The Effect of Global Value Chain Participation on the Labour Share: Industry Level Evidence from Emerging Economies

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Abstract: Participation in global value chains (GVCs) has been proposed as a central means for emerging economies to develop and technologically upgrade. However, the effects of GVCs on income distribution in the global South remain underexplored. We present an econometric analysis of the determinants of the labour share in seven emerging economies for the period 1995–2014. Drawing on industry-level data from global input-output tables, we focus on how GVC participation – in particular offshoring of production from advanced to emerging economies – affects the labour share of different skill groups within manufacturing and service industries. We also estimate the effects of GVCs on productivity, real wages, and the capital-value added ratio to shed further light on the channels through which GVCs affect the labour share. In both industry groups, we find that integration into GVCs with advanced economies has a negative effect on the labour share in emerging economies, particularly for medium-skilled workers. In contrast, higher union density and government consumption spending have positive effects on the labour share. Thus, labour in emerging economies loses out relative to capital as production becomes more integrated across borders.

Keywords: labour share; income distribution; emerging economies; global value chains; union density; technological change

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INTRODUCTION

The share of labour income in GDP has declined globally since the 1980s. Empirical evidence suggests that participation in global value chains (GVCs) reduced the labour share in advanced economies, in particular due to the offshoring of fragments of production to emerging economies (Elsby et al., 2013; Guschanski and Onaran, 2021). The flipside of these trade relations, i.e. the impact of GVCs on workers in emerging economies, is not yet well researched. International policy institutions frequently assert GVCs as important pathways for development and technological upgrading in emerging economies (World Bank, 2020; WTO, 2013), while neoclassical trade theory based on the Heckscher-Ohlin model and Stolper-Samuelson theorem suggests that trade with the global North will benefit labour, and particularly low-skilled workers, in the global South. Yet, mounting evidence of workers' rights abuses along GVCs between advanced and emerging economies implies that potential gains from productivity are not equally shared (ILO, 2016; Selwyn and Leyden, 2021).

We contribute to these debates by conducting an econometric analysis of the determinants of the labour share in seven emerging economies (Brazil, China, India, Indonesia, Mexico, South Korea, Turkey)[1] for the 1995–2014 period. Drawing on industry-level data from global input-output tables, we empirically assess the effect of GVC participation, and specifically offshoring of production processes from advanced to emerging economies, on the labour share of different skill groups within manufacturing and service industries. This article is the first to estimate the determinants of the labour share from a sample of emerging economies using data at the industry level. We also estimate the effects of GVCs on productivity, real wages, and the capital-value added ratio to shed further light on the channels through which GVCs affect the labour share.

The article presents three contributions to the literature on GVCs and income distribution in the global South. Firstly, a separate analysis for emerging economies is necessary to capture the effect of offshoring from the global North to the global South. Trade theory in line with the Heckscher-Ohlin model and Stolper-Samuelson theorem suggests radically different distributional outcomes for economies at different stages of development. Yet, previous industry-level research on the effect of GVCs pools advanced and emerging economies and does not distinguish trade conducted between advanced and emerging economies from trade among emerging economies (Dao et al. 2019; Reshef and Santoni 2019).

[1] The country sample and estimation period are determined by data availability as discussed in more detail in Section 4.

Secondly, we distinguish between high-, medium-, and low-skilled workers in manufacturing and service industries. Differences across industries and skill groups are relevant because GVCs might affect manufacturing industries differently from service industries since manufacturing output is more tradable. Furthermore, economic theory suggests that the impact of GVC integration is likely to vary for workers of different skill groups. Thirdly, by using industry-level data, we can focus on the decline of the labour share within industries in emerging economies. Economic theory on distributional effects of GVCs predicts a within-industry (or within-firm) decline of the labour share, and empirically, a within-industry decline has been highlighted as the main driver of the decline in the country-level labour share in both emerging and advanced economies (Dao et al., 2019). However, previous econometric analyses for emerging economies use country-level data, which does not allow to assess whether GVC participation impacts the labour share within industries, or whether it induces a reallocation towards industries with a lower labour share (Doan and Wan, 2017; Harrison, 2002; Onaran, 2009; Stockhammer, 2017).

