{isrt}$  is the log wage of individual  $i$  in industry  $s$  in location  $r$  in period  $t$ .  $e$  is a dummy which is equal to 1 if an individual received a post-secondary education and zero otherwise.  $FDI$  is a measure for greenfield FDI, i.e. number of FDI jobs created. The main specification controls for workers' years of experience and years of experience squared. It includes region-year  $\delta_{rt}$ , industry-year  $\alpha_{st}$ , and region-industry  $\theta_{rs}$  fixed effects and cluster standard errors at the region level. 10 industries are merged between household surveys and FDI data, namely: Agriculture, Extraction, Manufacturing, Construction, Utilities, Commerce, Transport and Communications, Financial and Business Services, Public, and Other Services. This 3-way fixed effect specification allows us to control for all factors that do not vary across these three dimensions but may affect the skill premium, such as the supply of skilled workers in each region in each period, or the region level trends in skill premia. It thus identifies the effect of FDI on skill premia that comes from the variation within region-years, region-industries, and industry-years.

The magnitudes of the estimates of  $\eta$  in equation 1 are summarized in Figure 3. The Figure shows the average level of skill premia in each country, where a skill premium of 2 means that skilled workers earn twice as much, as well as the change that would occur with an increase in 10,000 FDI jobs. These effects are based on estimates of  $\eta$  and suggest that FDI projects are associated with a decrease in the skill premium in 4 out of 7 countries. The effect is statistically significant in all countries but Mexico and Vietnam, and is strongest in Ethiopia, where an extra 10,000 FDI jobs are associated with a drop in skill premium from around 2.75 to around 1.8.

The results contrast with the majority of the literature which suggests that FDI increases the skill premium in host countries. This could be due to the different FDI data or the novel approach. It could be due to the inclusion of wage information for informal workers, which are included in household survey data but often not available in industry or firm level data. The sign and magnitude of the effect might also depend on the countries studied, even if at the same level of development, or on the sectors

targeted by FDI, whether the FDI is in new projects or in acquisitions, or on the current level of skills in the workforce, for example. The heterogeneous effects could be examined more carefully in future research.

Figure 3: The effect of FDI on the skill premium



Note: The arrows are based on estimates of  $\eta$  in equation 1, i.e. the marginal effect of FDI on the skill premium controlling for gender, the individual's years of work experience and its square. The estimates of  $\eta$  are not statistically significant in the case of Vietnam and Mexico. The circles are estimates of  $\lambda$  in an equation similar to 1 which does not include FDI nor its interaction with education. Countries are ordered by GDP per capita in 2004.

## 4 The state of the art and future research potentials

The literature so far in most cases suggests that FDI increases wage inequality in developing countries. This is true for cross-country studies, and also for country-specific studies that use variation across firms, industries or cities. There is however some heterogeneity across countries. For example, [Kaulihowa and Adjasi \(2018\)](#) finds that FDI decreases wage inequality in some African countries. Also, the evidence from the select group of emerging economies discussed in the previous section is in line with low-skill-intensive production rewarding less-skilled workers in skill-scarce countries. This is also in line with the anecdotal evidence that FDI in manufacturing in emerging markets might create large amounts of low-skill employment, especially for women, and these jobs might provide higher wages than informal jobs such as rural farm work, thereby lowering the skill-premium. It is worth noting however that this does not mean that manufacturing jobs are always attractive. In a recent study of manufacturing work in Ethiopia, [Blattman and Dercon \(2018\)](#) show that many low-skill workers who were randomly given industrial jobs with long hours and low pay quit just months after starting. The authors found no wage premium in industrial firms, compared to informal work. Similarly, [McLaren and Yoo \(2016\)](#) suggest that between 1989 and 2009, FDI to Vietnam only led to small improvements in living standards for those who were lucky enough to get a job in foreign-owned businesses, thus highlighting that FDI work is not always a major improvement in terms of wages. These caveats should be kept in mind when thinking about the effect of FDI on the skill premium.

