

Global Value Chains and Developing Country Employment

A Literature Review

Ben Shepherd, Principal.

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Abstract

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This paper provides a review of the available literature on global value chains (GVCs) and employment markets in developing countries. Due to the difficulty of observing intra-GVC transactions, there is very little direct empirical work on GVCs and labour markets. However, it is possible to extrapolate from the extensive empirical work already undertaken on firm internationalisation and labour markets to draw inferences as to the likely impacts of GVCs. The review therefore focuses on the labour market impacts of three processes that lie at the core of GVC development: importing, exporting, and foreign direct investment (FDI). It examines their impact on labour demand and wages, and disaggregates the effects whenever possible by skill level. The available empirical evidence strongly suggests that the type of activities undertaken by GVC participants influence labour market outcomes. For instance, many GVC firms are vectors of technological upgrading that in turn increases the relative demand for skilled labour. In these cases, GVC participation is linked to higher relative wages for skilled workers, but also greater wage inequality between skilled and unskilled workers. The evidence on outcomes is more mixed as regards pure processing trade (assembly), however: the limited data available on firms engaged purely in these activities suggests that they do not systematically pay higher wages than domestic firms, which is the reverse of the finding for foreign-owned firms, exporters, and importers in general. The labour market effects of GVCs in developing countries are therefore likely to be broadly positive, but highly case specific. The review therefore concludes with two case studies—electronics in Asia and services in Chile—that demonstrate the complexity of the issues involved, and the role of complementary policies in areas such as human capital development.

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JEL classification: F16, F21, F23, O24.

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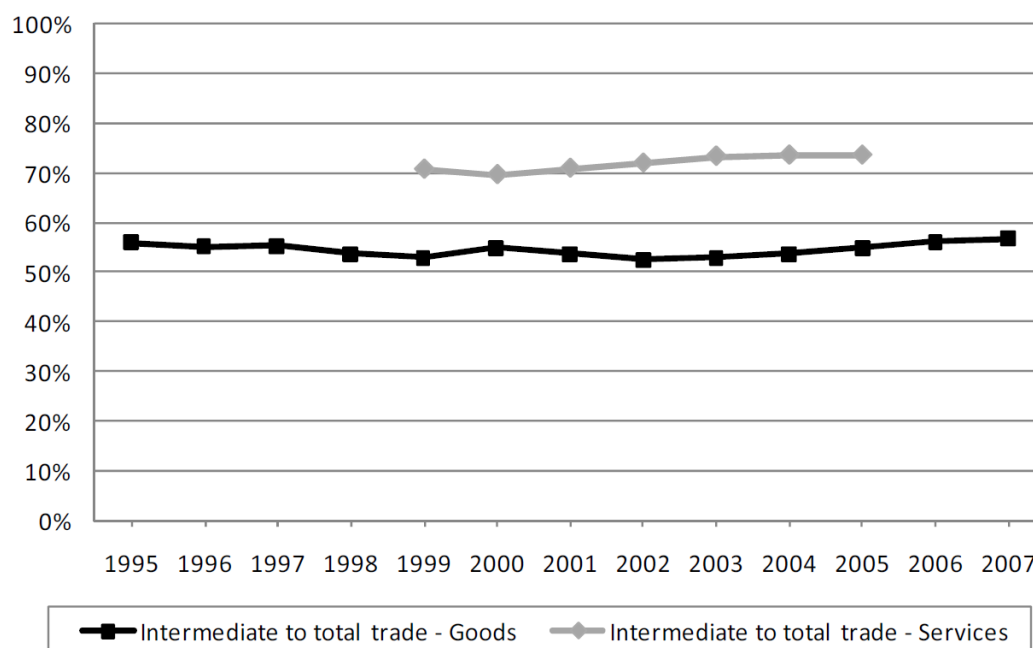
Table of contents

Introduction	4
Trade and labour markets in developing countries.....	8
Exports, imports, and labour demand.....	8
Exports, imports, and wages	10
FDI and labour markets in developing countries	14
Labour demand.....	14
Wages	15
Case studies	16
Electronics in Asia	17
Offshore services in Chile	18
Conclusion, policy implications, and directions for further research.....	18
References	21

Introduction¹

The rise of global value chains (GVCs) in a variety of industries—covering both goods and services—has been a salient feature of the world economy over recent years (Miroudot et al., 2009; Figure 1). Increased participation by developing countries, particularly in East Asia, stands out strongly in the data (World Bank, 2003; Figure 2). GVCs are characterised by the functional and spatial fragmentation of activities in a firm’s value chain, including production, distribution, sales and marketing, R&D, innovation, and other functions (De Backer and Yamano, 2012).² GVCs, like the famous one used to produce Apple’s iPhone, are inherently complex phenomena: they do not rely on a linear supply chain, but instead use a network-based approach in which parts and components move across borders multiple times during the production process, and component production takes place in different locations from where assembly of the final product is undertaken. GVCs are not just about manufacturing, however: services are key in two respects. Firstly, GVCs cannot function properly in the absence of well-functioning markets for backbone services such as transport and logistics, and telecommunications—the GVC business model is highly dependent on the existence of an open and competitive services sector. Secondly, services are also being produced through GVCs in their own right. The rise of business process offshoring is an example: a financial firm headquartered in New York can fragment its research and writing processes to ensure around the clock functioning using affiliates in Europe and Asia. Services are thus a key component of analysing GVCs.

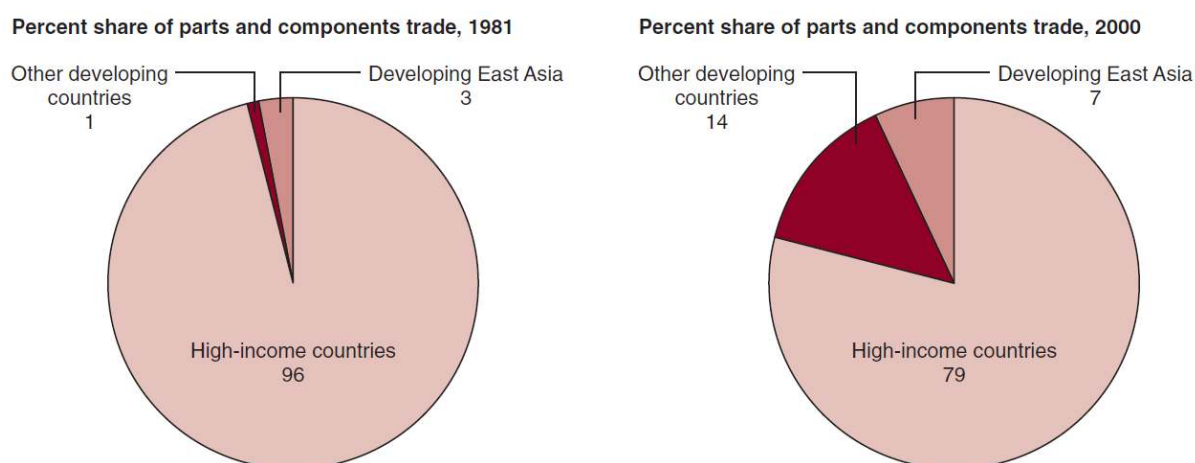
Figure 1. Share of intermediate trade to total trade in goods and services for OECD countries (1995-2007)



Source: Miroudot et al. (2009).