In addition to these empirical insights, we provide a novel theoretical framework that synthesizes economic literature on functional income distribution with development studies research on industrial and social upgrading. We discern two channels via which GVC integration impacts the labour share. Firstly, productivity in emerging economies rises as advanced economies offshore capital-intensive tasks to emerging economies as well as due to trade-induced technological change (De Loecker and Warzynski, 2012; Elsby et al., 2013; Lian, 2019). This process, which we label the '*productivity channel*', can increase the capital-value added ratio or labour productivity, and thus reduce the labour share for a given wage rate. Secondly, integration into GVCs is often accompanied by changes in industrial relations and higher markup power of firms (Barrientos et al., 2011; De Loecker and Warzynski, 2012; Lund-Thomsen et al., 2012). The resulting decline in labour's bargaining power and the rise in the markup on production costs can lower the real wage for a given level of productivity, consequently reducing the labour share. We label this the '*bargaining channel*'. Thus, our theoretical framework introduces power relations between capital and labour into the economic literature on GVCs and the labour share in emerging economies, which has hitherto focused mainly on technological factors (Dao et al., 2019; Lian, 2019; Reshef and Santoni, 2019).

Based on this theoretical framework we econometrically estimate the effect of GVCs on the labour share using industry-level panel data. We control for several other determinants of the labour share that are highlighted in previous research such as the capital-value added ratio (Bassanini and Manfredi, 2014; Bentolila and Saint-Paul, 2003), labour market

institutions and the exchange rate (ILO, 2011; Jayadev, 2007; Onaran, 2009; Stockhammer, 2017). To identify the effect of GVCs on the labour share we employ various instrumental variables estimators, which rely on 'internal' instruments based on lags of GVC participation or 'external' instruments generated from weighted averages of GVC intensity in our sample.

The results provide evidence that GVCs had a negative impact on the labour share in emerging economies, and this effect is particularly strong for medium-skilled workers in manufacturing industries, although it is also apparent in service industries. Furthermore, we find some evidence for a positive effect of GVC participation on labour productivity in line with the *productivity channel*, but the results are not robust across different specifications and estimation methodologies. Moreover, GVC participation has a negative effect on the industry-level real wage for a given level of labour productivity. This finding is consistent with a reduction in labour's bargaining power or increasing markups of firms as a result of GVC participation, as emphasised by the *bargaining channel*, although we do not estimate markups or bargaining power directly. Therefore, our findings highlight changes in the relative bargaining power between capital and labour as an important yet under-researched effect of GVC participation on income distribution.

The article is organized as follows. Section 2 presents stylised facts on the labour share and its determinants, i.e. GVC participation, the capital-value added ratio and labour market institutions. Section 3 presents a theoretical framework illustrating the two channels via which GVCs impact the labour share, differentiating the effects for workers of different skill groups. We also discuss the relationship between the labour share and industrial and social upgrading. Section 4 presents the data, econometric model, and methodology. Section 5 discusses the estimation results for the labour share and productivity, real wages, and the capital-value added ratio. Section 6 concludes.

STYLISED FACTS

While the global decline in the aggregate country-level labour share is a well-documented fact, there is only limited analysis at the industry level, particularly for emerging economies. We find that the aggregate trend is mirrored at the sectoral level, albeit with differences between manufacturing and services industries as well as high- (HS) and low-skill (LS) industry groups (Figure 1).

<Figure 1>

During our sample period 1995–2014, the country-level labour share followed a U-shaped pattern in Brazil, China, and India, while there is a secular decline in Indonesia and South Korea (henceforth Korea). In Turkey and Mexico, the currency crises in the early 2000s mark a new phase of decline in the labour share following a brief period of recovery after the 1994 currency crises. The years shortly after the 2007 financial crisis show a temporary increase in the labour share in all countries. Profits decline faster than wages in recessions because wages are often set by long-term contracts, thus leading to a temporary increase in the labour share during recessions.

Turning to the industry level, the labour share declined in half (48 per cent) of all industries between 1995 and 2014. Moreover, 85 per cent of those industries where the labour share decreased, experienced a decline of more than 3 percentage points between 1995 and 2014. The similar dynamics between industry and country-level labour shares confirm previous findings from shift-share analyses that attribute the decline of the country-level labour share to a decline within industries (Dao et al 2019; Karabarbounis and Neiman, 2014). The decline is most pronounced across countries in low-skilled manufacturing sectors like 'Basic and Fabricated Metals', 'Food, Beverages and Tobacco', and high-skilled sectors like 'Chemical Products'. Several low-skilled service sectors such as 'Wholesale' and 'Retail Trade' as well as 'Construction' were equally affected and there is also evidence of a decline in high-skilled service sectors like 'Financial Intermediation'.