One could argue that the literature so far has three main limitations. First, there is a lack of focus on the identification of a causal effect, especially in cross-country settings. Second, the data quality has not matched that in the studies of trade and inequality. This is partly due to the lack of availability of FDI data across countries and across sectors. This high-quality data is particularly useful for the identification

of the mechanisms driving the relationship between FDI and the skill premium, which have not been explored sufficiently yet. Third, the focus on variation in wages across foreign-owned firms has not allowed for the identification of spillover effects, whereby FDI may affect wage inequality across industries and across locations. The evidence provided by this chapter suggests household-level data can be used to identify local or industry-level effects of FDI, and panel data across location and sectors, may improve the identification of the effect via the inclusion of fixed effects at many levels.

Six avenues of future research potential that could be explored include:

- Using household-level or other fine-grained measures of wages, providing information at the local and industry level. Using employee-employer matched datasets as suggested in [Abowd and Kramarz \(1999\)](#) and used by [Urena et al. \(2021\)](#), for example would allow not only for precision but also a separation of the contribution of the direct effect via employment in FDI firms and the indirect effect via geographic or industry spillovers.
- Using the best available FDI datasets. FDI data has been hard to obtain in the past, apart from country-level aggregates or country-industry aggregates, available from UNCTAD or the IMF. Researchers have also relied on information in firm-level data or household surveys to get approximate measures of FDI. New sources of data such as fDiMarkets provides data on individual greenfield FDI projects, or the Mergers and Acquisitions Database from Thompson Reuters that provides data on brownfield FDI projects. Furthermore, Bureau van Dijk, which covers mergers and acquisitions at the firm level, can be used to provide a comprehensive and fine-grained measure of FDI in as many locations and industries as possible. For example, [Mendola et al. \(2022\)](#) use Bureau van Dijk data to check how multinational enterprises create local job opportunities in developing countries. This data could be used to study wage inequality effects as well.
- Exploring heterogeneous impacts. Few studies estimating the impact of FDI on



wage inequality account for heterogeneity across types of FDI (greenfield versus brownfield), FDI motivation (efficiency-enhancing versus market-seeking), ownership modalities (joint ventures vs. foreign control), source country (high-income versus middle-income), sector (manufacturing versus services) and characteristics of domestic firms (firm capabilities and technology readiness). Exploring factors that mediate the relationship between FDI and wage inequality remain a key area for policy research. For example, existing studies largely examine the wage effects of FDI in manufacturing. However, the share of manufacturing in greenfield FDI inflows into developing countries has declined over the past decade, from 42 percent in 2003 to 28 percent in 2015 [Hallward-Driemeier and Nayyar \(2017\)](#). And much of this decline was picked up by the services sector that continues to be characterized by several barriers to FDI [Nayyar and Davies \(2021\)](#).

- Exploring the impact of outward FDI from developing economies. The share of developing economies in global outward FDI increased from 4 percent in 1995 to almost 20 percent in 2015. While large emerging markets, such as Brazil, Russia, India, China, and South Africa, are driving this outward FDI from developing countries, many others are also increasingly engaged (World Bank 2018). The underlying motivation for these FDI are likely to influence wage inequality in the source country. Take, for example, the acquisition of German robotics companies by Chinese firms. Such outward FDI that is used to access new technology without having to innovate at home, can affect the relative demand for skills in the home economy too [Mani \(2013\)](#). Outward FDI can also boost exports of intermediate goods from the home country [Ahmad and Yang \(2016\)](#) that, in turn, affect the relative demand for low-skilled labor. This applies, for example, in the case of Chinese infrastructure-related investments in Africa as well as through the Belt and Road Initiative.
- Focusing on the identification of causality. It is difficult to design an RCT to study a question of this scale with large local and industry spillovers. But more efforts

could be directed at finding policy or natural experiments, involving for example large FDI shocks, that allow for exogenous variation in FDI across locations or industries. [Toews and Vézina \(2020\)](#), for example, use an FDI bonanza caused by a major gas discovery in Mozambique to look at the job multiplier effects of FDI projects. Similar FDI booms, driven by policy changes, could be exploited further to identify the causal effect of FDI on wage inequality. [Johannson and Liu \(2020\)](#), for example, focus on an FDI policy change in China. Another potential to improve identification is to focus on high-quality panel data that allow for the inclusion of high-dimension fixed effects, at the level of localities, sectors, or occupations, to isolate specific channels, as well as for credible difference-in-differences designs where it is possible to test for parallel trends in wages before FDI shocks.