1. Contact: Ben Shepherd, Principal, Developing Trade Consultants Ltd. Ben@Developing-Trade.com.
2. The concept of GVCs is closely related to those of global production networks (GPNs) and global commodity chains (GCCs). We make use of findings from the literature on GPNs and GCCs as appropriate, in light of the closely linked nature of these concepts.

Figure 2. Developing countries' share in parts and components trade, as a proxy for GVC participation, 1981-2000



Source: World Bank (2003).

Despite their importance for the world economy, GVCs are relatively understudied by economists due to the difficulty in obtaining data on intra-network transactions. Most of the extensive research that has been carried out in other disciplines on GVCs and related concepts tends to be based on case studies, rather than data and quantification. In this review, it is preferred to focus on the second path. In analysing the effects of GVC development on national economies, it is therefore necessary to proceed largely by analogy, focusing on research that examines the types of firms that GVCs would typically involve, even though it is impossible to tell in the data whether or not those firms are actually involved in particular GVCs or not. For example, there is a wealth of data on the characteristics of firms that export, import, and have foreign investor involvement: all three activities are commonly observed within GVCs, and many GVC participants engage in all three activities simultaneously. From information on the behaviour of these types of firms, it is possible to make inferences about the likely impacts of GVCs on national economies. Those inferences can be strengthened by case study evidence from other disciplines that examine particular examples of GVCs.

The purpose of this paper is to review the literature on one aspect of the relationship between GVCs and national economies: their labour market effects. Specifically, its focus is on the impact of GVCs on developing country labour markets, defined as all economies except those in the World Bank's high income group. This is a broad area, and the analysis is divided into two main sections: trade, and FDI. These two sections reflect the core activities of GVC firms on which extensive empirical evidence is available. Within each section, labour demand and wages are discussed separately. In both cases, the analysis attempts to break out the available results according to skill level, which makes it possible to look not just at aggregate effects on employment levels and payments received by workers, but also at issues like relative demand for skilled employment, and wage inequality between workers of different types.

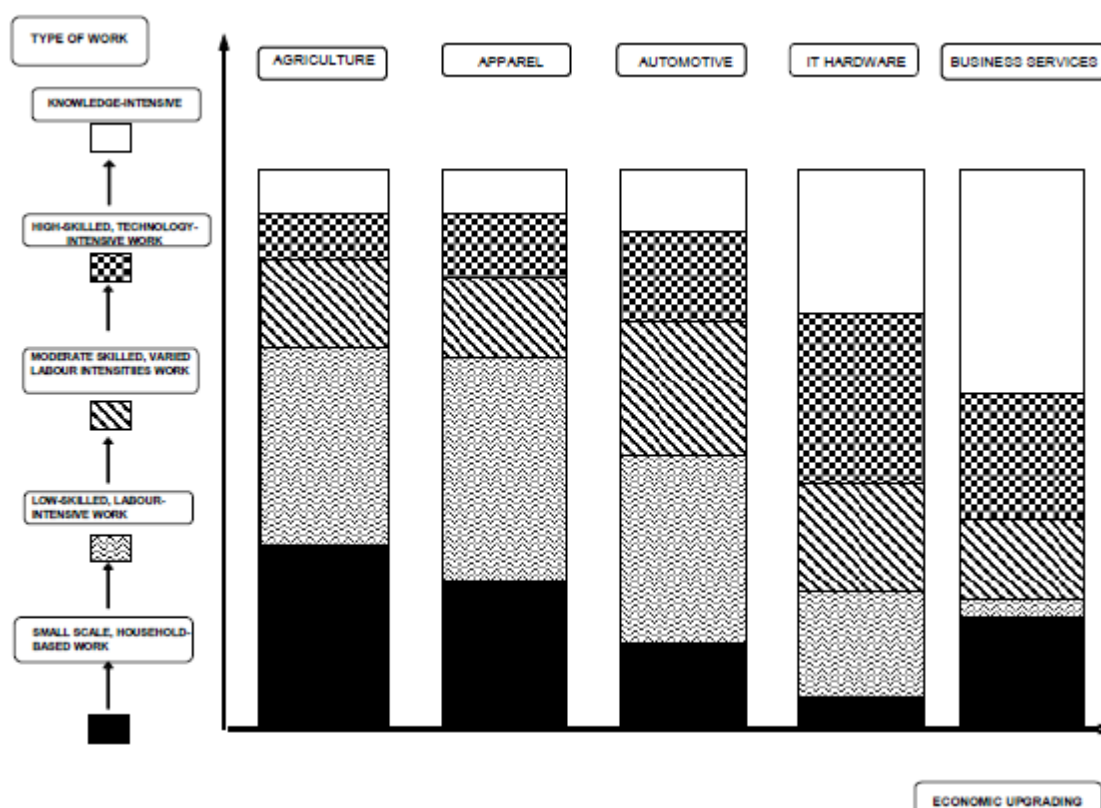
The labour market effects of GVCs have become increasingly important from a policy point of view, as they are closely linked to the concepts of economic upgrading and social upgrading within economies with a substantial GVC presence. Barrientos et al. (2010) and Milberg and Winkler (2011) provide reviews of the issues in this area. They argue that economic upgrading—the process of moving into higher value-added activities within a GVC—only sometimes translates into improvements for workers, and proceed to examine the situations in which both can take place simultaneously. In the discussion below, we focus on identifying the

situations in which labour can gain from the expansion of GVCs, and in particular the types of complementary policies that might be necessary for such outcomes to flow.

From the standpoint of economic analysis, there are many ways in which GVC participation and labour markets can be linked, and a primary purpose of this literature review is to examine the empirical evidence on the size and direction of these links. By way of introduction and framing the issues, it is useful to first consider the types of links that might exist before moving to the evidence on their relative extent. As a starting point, it is well known that internationalised firms—those that engage in imports or exports or which are controlled by foreign investors—are larger (sell more) and more productive than purely domestic firms. (See below for references on these points.) Internationalisation, including through participation in a GVC, therefore includes both a scale and productivity effect. At first glance, one would expect both effects to have a positive impact on developing country labour markets. If firms are to grow and sell more, including to overseas markets, they must employ more workers (increased labour demand). In addition, in environments without too much unemployment and in which labour markets function well, higher productivity should translate into higher wages, as workers are paid close to their marginal product. Of course, both points are subject to a variety of caveats in the real world of developing country labour markets, and they are discussed in detail below.