To assess the development of GVC participation, Figure 2 shows intra-industry intermediate exports from emerging economies to high-income countries (including Australia, Canada, Europe, Japan, Russia, and the USA) as a share of gross output. This measure captures, for example, exports from the textile industry in Mexico, which are used as intermediate inputs in the textile industry in the USA. Our measure is closely related to forward linkages in GVCs, which are defined as the share of exports consisting of intermediate inputs used by trading partners for the production of their exports to third countries (Dao, et al. 2019), but arguably captures the offshoring process more precisely as we only consider trade within the same industry across countries.

<Figure 2>

Exports of intra-industry intermediate products are concentrated in manufacturing industries, even though some countries, such as India, experience substantial growth of high-skill service

exports. At the country level, the share of exports increased until 2007. The only exception is Korea, which experienced an overall decline in the export share of intermediate goods, and Indonesia, where exports are highly volatile and declined by a negligible 3 per cent between 1995 and 2007. While most countries experienced a decline in exports for several years following the 2007 financial crisis, the positive trend has resumed since 2009. One exception is China, which has stagnating export shares since the Great Recession.

At first glance, data for most countries confirm opposing patterns pre-2007, with increasing participation in GVCs and a declining labour share. The dynamics post-2007 are more variable and country-specific but are largely characterised by increasing intermediate exports and stagnating labour shares.

GVC participation has only recently gained prominence in the growing literature on the decline of the labour share, while previous research focuses on two different explanations: technological change and labour market institutions. Most prominently, Karabarbounis and Neiman (2014) argue that technological change led to a reduction in the relative price of capital and a subsequent increase in capital intensity, which contributed to a decline in the labour share globally. In contrast, Dao et al. (2019) show that evidence for this process is weak in emerging economies. To assess descriptive evidence for our sample, figure 3 plots the capital stock as a ratio to value added. We use value added rather than output in the denominator to account for intermediate inputs (see also Bassanini and Manfredi, 2014; Bentolila and Saint-Paul, 2003).

<Figure 3>

Interestingly, the capital-value added ratio shows a similar pattern to the labour share, with a marked decline until 2007, and a slight increase thereafter in most countries. Ostensibly, this contrasts with explanations for the decline in the labour share based on an increase in capital intensity.

Turning to labour market institutions, several empirical analyses have confirmed a positive impact of the minimum wage and government consumption on the labour share in emerging economies, suggesting that labour's position improves if they can rely on the fall-back option of a social wage (ILO, 2011; Jayadev, 2007; Onaran, 2009; Stockhammer, 2017). Additionally, union density is one of the most commonly used institutional measures of bargaining power in the literature on advanced economies (ILO, 2011; Stockhammer, 2017). However, the expected effects will depend on the wider institutional and political framework

and might differ, for example, between progressive and conservative or authoritarian political regimes. Figure 4 plots union density at the country level for our sample.

<Figure 4>

Overall, countries experienced a decline in trade union density, except for Indonesia, where union density increased between 1995 and 2001, followed by a secular decline. This is in line with the argument linking the decline in the labour share to a fall in the relative bargaining power of labour.

THE LABOUR SHARE IN THE CONTEXT OF GLOBAL VALUE CHAINS

This section discusses the effects of GVC participation on functional income distribution in emerging economies by drawing on literature in labour economics, as well as research on industrial and social upgrading. Industrial upgrading examines how 'nations, firms, and workers move from low-value to relatively high-value activities in global production networks' (Gereffi, 2005: 171). Social upgrading looks at wages and working conditions throughout the process of GVC integration (Barrientos et al. 2011). While industrial and social upgrading cover a variety of factors, two implications stand out: industrial upgrading involves increases in productivity, whereas social upgrading is accompanied by increases in the real wage. Labour productivity and the real wage, in turn, determine the labour share (S), which is average real wages (w_r) times hours worked (L) divided by value added (Y). S can equally be written as the ratio of real wages and labour productivity (y):

$$S = \frac{w_r \times L}{Y} = \frac{w_r}{Y/L} = \frac{w_r}{y} \quad (1)$$

Transforming the equation to growth rates yields

$$\hat{S} = \hat{w}_r - \hat{y} \quad (2)$$

Thus, the labour share declines (increases) when real wages grow less (more) than labour productivity.