- One last research potential is the identification of the specific mechanisms through which FDI might affect wage inequality. This would rely on fine grained data, for example employer-employee matched data, or a mix of firm-level and household-level data, with reliable information not only on wages and location and industry but also on management practices and technology adoption at the firm level. The work of [Verhoogen \(2008\)](#) for example could provide inspiration here, where he linked international trade to more-skilled workers via the use of state-of-the-art technology in exporting firms to produce high-quality products. Data on computerization, and other uses of capital and technologies, could further allow for the isolation of the skill-biased technical change effect from say product quality, or input quality effects. Employer-employee earnings data might also allow for the identification of the impact of different management practices of FDI firms on wage inequality. Recent work by [Bloom et al. \(2021\)](#), which finds that employees at firms with more structured management practices have higher pay, could provide inspiration for identification strategies. Finally, the combination of employer-employee data with information on all firm-to-firm relationships in

[Urena et al. \(2021\)](#) is a great example of what can be done with fine-grained data to identify the specific channels through which FDI affects the skill premium.

Whether FDI increases or decreases the wage skill premium in developing countries remains an open questions, and the answer might be, “it depends”. Figuring out what are the mechanisms that drive the causal effects and the various factors that may influence it provides for promising further research.

## 5 Summary

This paper provided an overview of the literature on FDI and the skill premium in developing countries. It found that out of 18 studies that looked at this relationship empirically in various regions and time periods, 15 found FDI to be associated with an increase in wage inequality. This relationship held both in cross-country studies and in country-specific studies that use variation across firms, industries or cities, as well as in state-of-art studies that combine employer-employee data with data on firm-to-firm relationships. These similar patterns at different levels of analysis provide convincing evidence that FDI might increase wage inequality. While the literature overwhelmingly points towards FDI increasing wage inequality, both cross-country and country-specific studies suggest that the effects of FDI could be heterogeneous across countries, regions or industries. A fresh look at the relationship using an alternative novel approach, i.e. matching information on FDI-related jobs from a project-level FDI data set with data on wages from household surveys by sector, location and year across seven emerging economies, suggested instead that FDI was associated with higher wages for unskilled workers, relative to skilled workers, in 4 of 7 countries.

This chapter identified three main limitations in the literature. First, there is a lack of focus on the identification of a causal effect, especially in cross-country settings. While it is difficult to design an RCT to study a question of this scale with large local and industry spillover, more efforts could be directed at finding policy or natural experiments, involving for example large FDI shocks, that allow for exogenous variation in FDI across locations or industries and credible difference-in-differences designs. Second, the data quality has not matched that in the studies of trade and inequality. High-quality data such as employee-employer matched datasets, or a mix of firm-level and household-level data, with reliable information not only on wages and location and industry but also on management practices and technology adoption at the firm level, allow for more precise estimates as well as the identification of mechanisms such as skill-biased technical change as well as of geographic spillovers. Data

on firm-to-firm relationships on the other hand is key to identify industry spillovers effects. Household-level data on the other hand may provide alternative fine-grained measures of wages, and also crucially include informal workers. This points to the third limitation of the literature, the lack of studies focusing on the identification of the specific mechanisms through which FDI might affect wage inequality. The positive association between FDI and the skill premium could be due to skill-biased technical change, whereby FDI brings in new technologies, capital goods or production methods. FDI might also lead to an increase in the relative demand for unskilled workers, in line with emerging economies' comparative advantage, and reducing the skill premium. In future research, new and improved data sets, as well as convincing empirical strategies, will allow for the identification of the precise mechanisms through which FDI leads to wage inequality.

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## 6 Cross references

- Upward Mobility in Developing Countries
- Skills shortage, educational mismatch youth unemployment
- Sweatshop Labor
- Inequality of Opportunity, Economic Development and Poverty
- Rural-urban Migration and Economic Development
- Returns to Higher Education - Graduate and Discipline Premium
- Gender Wage Gaps and Skills

- Inequality Measurement: Methods and Data
- Testing the Employment and Skill Impact of New Technologies
- Integration in Global Value Chains and Employment
- Globalization and Worker Representation

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