A second way in which GVC participation is linked with labour markets is through the relative demand for skilled labour. Many different activities take place within GVCs, some of which—such as research and development—are highly skill intensive, and others of which—such as assembly—are relatively intensive in unskilled labour. Development of part of a GVC within a country therefore has different implications for different segments of the labour market depending on the type of activity that is undertaken. If the GVC segment is more skill intensive than average within the economy—as often appears to be the case empirically—the relative demand for skilled labour will increase. The labour market effects of GVC participation can therefore be seen to be a complex empirical question: in this example, skilled workers gain on two fronts (increased demand and higher wages), but low skilled workers can either be left in the status quo, or even worse off if the relative demand shift is strong. Wage inequality is thus another issue that needs to be considered in examining the labour market effects of GVCs. The particular level of inequality between skilled and unskilled wages that each country accepts is of course a matter of social choice for that country. But economic analysis can be useful in tracking changes in this measure, and relating them to changes in the level of internationalisation of the economy, including through GVC participation.

The importance of breaking down GVCs into their component activities, and focusing on the skill composition of those activities in terms of labour market impacts, is highlighted by Figure 3 (from Barrientos et al., 2010). Those authors use five typical GVCs in different sectors that have different mixes of skilled and unskilled workers in different employment contexts. Clearly, the labour market implications of expanding participation in an agriculture GVC in which a country is mostly involved in primary production at the household level are vastly different from those of expanding participation in an offshore services GVC in which a country's firms are mostly involved in knowledge-intensive activities.

Figure 3. Workforce composition and economic upgrading in five representative GVCs

Source: Barrientos et al. (2010).

As already noted, it is generally impossible to obtain specific data on transactions taking place within GVCs. As a result, there is no rigorous quantitative (econometric) work on the employment effects of GVCs in developed or developing countries. The approach adopted here is therefore necessarily indirect, and relies on the wealth of emerging firm-level data on the employment effects of exporting, importing, and foreign ownership. Considerable evidence is available on these effects in developed countries, and we make reference to it as appropriate.³ However, extensive data is also available from a number of developing countries, including some G20 countries, and it is on that evidence that the paper focuses.

An additional restriction that needs to be kept in mind is that the focus of this paper is on empirical evidence and data analysis. As a result, the analysis should be interpreted as indicative of the links between GVCs and formal labour markets in developing countries. Data are generally not available on informal labour markets, even though these latter mechanisms can be important sources of employment in developing countries. Some of the policy literature expresses the concern that GVC participation might be linked with increased informality of work. This concern may, or may not, be valid, but it cannot be assessed on the basis of the data currently available (see Bacchetta et al., 2009 for a survey of the available evidence on globalisation and informality). Although informality is a major issue in some developing countries, it should be remembered that it is typically the parts of the GVC performing the least sophisticated activities—and which tend therefore to be linked with other domestic firms rather

3. Stone and Bottini (2012) give examples of contributions showing both positive and negative effects, and conduct a novel analysis using data for a number of OECD countries.

than having direct international linkages—that are most likely to be involved in informal practices. Similarly, the fundamental economic forces of supply and demand for skilled and unskilled labour can sometimes have similar effects on the price of labour (wages) in informal markets as in formal markets, although the difference between the two levels can be substantial due to the failure to pay mandated benefits such as health insurance or unemployment insurance in the informal sector.

With this background in mind, the paper proceeds as follows. Section 2 provides an overview of the literature on trade and labour market outcomes in developing countries. The following section reviews the literature on foreign direct investment and labour market outcomes in developing countries. Section 4 then looks at two representative case studies from the small literature that deals directly with global GVCs and labour markets, focusing on case studies and policy reports. The final section concludes with some possible policy implications that flow from the existing literature, as well as directions for further research.

Trade and labour markets in developing countries

Two types of trade linkages are important for the development of global value chains: imports of intermediate goods (parts and components) and services, and exports of goods or services at a higher degree of value added, up to and including final (consumer) goods and services. It is important to consider both aspects separately, because the labour market implications of the two processes are potentially different even though they are closely intertwined in current business models and the distinction is therefore somewhat of an artificial one when many firms are engaged in both processes in a simultaneous and complementary way. We therefore distinguish between the import and export sides in what follows. First, we discuss the impact of trade on employment demand, including where possible references to segmentation of labour markets according to skill. Next, we discuss the impact of trade on wages. Together, these two aspects provide a simple, quantitative picture of the links between trade and employment in the context of the type of trade that takes place in global value chains. Despite the importance of services in making goods GVCs work to their full potential, and as subject to GVCs in their own right, our focus is necessarily on manufacturing in what follows. There is simply very little data and analysis on services in GVCs, particularly in the developing country context, but it is likely that many of the dynamics isolated in the goods literature also apply to services.

Exports, imports, and labour demand

A large and growing literature focuses on the characteristics of exporting firms relative to non-exporters (those that serve the domestic market only). In general, exporters are larger and more productive than firms that only sell domestically. Two mechanisms are at work to produce this result. The first is productivity-based self-selection: firms decide whether or not to export based on the additional costs of doing so and their own productivity. The second is learning-by-exporting, whereby firms learn new production techniques or engage in upgrading following export market entry. Using data for the United States, Bernard and Jensen (1999) find that it is the first mechanism (self-selection) which dominates, however the evidence for developing economies is more mixed: particularly through trade with industrialised countries, but not so much for trade with developing countries, there is also evidence of learning-by-exporting effects that are quantitatively significant (see Van Beisebroeck, 2005 for Sub-Saharan Africa; De Loecker, 2007 for Slovenia; and Brambilla et al., Forthcoming for Argentina; cf. Haidar, 2012 who finds no significant effect in India). Some studies find evidence of both effects acting simultaneously (e.g. Alvarez and Lopez, 2005 for Chile). Regardless of which mechanism dominates in particular cases, one implication is clear: exporters, including those involved in GVCs, are larger and more productive than other firms in the economy.

What does this finding—which has been consistently replicated in numerous studies—imply for labour markets? The first implication, which we discuss in this sub-section, is that part of being “larger” is employing more workers. That is, exporters tend not only to have higher sales than other firms, but they also employ more workers to do so. Exporting is therefore associated with stronger labour demand. Of course, the direction of causality is not established by most studies. There is evidence, however, that causation runs at least partly from exporting to employment firstly because of a scale effect due to exporting—more workers are required to produce more output—but also because of a “preparation” effect (Iacovone and Javorcik, 2012): firms get ready to export by improving production processes and employing more workers, particularly workers with experience at other exporting firms (Molina and Muendler, 2009).