This provides a link between the literature in development studies on industrial and social upgrading and the economics literature on the labour share. On the one hand, industrial

and social upgrading illuminate different channels that can lead to changes in labour productivity or real wages, and subsequently change the labour share. On the other hand, a change in the labour share could indicate a decoupling of industrial and social upgrading, bearing in mind our limited representation of industrial and social upgrading by labour productivity and the real wage (see also online appendix A1). Similar to the literature on industrial upgrading, the economics literature on the labour share has focused on how GVCs affect productivity and the production process in emerging economies, whereas power relations between capital and labour are notably absent from the discussion (Dao et al., 2019; Lian, 2019; Reshef and Santoni, 2019).[2] Whilst social upgrading has been linked to industrial upgrading (Barrientos et al., 2011; Gereffi and Lee, 2016, Marslev et al., 2022), both concepts have not been integrated with the economics literature on the labour share. We provide a first attempt at such a synthesis by discussing the effect of GVCs on bargaining power within a political economy framework.

The next subsection focuses first on industrial upgrading and the effect of GVCs on productivity, and subsequently on social upgrading and the real wage. The following subsection presents a simple theoretical framework building on the literature in labour economics to pin down the different channels via which GVC participation impacts the labour share. This theoretical framework motivates our subsequent econometric analysis.

Industrial Upgrading and Productivity; Social Upgrading and the Real Wage

As firms from advanced economies offshore parts of their production to emerging economies, the latter can experience productivity increases. There are two main reasons. First, firms in emerging economies might get access to more advanced technology that allows to automate part of the production process or organize it more efficiently (referred to as process upgrading, Barrientos et al. 2011). Second, while firms in emerging economies often start with the production of low-technology products, they can successfully move towards more technologically-advanced goods. Technology-intensive products often require a more educated workforce and advanced machinery and are thus associated with higher labour productivity by the very nature of their production process (referred to as functional upgrading, Barrientos et

[2] GVC participation and offshoring has been linked to bargaining power in the context of advanced economies, but not for emerging economies (Guschanski and Onaran, 2021). A related literature analyses the effect of general trade openness, measured by imports plus exports as a ratio to GDP, and FDI on the bargaining power of labour vis-à-vis capital and there is evidence of a negative effect on the labour share (Harrison, 2002; Jayadev, 2007; Onaran, 2009; Rodrik, 1998). However, our focus is on GVCs, which is a narrower concept.

al. 2011). For example, exporting firms in Mexico's textile industry successfully expanded the spectrum of activities from only assembly in 1993, to a variety of higher value-added production steps, including cutting, laundry and finishing, in 2000 (Bair and Gereffi, 2001). Strategies aimed at industrial upgrading are often referred to as the 'high road' to competitiveness. There are, however, examples of producers who follow a path of industrial downgrading. As the main reason for the offshoring of production to emerging economies are lower labour costs, some actors prefer to stay, or even move down, the GVC, to focus on low value-added activities. This is referred to as the 'low road' to competitiveness, and, as price competition is fierce, it is often accompanied by squeezing wages and failure to abide by social or environmental laws (Bair and Gereffi, 2001; Lund-Thomsen et al., 2012).

While productivity increases are often seen as a precondition for increases in the real wage, it depends on workers' bargaining power whether higher real wages are actually achieved (Marslev et al., 2022). Participation in GVCs can open up new employment opportunities and increase the demand for labour. A tighter labour market is usually associated with stronger bargaining power of labour and higher wages in standard economic models. Conversely, literature on social upgrading has highlighted how participation in GVCs disrupts existing labour relations, with negative consequences for the bargaining power of labour. Aspects that are highlighted include outsourcing of employment, non-standard production locations and restrictions in labour rights. Evidence suggests that suppliers of big multinational companies rely on contract and agency labour. Workers hired through subcontractors are more likely to be subject to low (below minimum) wages, forced overtime, and higher production targets. An ITGLWF (2011) report based on interviews in 83 factories in the textile industry (of which 18 are situated in Indonesia, a country in our sample) found that agency workers were paid up to 15 per cent lower wages than permanent workers, and that they were impeded from joining trade unions, lest their contract be terminated. Subcontracting is similarly spread in India and China (ILO, 2016; Lund-Thomsen et al., 2012). Additionally, to accommodate the increasing and volatile demand of international buyers, companies shift production from factories to workers' homes or temporary work centres.[3] Lund-Thomsen et al. (2012) compare the evolution of work conditions in India, Pakistan, and China, and find that Chinese workers are more frequently employed in factories, whereas Indian workers often work in centres or

[3] The volatile nature of demand by multinational corporations was highlighted during the Covid-19 pandemic, as many international buyers cancelled orders and refused to pay for goods that have already been produced. Consequently, many workers were made redundant, often without severance pay (Anner, 2020).

from home. They argue that factory-based production allows workers to organize and instigate strikes more easily, whereas outsourcing to centre- and home-based locations reduces wages and increases income and occupational insecurity. Lastly, exporting firms in general and GVCs in particular are often regulated by special laws to guarantee international competitiveness. For example, Korea had strict restrictions on union activity to achieve export targets during the 1990s (Seguino, 1997). Similarly, Turkey's labour unions faced tough restrictions on strike activities in the name of gaining international competitiveness after the conservative Justice and Development Party won the elections in 2002 (Onaran and Oyvat, 2016). Such policies could result in stagnating wages or worsening working conditions despite continuous industrial upgrading.

Summing up, the effect of GVC participation on real wages and productivity is ambiguous and depends on the bargaining power of labour, as well as whether firms follow a 'high-road' strategy. Online appendix A1 shows that 70 per cent of industries in our sample experienced an increase in both labour productivity and real wages, being consistent with simultaneous industrial and social upgrading. Nevertheless, in roughly half (48 per cent) of all industries, the real wage increased less than labour productivity, implying that labour lost out relative to capital. More strikingly, in 13 per cent of industries that experienced increasing labour productivity, the real wage declined, indicating that labour lost out not only in relative but also in absolute terms.

The Impact of GVCs on the Labour Share: A Simple Framework

Based on the literature on industrial and social upgrading, we now provide a more formal treatment of the different channels via which GVC participation affects the labour share. We present a reduced form equation that defines the labour share as a function of the capital-value added ratio, technological change, bargaining power and the markup. Subsequently, we discuss how GVC participation, through industrial and social upgrading, impacts these variables. We conclude that industrial upgrading shifts the capital-value added ratio and induces technological change, which would be reflected in rising labour productivity. Equivalently, social upgrading impacts the real wage via bargaining power and the markup.

Bentolila and Saint-Paul (2003) show that under the assumption of a differentiable production function with constant returns to scale, but allowing for imperfect competition in the labour and goods market, the labour share (S) can be expressed as a function of the capital-

value added ratio (k), capital-augmenting technological change (A), the markup on labour costs (m) and a parameter capturing the bargaining power of labour (γ).

$$S = f(A, k, m, \gamma) \tag{3}$$

Some previous studies use the constant elasticity of substitution production function (e.g. Bassanini and Manfredi, 2014). Following Bentolila and Saint-Paul (2003) we adopt a more general multiplicative functional form:

$$S = A^{\beta_1} k^{\beta_1} e^{\beta_2 m + \beta_3 \gamma} \tag{4}$$

where the parameter β_1 will be negative *iff* the elasticity of substitution between capital and labour is above one (Bentolila and Saint-Paul, 2003). If the elasticity is below one, β_1 will be positive. Note that the effect of k and A on S should be the same, although the coefficient in empirical estimations might differ due to different measures of the variables (Bassanini and Manfredi, 2014). β_2 is negative as profits increase when firms can charge a higher markup on labour costs, whereas β_3 is positive because an increase in bargaining power allows labour to capture a larger share of profits. GVC participation can impact each of those variables and even parameters. An increase in k and A would increase productivity (*productivity channel*), and can thus be associated with industrial upgrading, whereas changes in m and γ would change the real wage (*bargaining channel*), and are thus related to social upgrading.