We do not reproduce the findings of all studies showing the “exporter premium” in employment—i.e., the fact that exporters employ more workers than other firms—but present selected results only. As one example, Van Beisebroeck (2005) finds for a panel of nine Sub-Saharan African countries that exporters employ over seven times as many workers as non-exporters. Similarly, De Loecker (2007) finds that Slovenian exporters employ over five times as many workers, on average, as firms that serve the domestic market only. Ranjan and Raychaudhuri (2011) find that in the Indian data, the difference in employment rates is around 150% for exporters versus non-exporters. Dai et al. (2011) find that exporters in China are generally larger than other firms as well, although the effect is muted somewhat—but still present—for firms engaged in processing trade (i.e., export of final goods based on assembly of imported intermediates).

Only Breinlich and Criscuolo (2011) provide comparable evidence of trade premia for services firms, using UK data. In line with the goods literature, they find that services exporters are systematically larger and employ more workers than firms that deal with the domestic market only. The trade premium in employment is particularly pronounced for firms that both export and import. This one piece of evidence—admittedly for a developed rather than developing country—therefore tends to suggest that the labour demand effects of trade may carry over to services trade, including services traded within GVCs.

Harrigan and Reshef (2012) highlight the importance of breaking down the exporter premium by skill category. Although their work is largely theoretical, not empirical, their model proposes a mechanism by which trade liberalisation and skill-biased technical change—which tends to increase the relative demand for skilled workers—are linked. The highest productivity firms, which tend to export, are also those that are relatively intensive in skilled labour. A reduction in trade costs leads these firms to expand while less productive firms contract, which causes an increase in the relative demand for skilled labour due to the twin influences of skill-biased technical change and trade liberalisation.

One important caveat for the exporter premium in employment is provided by Menezes-Filho and Muendler (2011) for the case of Brazil. As in standard models of trade, they find that liberalisation leads to contraction of import competing firms and expansion of exporters. We would expect labour to move from the former to the latter, but the authors instead find that exporters retrench significantly more workers and hire fewer workers than other employers. Trade liberalisation therefore leads to some transitions to unemployment, services, and exit from the labour market, instead of just reallocations of workers from low productivity to high productivity firms. One reason for this result might be imperfections in the labour market or mismatches between the skill levels of workers at import-competing and exporting firms. In both cases, appropriate labour market programs such as training and education could play a role in reducing the negative labour market effects of trade liberalisation.

Thus far, we have focused on the position of exporting firms. Less information is available on the import side, but Bernard et al. (2007) report that US importers employ more workers on

average than non-importers, with a differential of around 300%, which is similar to the exporter premium. Interestingly, they find that the premium is even larger for firms that both export and import. Engaging in both activities is typical of firms involved in GVCs, so their results are suggestive of a positive impact of GVCs on labour demand, although they cannot examine the question directly since their data do not make it possible to distinguish between networked trade and other types of export-import relationships.

The only paper to examine the import premium in developing countries is Seker (2012). The author uses data for 43 developing countries to show that exporters, as well as importers, tend to employ more workers than firms that do not trade at all. In line with the results of Bernard et al. (2007), he finds that the largest employment demand premium is for firms that engage in both importing and exporting activities simultaneously. This finding provides further support for the conjecture that the overall employment effects of GVCs—which typically require firms to both import and export—could be positive in both developing and developed countries.

It is important to nuance this result, however, as it may not apply to all developing countries and all worker skill levels. Fajnzylber and Fernandes (2004) contrast Brazil and China. In the former, internationalisation—exporting or importing intermediates—is associated with stronger demand for skilled labour. In China, however, the opposite is true. Although the reasons for this difference are not disclosed by the data, a likely possibility (see further below) is the extent of processing trade or simple assembly undertaken in China relative to Brazil. This example highlights that the types of activities undertaken by GVCs, or the relative position of a country's firms within a GVC, can affect the relative labour demand impact of internationalisation.

Exports, imports and wages

Basic economic theory suggests that in the absence of distortions or dysfunctions, workers should be paid according to their marginal product. This means that more productive workers should be paid more than less productive ones, all other things remaining equal. This insight provides the second labour market implication of the exporter productivity premium: in addition to employing more workers, we also expect exporters—including those involved in GVCs—to pay higher wages than firms that serve the domestic market only.

As in the previous section, there is now a wealth of evidence in support of the proposition that exporters pay higher wages than non-exporters. For instance, Van Biesebroeck (2005) finds that exporters pay on average 40% more in wages than do firms that serve the domestic market only. De Loecker (2007) finds that Slovenian exporters pay wages that are approximately 17.5% higher than non-exporters. In Chile, Alvarez and Lopez (2005) report that exporters paid wages around 20% higher than other firms. Ranjan and Raychaudhuri (2011) use Indian data to show that exporters pay wages that are around one-third higher than those paid by non-exporting firms. Helpman et al. (2012) find that exporters in Brazil pay higher wages than non-exporters, even after controlling for firm size; the differential is around 9%. They also find that firms switching into export status tend to pay higher wages. Isgut (2001) finds similar results for exporters in Colombia, with a wage premium of around 19% overall. Again, the only evidence on services trade is for the UK (Breinlich and Criscuolo, 2011), but it suggests that services traders similarly pay higher wages, and are more skill intensive, than firms that serve the domestic market only. Similar dynamics may therefore apply to both services and goods-based GVCs.

It is important to note a significant caveat to the above results, however. That is the case of China, and in particular its firms engaged in processing trade. Dai et al. (2011) show that it is important to distinguish between traditional exporters and those firms that simply assemble tariff-free imported intermediates into final goods for export (export processors). Whereas traditional exporters in China as elsewhere tend to pay higher wages than other firms, firms

engaged in export processing tend to pay lower wages and are less productive than non-exporters. In the existing literature, it is only the case of China where it has proved necessary to examine the difference between export processors and other exporters so as to resolve anomalies in the reported wage and productivity data. This is no doubt due to the relative importance of export processing in China's total trade compared with that of other countries where similar research has been undertaken. Nonetheless, it highlights the fact that the connection between trade and wages within GVCs is likely to be complex and highly case-specific. If the evidence from China is generalisable, those firms engaged in simple assembly for export might pay lower wages than other firms, whereas businesses that engage in other export activities or a mix of processing and other exports indeed pay higher wages than those that deal with the domestic market only. The Chinese case examined by Dai et al. (2011) highlights the importance of a firm's place and role within a GVC as a potential determinant of its wage paying behaviour. For other developing countries interested in increasing GVC participation and learning from China's experience, it will be important for future research to examine whether processing trade generally has these kinds of implications, or whether there is something special about the way in which it is implemented in China which drives the results.

An additional caveat to the standard analysis is provided by Krishna et al. (2011), who look at the case of Brazil. After first confirming the existence of the usual exporter premium in their raw data, those authors go on to control for a variety of labour market mechanisms that mediate the link between trade and wages. In particular, they argue that worker ability and the quality of the match between workers and jobs improves in exporting firms following trade liberalisation. Once this effect is accounted for, the exporter wage premium is no longer significant. This analysis therefore highlights the importance of labour market institutions as factors determining the extent to which trade and wages are linked.

Atkin (2010) also nuances previous research. Using Mexican data, he first confirms that exporting firms pay higher wages than non-exporters, as in most of the other papers discussed in this section. However, he goes on to show that the changing wage environment alters the educational decisions of students who then become workers: by increasing wages, the incentive to leave school earlier and start working is higher, with the result that some workers are worse off in the long run than if they had stayed in school and obtained additional training. This finding suggests that policies on compulsory education, and strengthening the incentives to education generally, could be an important complement to the development of value chains that change the wage structure of the economy.

As in the previous subsection, it is important to break out the overall results by worker skill level. It is plausible that since increased labour demand falls differently on different skill segments of the labour market, wages also respond differently in each case. There is indeed some evidence for such an effect. Using Chilean data, Alvarez and Lopez (2005) find that exporters pay relatively more to skilled workers than to unskilled workers: the pay differential with domestic-oriented firms is 30% for non-production workers, but only 15% for production workers. So although exporters pay higher wages in both cases, the wage premium appears to be skewed towards relatively high-skilled workers. Isgut (2001) reports similar evidence for Colombia: exporters pay significantly higher wages to all categories of workers for which data are available—blue collar, white collar, technicians, and managers—but the premium is largest (29%) for managers and smallest (12%) for blue collar workers.

With this distinction between skilled and unskilled labour in mind, more recent work has focused directly on the question of wage inequality and its links with the trade experience of firms. Verhoogen (2008) uses Mexican data to show that an exchange rate devaluation can give firms an incentive to engage in quality upgrading, which leads to more intense export behaviour. In line with this export growth comes growth in wages for both skilled and unskilled workers,

but the growth rate is faster for the former than for the latter, thereby contributing to increased wage inequality.

Helpman et al. (2012) also focus on trade and wage inequality, and in particular on dispersion in wages within sector-occupation combinations. This contrasts with the neo-classical approach to trade and inequality, which emphasises wage changes across occupations through inter-sectoral reallocations (the Stolper-Samuelson effect). They find that trade plays a significant role in driving wage inequality in a model with labour market frictions. Using counterfactual simulations, they show that the direction of the effect of trade liberalisation on wage inequality depends on the initial level of openness. As trade costs decline from very high levels, wage inequality first increases and then decreases as workers are reallocated from import-competing firms to exporters, and the latter grow in response to greater market access opportunities abroad. The important point to take away is therefore that the impact of trade—including through value chains—on wage inequality can be ambiguous, but that a high initial level of openness is suggestive of a decrease, rather than an increase, in wage inequality.

The discussion so far has focused on exporting firms. What about importing firms? Do they also display systematic differences in productivity, and therefore wages, with respect to firms that deal only with the domestic market? Data are typically difficult to find on the source and nature of imported intermediates at a firm level, matched to data on employees. As a result, there is little direct evidence of the effect of importing on wages. There is, however, indirect evidence that is relevant to this point. For example, there is some emerging evidence that importers of intermediate goods tend, like exporters, to be more productive than domestic firms. A self-selection mechanism is likely again at work, with only the most productive firms being able to surmount the extra cost barriers inherent in sourcing goods from overseas. At least in environments with well-functioning labour markets, higher productivity should translate into higher levels of employment and higher wages, on average. Van Biesebroeck (2008) shows that although experiences differ markedly among developing countries, these basic characteristics of the labour market are indeed observed in some cases.

Shepherd and Stone (2011) provide some relevant evidence using firm-level data for up to 115 mostly developing and transition economies. They find that, on average, an increase of 10% in the proportion of imported goods in a firm's total consumption of intermediates is associated with an increase of 2% in productivity. In presence of a properly functioning labour market, this increase in productivity could be expected to have an upwards impact on wages. However, the authors do not examine employment effects directly, and this mechanism has to remain a matter of conjecture, particularly in developing countries where labour markets can function poorly. One aspect that the authors do examine, however, is the role of complementary policies in mediating the link between imports of intermediate goods and productivity gains. They find that access to skilled labour is a particularly important complement to liberalisation of trade in intermediate goods. This result is consistent with a mechanism in which importing intermediates increases the demand for skilled labour in particular, and therefore also wages in that area. However, we emphasise again that the authors' results do not directly examine the questions of labour demand or wages, and so these ideas must be treated as possible extensions of their results, rather than concrete findings.

Halpern et al. (2011) find similar evidence using Hungarian data. In their specification, increasing the proportion of imports in total usage of intermediate goods from zero to 100% would increase firm productivity by 12%. Moreover, they find that foreign firms benefit particularly strongly from imported intermediates: the effect is about 27% stronger. This finding indicates that there are complementarities between importing intermediates and FDI, which is important in the context of GVCs in which both activities tend to take place together. Again, Halpern et al. (2011) only look at the links between imported intermediates and productivity,

and do not consider labour market outcomes directly. Although higher productivity tends to act positively on employment and wages, such outcomes are by no means guaranteed in highly imperfect labour markets such as those found in many developing countries.

Amiti and Konings (2007) take a less direct approach to the same question, focusing on the impact of reforms to input and output tariffs on productivity in Indonesia. They find that reductions in tariffs in intermediate goods sectors translate into productivity gains for firms that use those inputs, and that the effect is stronger for those that import them directly. This result lays the groundwork for the findings on wages in Amiti and Davis (2011), discussed above.

Goldberg et al. (2010) and Topalova and Khandewal (2011) focus on the case of India. They find that trade liberalisation tends to increase firm-level productivity, and that the effect is particularly strong for liberalisation of intermediate goods sectors. One important channel through which this mechanism works is importing new varieties of intermediate goods, which in turn leads to the production of new domestic varieties (i.e., an expansion of firm scope). This finding suggests that the type of trade that GVCs are most engaged in—the movement of parts and components across borders prior to final assembly—is closely linked with higher productivity. Again, they do not focus directly on the labour market effects of this link, but taking this evidence with the other results discussed in this section suggests that GVCs can impact developing country labour markets positively through a productivity channel.