Before we discuss this in more detail, it is important to note that GVC participation is not the only determinant of k and γ, and thus not the only determinant of the labour share (S). As discussed in section 2, the capital-value added ratio will change if the relative price of capital changes (Karabarbounis and Neiman, 2014), whereas γ is impacted by bargaining institutions, such as trade unions (Guschanski and Onaran, 2021). This has implications for the interpretations of our empirical results, which we discuss in Section 5.

The productivity channel

Firms in advanced economies offshore tasks to emerging economies to benefit from lower wages (Dao et al., 2019). Elsby, et al. (2013) argue that offshored tasks, while being relatively labour intensive in advanced economies, can be considered capital intensive in emerging economies, which would imply that offshoring increases the capital-value added ratio (k) in

emerging economies. An increase in the capital-value added ratio is often associated with the production of higher value-added products and is thus related to the process of functional upgrading. It will reduce the labour share if the elasticity of substitution is above 1 ($\beta_1 < 0$).

Lian (2019) provides further evidence for the argument raised by Elsby et al. (2013) in a two-country model. He shows that it would be rational for global South countries to specialise in tasks with a low elasticity of substitution between capital and labour. In the context of declining prices of capital relative to labour (due to technological change) and declining offshoring costs, global North countries will offshore tasks with a low elasticity of substitution (relative to other tasks in the North) to the South. The consequences are similar to Elsby et al. (2013) and imply increasing capital-value added ratios and declining labour shares in emerging economies. Additionally, this process can also increase the share of tasks with high elasticity of substitution in low-wage countries. If this hypothesis holds, we should expect a decline in parameter β_1, in addition to the increase in k.

GVC participation can also give firms in emerging economies access to new technologies, thus leading to trade-induced technological change or 'learning by exporting' (De Loecker and Warzynski, 2012). If technological change is capital-augmenting, this will increase A, and reduce the labour share if capital is a substitute for labour. This is consistent with process upgrading, which states that productivity increases through participation in GVCs. Notably, an increase in k or A would be reflected in increasing labour productivity. A negative effect of both processes on the labour share is contingent on a specific parameter restriction – an elasticity of substitution between capital and labour above one.

The bargaining channel

GVC participation has been associated with outsourcing of workers and restrictions of labour rights, as discussed above. As the share of workers with lower-than-average bargaining power increases (a decline in γ), the labour share declines.[4,5] Additionally, GVC participation can

[4] Conversely, if newly hired workers were previously unemployed, the bargaining power of labour can increase due to a tightening of the labour market. However, many emerging economies face structural changes that imply a declining labour demand in the agricultural industry and subsequently excess labour supply as displaced agricultural workers pour into manufacturing and service jobs. In such a situation, the negative effect of GVCs on the bargaining power of workers will outweigh the negligible positive effect of GVCs from a tightening of the labour market (Marslev et al., 2022).

[5] Several authors suggested that GVC integration has led to increased competitive pressure among suppliers, which subsequently become less accommodating in wage negotiation and attempt to squeeze wages (Anner, 2020; Milberg, 2004; Onaran, 2009). However, the argument lacks an explanation for the reduction in the bargaining power of labour, which is a necessary condition for the wage squeeze to be successful.

impact markups. While the price-setting power of firms is not usually discussed in the literature on social upgrading, the markup can be seen as one of the variables capturing the bargaining power between capital and labour. Firms rarely impose nominal wage cuts. Instead, when their relative bargaining power rises, they increase prices while keeping wages constant, thus effectively raising the markup on their nominal unit production costs. As firms enter (or move up) the GVC, they often start producing goods that are more sophisticated than those produced for the domestic market. Sophisticated products, in turn, facilitate product differentiation and thus face a lower price sensitivity of demand (in absolute terms). Additionally, as production requires more complex technology, there are fewer competitors for these goods (Sutton and Trefler, 2016). Both factors allow to increase the markup.[6] De Loecker and Warzynski (2012) show that these effects are particularly relevant for exporting firms. Kruger et al. (2017) provide evidence that Chinese and Mexican firms increased the markup as a consequence of the increasing sophistication of their exports.[7]

Additionally, as suppliers in emerging economies establish trade relations with advanced countries, they might be able to cut out brokers or trading companies, thus reducing the costs for suppliers. Bair and Gereffi (2001) present evidence for the textile industry in Mexico. Whether the cost reduction is used to increase the profit share, thus being equivalent to an increase in the markup, shared with labour, which would leave the labour share unchanged, or used to reduce product prices, thus increasing the labour share, will depend on the price elasticity of demand and the bargaining power of labour. However, in the context of suppressed labour unions and the absence of worker representatives on company boards, workers are unlikely to be informed of such developments and will hardly react by increasing their wage demands, thus a rise in the markup is the most likely outcome.