It is important to note, however, that not all evidence supports the existence of an importer premium in productivity. Muendler (2004) in the case of Brazil finds that imported intermediates play only a minor role in determining firm productivity. However, this paper stands out as an exception to the general trend in the literature, and seems to run counter to the results in Schor (2004) that also rely on Brazilian data.

Turning to the literature examining wages explicitly, results are generally in line with expectations based on the above work. Bernard et al. (2007) show that data from the United States support the view that importing firms share many characteristics with exporters: in particular, they are more productive, pay higher wages, and are more skill-intensive than non-importers. Martins and Opromolla (2012) examine similar questions using data for Portugal. They find that firms that increase their use of imported intermediate goods tend also to pay higher salaries, the same dynamic that is present in the case of exporting. Before controlling for other factors, importer wages are nearly 25% higher than those of non-trading firms. After conducting extensive tests on the data, the authors infer that workforce ability—which is unobservable—must be driving a significant proportion of the importer wage premium, perhaps around half of the total effect.

Amiti and Davis (2011) examine similar questions using data for Indonesia. In line with other results for exporters, they find that liberalisation of final goods tariffs is associated with higher wages for workers in exporting firms, but lower wages for those in import-competing firms that serve the domestic market only. Most interestingly, they also examine the case of imported intermediates and find that liberalisation of those markets translates into higher wages for workers at firms that use those products: a 10% decrease in the level of protection of intermediate goods translates into an up to 12% increase in wages for firms that use them, and has an insignificant effect on firms that do not use them. Thus, the type of importing activity we expect to see in GVCs is associated with the payment of higher wages to workers.

Amiti and Cameron (2012) extend previous results to look at the skilled wage premium, rather than simply the level of wages. Contrary to some of the results for exporters, such as Verhoogen (2008), Amiti and Cameron (2012) find that the wage premium is actually lower following liberalisation of intermediate goods imports. They argue that their finding is consistent with a mechanism in which liberalisation in intermediate goods sectors shifts the

relative demand for skilled labour down because—at least in the case of Indonesia—intermediate inputs tend to be relatively skill-intensive. By importing, firms are essentially substituting away from internal production, which tends to reduce the skilled labour premium. This result crucially depends, however, on the skill content of imported intermediates: the opposite mechanism might well operate in environments where imported intermediates are not skill-intensive, and so a determination of the effect on relative wages must be highly case-specific.

Seker (2012) is the only other paper that examines the wage premium for importers in the developing country context. He finds that exporters and importers in developing countries both pay higher wages than other firms, and that the effect is particularly large for firms that are engaged in both activities simultaneously. As noted above in the context of employment demand, this finding is suggestive for the case of GVCs, in which member firms are likely to be engaged in international trade in this way.

FDI and labour markets in developing countries

As is the case for firms involved in trade, there is substantial evidence that firms that engage in FDI are more productive than those that deal only with the domestic market. Indeed, the literature typically works on the assumption that foreign investors are even more productive than exporters or importers (Helpman et al., 2004). However, these results apply primarily to developed countries, since foreign investors are typically based there, and not in developing countries, although that situation is changing somewhat. More pertinent from the point of view of a developing country analysis is the body of research showing that firms that have accepted foreign investment tend to be more productive than domestically-owned firms. For example, Shepherd and Stone (2011) find that foreign firms tend to be more productive than domestically-owned ones using a panel of data from 115 mostly developing and transition economies. By splitting the sample between OECD countries (of which only a small number are in the dataset) and non-OECD countries, they show that the productivity enhancing effect of inward FDI is primarily felt in the latter group. The productivity gains from FDI—including FDI that takes place within the context of the development of GVCs—are likely to be significant for developing countries.

In addition, there is evidence that inward FDI has positive spillover effects for domestic firms: Hale and Long (2011b) provide a review for China, but find little evidence of positive spillovers in their own analysis using firm-level data. By contrast, Javorcik (2004) finds strong evidence for spillovers using data for Lithuania. The difference between the two results perhaps suggests that the type of foreign investment that is dominant in a particular country-sector might determine the extent of productivity spillovers that take place. The remainder of this section discusses work that builds on that result, using measures of performance more closely connected with labour market outcomes.

Labour demand

The labour market effects of inward FDI in developing countries are less studied than those of trade linkages, discussed above. Lipsey et al. (2010) use a long (1975-2005) dataset on the performance of Indonesian firms to show that foreign-owned firms generally experience faster employment growth than domestically-owned ones. The authors' case for a causal effect of foreign ownership is bolstered by their analysis of firms undergoing an ownership transition during the sample period: firms that switch from domestic to foreign ownership generally experience rapid employment growth, particularly immediately following the acquisition, but firms switching from foreign to domestic ownership do not experience such growth. Overall,

these results suggest that inward FDI of the type that is common in GVCs has a positive impact on labour demand.

Similarly, Karlsson et al. (2009) show that FDI has generally benefitted the Chinese labour market. They find that foreign owned firms tend to experience relatively high employment growth due to their particular characteristics. Moreover, they find that FDI appears to have positive employment spillovers: domestically owned firms also experience faster employment growth as a result of foreign investment in other firms in the same sector.

As in the case of trade above, it is important to break these results out by skill level. Slaughter (2002) outlines three mechanisms by which FDI can influence the relative demand for skilled labour in the host economy: intra-firm technology transfer; investments in physical capital related to new technologies; and technology flows to host country firms. Based on a review of the literature focusing on the behaviour of US multinationals abroad, he finds strong empirical evidence in favour of the first two channels, including in developing countries. However, findings are much more mixed in the case of the third channel (spillovers).

Fajnzylber and Fernandes (2004) provide similar nuance to these results based on differences in employee skill levels. As noted above in the case of trade, they find a contrast between the situations of Brazil and China: inward FDI in the former is associated with increased demand for skilled labour, but the same is not true in the latter case. Again, the difference is likely due to the importance of simple assembly operations in China, although this is a point that would need to be examined in further research using detailed data on processing trade such as those considered by Dai et al. (2011).

Wages

The literature on labour markets and FDI tends to focus on the question of wages, and in particular wage inequality. OECD (2008) provides a review of the literature on FDI and wages, including some examples from developing countries. In general, firms that are foreign owned tend to pay higher wages than domestic firms: see, for example, Doms and Jensen (1998) for the case of the US. However, this outcome might be due to compositional effects, so as in the case of trade above, it is important to break out the data on wages according to skill category. In particular, it could be expected that FDI affects the relative demand for skilled labour, as discussed above, which would in turn have implications for relative wages.