Skills and GVC participation

The channels discussed above have different implications for workers of different skill groups. Whether an increase in the capital-value added ratio (k) or technological progress (A) reduces the labour share depends on the elasticity of substitution between capital and labour. Low- and medium-skilled labour is usually assumed to be easily substitutable, whereas high-skilled

[6] The markup is a negative function of the price elasticity of demand in models of imperfect competition.
[7] In standard economic models an increase in the markup would imply a loss in competitiveness, which could have a negative effect on the profit share. However, the increase in the industry-level markup in this argument is a consequence of changing the composition of products, by increasing the share of sophisticated products that allow to charge a higher markup. While this increases the industry-level price index, it does not necessarily lead to a loss in competitiveness.

labour is complementary to capital. Thus, we would expect a negative effect of k and A on the former, and a positive effect on the latter. GVC participation might also affect the bargaining power of different skill groups differently. Feenstra and Hanson (1997) suggest that offshoring increases demand for high-skilled workers in advanced as well as emerging economies since tasks that are considered low-skill intensive in advanced countries are high-skill intensive in emerging economies. Such a shift in demand might reduce the bargaining power of low- and medium-skilled vis-à-vis high-skilled workers and thus increase the labour share of high-skilled labour, while reducing the labour share for lower-skilled workers. The negative effect might be particularly strong for medium-skilled workers, who are more likely to be employed in GVCs than low-skilled workers as firms move towards higher value-added products. The overall effect on the labour share depends on whether the positive effect on high-skilled labour offsets the negative effect on medium-skilled labour, which is contingent on the composition of the workforce and the elasticities of substitution between high- and low-skilled labour and capital.[8]

Our hypotheses are summarised in Table 1. GVC participation can lead to industrial upgrading (row 2), which will be reflected in rising capital-value added ratios and accelerated technological progress (column 1) and consequently a rise in labour productivity (column 2). The effect on high-skilled workers is likely to be positive (column 4) since their elasticity of substitution is below one. The opposite holds for low- and medium-skilled workers (column 5). If GVCs reduce bargaining power and increase the markup as highlighted in the literature on social upgrading (row 3, column 1) the real wage will decline (column 3). Nevertheless, there might be different effects on high- and lower-skilled labour as GVC integration is likely to raise the demand for skilled workers (column 4), while low- and medium-skilled labour is likely to experience the negative effects of lower bargaining power more strongly.

<Table 1>

We analyse the empirical evidence for these channels in the next section.

[8] Figure A2 in the online appendix presents the labour compensation of high-, medium- and low-skilled workers (as defined by their level of education) as a ratio to total value added. While the share of high skilled workers' wage bill in value added increased in some countries, the picture is dominated by declining labour shares of both medium- and low-skilled workers, in line with different effects across skill groups.

DATA AND ESTIMATION STRATEGY

Our empirical model follows equation (4) in logarithms and mirrors standard econometric approaches to estimating labour share determinants (Bassanini and Manfredi, 2014; Bentolila and Saint-Paul, 2003; Doan and Wan, 2017). As there are no direct measures of the markup (m) and bargaining power (γ), we include their determinants (GVC participation and labour market institutions, LMI) directly in the estimation equation:

$$\ln(S_{c,i,t}) = \alpha_{0,c,i} + \Sigma_{j=1}^{3}\, \alpha_{1j} \ln S_{c,i,t-j} + \alpha_2 \ln k_{c,i,t} + \alpha_3 \ln GVC_{c,i,t-1} + \alpha_4 \ln LMI_{c,t} + \alpha_5 \ln XR_{c,t} + d_t + \varepsilon_{c,i,t} \quad (5)$$

c, i and t denote country, industry, and year, $\alpha_{0,c,i}$ is a country-industry specific intercept, d_t denote year dummies and ε is the error term. S is the adjusted labour share, measured as labour compensation as a ratio to value added based on the World Input-Output Database (WIOD; Timmer, et al., 2015).[9] WIOD relies, where available, on labour force surveys to estimate labour income of self- and informally-employed workers in emerging economies. In contrast to the static model in equation (4), we use a dynamic model, in line with the sluggish adjustment of our variables.[10] We also estimate separate specifications for the share of the labour compensation of high-, medium- and low-skilled workers in sectoral value added. Low-, medium- and high-skilled refers to workers with primary, secondary, and tertiary education, respectively (Timmer, et al., 2015).