Feenstra and Hanson (1997) highlight the importance of this point for Mexican maquiladoras: they use industry-level data to show that FDI was responsible for a substantial part of the observed increase in the relative demand for skilled versus unskilled labour, which translated into a rise in the skilled labour share of wages. Indeed, FDI accounted for around half the observed increase in the share of wages going to skilled labour in the late 1980s. In the case of China, Hale and Long (2011a) find in a panel of manufacturing firms that FDI increases wages, but only for skilled workers: there is no change in the case of unskilled production workers.

Lipsey and Sjöholm (2004) take the analysis even further using firm-level data for Indonesia. First, they find that foreign-owned firms tend to pay higher wages than domestically-owned firms, in line with the literature cited above to the effect that FDI tends to be associated with greater firm-level productivity. Second, they find that the effect of FDI is not purely compositional, in the sense that foreign-owned firms pay more for labour of any given type, than do domestically-owned firms. Only part of the difference is accounted for by firm-characteristics, which means that the fact of ownership indeed plays a significant role in determining wage differentials. This finding suggests that the presence of GVCs could be

associated with higher wages for reasons other than an increase in the relative demand for skilled labour.

Building on these results, Tomohara and Yokota (2011) use firm-level data for Thailand to show that, on average, FDI tends to increase wage inequality. They argue that FDI acts as a vector of skill-biased technical change, which thereby puts greater upward pressure on skilled wages than on unskilled wages. However, an interesting caveat to their research is that the origin of FDI matters: Japanese and Chinese Taipei FDI in Thailand tends to be of a more vertical character than other origins, and as a result is relatively skewed towards basic production activities. They therefore find that because of this character, Japanese and Chinese Taipei inward FDI in Thailand is associated with less, rather than more, wage inequality, since it increases the relative demand for unskilled labour.

As discussed in the section on trade above, it is also important to enter an important caveat in relation to export processing activities that some firms undertake as part of their participation in GVCs. Dai et al. (2011) use Chinese data show that export processors are less—not more—productive than firms that serve the domestic market only, and also tend to pay lower wages than other firms. Foreign investment is particularly prevalent in that sector, however, which suggests that the FDI premia discussed in this section may not always apply in the case of export processing activities. Over 80% of the total export value of foreign firms comes from processing activities. So although Dai et al. (2011) do not directly examine the effect of foreign ownership on wages, it is likely that because of the productivity-wages link discussed throughout this paper, wages may be lower in firms engaged in export processing trade than elsewhere. This conjecture applies to firms engaged uniquely in export processing activities, and would likely be reversed for those that engage in other activities too. However, it again serves to highlight the context dependent nature of the link between FDI and wages, as was the case for trade and wages, discussed above.

An additional caveat in relation to aggregate results on FDI and wages comes from the Swedish data examined by Heyman et al. (2007). Those authors used matched employer-employee data to control for heterogeneity across firms and individuals. They find that although foreign-owned firms tend to pay higher wages, on average, than domestically-owned ones, the effect is largely compositional: wages for workers with similar characteristics are not substantially higher in foreign-owned firms. The crucial difference is between multinational firms—whether locally owned or foreign-owned—and those firms that deal exclusively with the domestic market. This result suggests that it is international linkages—such as those that are typically found in GVCs—that translate into higher wages, and not necessarily foreign ownership as such. However, it remains to be seen whether this result can be replicated in developing countries or not. In particular, the potential for foreign ownership to act as a vector for skill-biased technical change is larger in a North-South FDI context than in a North-North context, so it is possible that the impact of FDI on wages is larger in the latter case. Indeed, the results found by Lipsey and Sjöholm (2004) quoted earlier are suggestive of such a conclusion.

Case studies

As noted at the beginning of this paper, it is difficult for standard quantitative work to examine the links between GVCs as such and employment outcomes because it is difficult to observe transactions that take place within GVCs, even with detailed firm-level data on trade and employment. Thus far, the paper has therefore focused on an indirect assessment of the labour market effects of GVCs in developing countries based on the available evidence linking trade behaviour and FDI with employment and wages. In the remainder of the paper, we take a different approach leveraging the small number of case studies that exist on the labour market

effects of particular GVCs. Although suggestive of some possible issues, case studies need to be interpreted cautiously as they are by definition difficult to generalise. Nonetheless, they provide interesting context for the econometric studies discussed in the previous section, and suggest a number of lines of inquiry for future work.

Electronics in Asia

Lüthje (2004), upon which this section is based, discusses the case of the electronics industry in China in the context of global value chains in that area. Within the global IT industry, Asia has clearly emerged as a hub. Major production clusters are present in China, Malaysia, and Thailand, and regional headquarters along with some smaller production facilities are present in Hong Kong, China; Singapore; Chinese Taipei; and Japan. The years since 1990s have seen the emergence of contract manufacturers as a central pillar of the global electronics goods production network. These firms tend to be large and global in scope, providing a full range of manufacturing services to leading consumer goods clients like Apple. They provide services such as product engineering, assembly of printed circuit boards, final assembly, and configuration of final goods for consumers. Other firms engage in components purchasing, distribution logistics, and repair services. According to Lüthje (2004), contract manufacturers account for around 15%-20% of global value added in the IT manufacturing sector. Although the field is dominated by a small number of large companies, they continue to coexist with much smaller component manufacturers and assemblers, who act as subcontractors.

According to Lüthje (2004), contract manufacturers in China typically use state of the art equipment sourced from overseas. Factory conditions are vastly different from those in smaller subcontractors. In terms of the demand for skilled and unskilled labour, the evidence examined by Lüthje (2004) confirms some of the econometric evidence for China discussed above: a large proportion of the workforce is relatively low-skilled and engaged in simple assembly operations, perhaps 70%-80%. These workers typically have a junior or senior high school qualification only, and are trained on the job. The remainder of the workforce consists of more skilled workers such as managers and engineers, who have higher levels of training. In terms of labour demand, the most striking fact is a high turnover of employees: figures of 20% or even 30%-40% per annum are not uncommon, according to Lüthje (2004). This feature is consistent with a highly flexible labour market in which hiring and separation are both relatively straightforward and inexpensive. Lüthje (2004) states that collective bargaining remains rare in the contract manufacturing sector, and that local labour laws are frequently enforced in a lax manner.

The general picture that emerges is one of a relatively tight labour market for these relatively highly-skilled workers, which would be consistent with the payment of wage premiums. By contrast, relatively unskilled workers are often drawn from the vast pool of un- and under-employed persons in rural China, which tends to drive wages down. Indeed, migrant workers provide a substantial proportion of the overall low-skilled workforce in Chinese contract manufacturers. Female migrant workers are present in significant numbers. Overall, the effect on wages is ambiguous, but the emergence of this type of production network could be a factor in favour of greater wage inequality at the firm level. As noted by Lüthje (2004), it also needs to be recalled that wages for both skilled and unskilled workers are relatively low by international standards, even though wages for the former might be high by local standards. That author reports that the starting salary for a skilled worker is 2.5 to four times higher than the average wage for an unskilled worker, with the prospect of rapid substantial rises with increases in experience. However, prospects for unskilled workers are generally not bright, with skilled workers usually brought in from outside the company rather than trained up from the ranks of unskilled workers.

Offshore services in Chile

One aspect of GVCs that has been almost completely overlooked in the econometric literature due to lack of data availability is services. However, services GVCs are also growing in scale and scope with the rise of business process offshoring in a number of important centres such as India and the Philippines, and increasingly in other countries as well. Fernandez-Stark et al. (2010), upon which this section is based, provide a detailed case study of the offshore services GVC—they refer to it as a GVC—in Chile, focusing on labour market issues. This focus on the labour market makes their study particularly valuable for the purposes of this review, given the paucity of direct evidence on the labour market effects of GVCs.

Chile's offshore services industry is now responsible for at least USD 1 billion in annual exports, and employs 20 000 people. In 2009, Chile was ranked by A.T. Kearney as the world's eighth best services destination. Key stakeholders have stated the objective of growing the industry by a factor of five by 2015. If this ambitious target is to be met, the availability of an educated and well-trained workforce is clearly key. According to interviews conducted by Fernandez-Stark et al. (2010), the technical competence of Chilean tertiary graduates is consistently high, which marks a point of contrast with the offshoring hub of India, where performance is much more variable.

In terms of industry composition, about one-third of offshore exports is accounted for by information technology outsourcing (ITO) and business process outsourcing (BPO). Growth in knowledge process outsourcing (KPO) is also taking place, but at a slower rate. Of the total offshore services workforce, about 41% work in BPO activities including customer service, marketing, and sales. In terms of workforce composition, the Chilean offshore services sector typically employs more skilled workers than other sectors: employees are typically younger than elsewhere, are more likely to be male, and hold some level of tertiary education, most often from a technical education institution rather than a university. This evidence sits well with the findings discussed above in which internationalised firms have been found to have relatively stronger demand for skilled labour.

The mix of nationalities in the offshore services sector is strongly skewed towards Chileans, although some expatriates are also involved in functions such as research and management. This dynamic highlights the fact that GVC participation, including in services, has the potential for major impacts on the local labour market.

From a policy perspective, the Chilean case study examined by Fernandez-Stark et al. (2010) is particularly interesting. Through the CORFO High Tech Program, Chile provides substantial incentives to develop local human capital. Two programs are particularly important in the offshore services GVC: on the job training, and specialised training and recruitment. The first program pays up to 50% of the annual salary of a new worker undergoing on the job training, up to a maximum of USD 25 000 per person. The second program provides subsidies for the acquisition of specific knowledge or the recruitment of experts, again covering 50% of the cost up to a maximum of USD 100 000. The specialised training and recruitment program is particularly important for firms involved in research and development. In addition, a separate program provides companies with income tax relief for training expenses, focusing on workers in lower wage categories.

Conclusion, policy implications, and directions for further research

This paper has reviewed the available empirical evidence on the labour market effects of GVCs in developing countries, focusing on econometric studies. As noted at the outset, the approach has been necessarily indirect: due to the inability of researchers to distinguish in the data between intra-network transactions and other types of transactions, it has thus far proved

largely impossible to conduct econometric studies of GVC trade as such. This review has therefore worked from the basis that firms involved in GVCs are typically involved in at least one of three processes, and possibly in all three simultaneously: exporting, importing (intermediate inputs), and being foreign owned (inward FDI). In all three cases, there is strong econometric evidence at the firm- and industry-levels to show that internationalised firms are larger (employ more workers) and pay higher wages than domestically-owned firms. One possible exception to this empirical regularity is the case of processing trade (assembly) in China, in which that differential does not seem to be observed. In aggregate and on average, however, participation in the kinds of transactions that are typical for firms in GVCs is associated with improved labour market outcomes in developing countries, most likely due to a combination of scale and productivity effects.

Given that GVCs typically involve firms performing different functions and using different combinations of skilled and unskilled labour, it is important to break out aggregate results like these according to skill level. The evidence generally suggests that GVC participation can have a positive impact on both segments of the labour market in developing countries. However, there is also significant evidence in the literature that firm internationalisation—including potentially through GVC participation—is associated with technological upgrading that tends to increase the relative demand for skilled labour. This is good news for skilled workers, as it both increases employment opportunities and relative wages. On the flipside, however, the gap between the wages and benefits received by skilled workers and those received by unskilled workers might widen under the pressures exerted by GVC participation. This development could be of concern from an equity point of view.

The policy implications of this research emerge most clearly from the two case studies that close out the paper. The first case study, on electronics in Asia, demonstrates the continued importance of maintaining open markets for final goods, intermediate inputs, and investment. GVCs cannot exist as a business model without these fundamental ingredients in place. Particularly in a post-crisis environment, however, it is worth stressing that increased participation in GVCs, especially in those regions, like Africa, where they are in their infancy, is only possible on solid foundation of economic openness.

The second case study, on services in Chile, demonstrates that although openness is necessary for GVC participation, it is not enough to ensure economic and social upgrading over time. The Chilean example makes clear that developing human capital is crucial to moving into higher value added activities in GVCs. Policies in areas such as education, training, workforce development, and research and development are therefore important complements to openness in this regard. Targeted and non-distortionary use of subsidies and other incentives can be an important tool for policymakers in these areas, which have important qualities of (partial) public goods. Developing instruments that promote the mechanisms behind economic upgrading while maintaining open and relatively undistorted markets will be a priority for developing country policymakers going forward.

In terms of the research agenda, a number of priorities emerge from this survey. First, there is a substantial gap between the large body of case study and policy analytical work on GVCs, and the very small amount of econometric work that deals directly with GVCs, such as Dai et al. (2011) on processing trade in China. Much of the econometric work reviewed here tends to pool observations across sectors so as to consider the whole of manufacturing at once. From the perspective of policy relevance, it will be important for future work to break out results by sector, and in particular to try and separate out the production of intermediate and final goods. Splitting results in this way could provide substantial additional information on the behaviour of GVCs.

A second policy research priority is to further disaggregate results based on labour market characteristics. There is already a substantial body of research dealing with relative wage and inequality effects between skilled and unskilled workers. That work should be extended to look at other characteristics, such as gender and informality. There is anecdotal evidence that low value-added GVC activities tend to be relatively intensive in female labour and informal work (Barrientos et al., 2010). It will be important for future econometric work to examine that possibility, in order to provide greater detail on the labour market implications of GVCs in developing countries from important development-related perspectives.

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