k is the capital stock as a ratio to value added. It would be desirable to include a measure of capital-augmenting technological change (A). However, (imperfect) proxies like total factor productivity or the information and communication technology capital stock are not available

[9] The choice of countries and time period is determined by data availability. Unfortunately, WIOD ends in 2014, and no new data has been released. We link data across two different releases of WIOD by splicing, which required aggregation of some industries. A detailed industry list is provided in Table A3 in the online appendix. We exclude the following industries from all estimations: Agriculture, Hunting, Forestry and Fishing, Mining and Quarrying, Coke and Refined Petroleum, as well as mostly publicly owned sectors (Public Administration and Defence; Compulsory Social Security; Education; Human Health and Social Work Activities). This is because wage setting in these industries may not be determined by the same forces as in other industries. Furthermore, we exclude the real estate sector whose value added largely constitutes imputed rents. We exclude outlier industries where the percentage change in the labour share exceeds 50 per cent in one year or where the labour share is constant for the whole period, as this suggests data or classification issues (six industries in total from Brazil, China, Indonesia and Turkey).

[10] The estimation of a static model produces autocorrelated residuals.

for our sample. Karabarbounis and Neiman (2014) provide evidence that the potential bias resulting from the omission of this variable is negligible.

We are mainly interested in the effect of offshoring of tasks from advanced economies on the labour share in emerging economies. In the baseline specification, we capture GVC by intra-industry intermediate exports, based on WIOD. Furthermore, we differentiate exports by destination based on two country groups defined as 'high-wage' countries (Australia, Canada, Europe, Japan, Russia, and the USA) termed '*Exports HW*' below, and 'low-wage' countries (including countries in our sample and the rest of the world), labelled '*Exports LW*'. '*Exports HW*' are intra-industry intermediate exports from emerging economies that are imported by advanced economies. In alternative specifications, we also estimate the impact of total exports as a broad measure of trade openness, inward and outward FDI, offshoring (defined as intra-industry intermediate imports by using sector), and final imports by supplying-sector, all measured at the industry level.

LMI refers to variables capturing industrial relations and labour market institutions, which will have an impact on the bargaining power of workers. We include union density at the country level in our baseline. We also test for the impact of country-level minimum wages as a ratio to sectoral average labour compensation per hours worked, government spending and an index of labour market institutions at the country level in alternative specifications. The latter has been found to impact the labour share in advanced economies (Damiani et al., 2018; Deakin et al., 2014). Additionally, financial globalisation, measured as exposure to international financial flows, was emphasised as a factor that can either impact the relative price of capital and subsequently k (Dao et al., 2019; Furceri et al., 2019), or the relative bargaining power of labour, γ (Jayadev, 2007; Kohler et al., 2019). We account for this by including non-FDI flows as well as total foreign assets and liabilities at the country level in auxiliary specifications.

Additionally, we control for the inverse of the nominal exchange rate (XR). Several studies highlighted the exchange rate as an important distributional variable in emerging economies (Bassanini and Manfredi, 2014; ILO, 2011; Onaran, 2009). Blecker (2012) argues that a currency depreciation induces a bargaining process between capital and labour. The impact on the labour share is ambiguous and depends on the relative bargaining power. An increase in XR indicates an appreciation of the domestic currency.

To shed more light on the exact mechanism via which GVC participation impacts the labour share, we additionally conduct separate regressions using the capital-value added ratio,

labour productivity and the real wage as dependent variables. According to the productivity channel, GVC participation should lead to increasing capital-value added ratios or capital-augmenting technological change. To test the former we regress the capital-value added ratio on GVC participation:

$$\ln(k_{c,i,t}) = \sum_{j=1}^{3} \beta_{1j} \ln k_{c,i,t-j} + \beta_2 \ln GVC_{c,i,t-1} + \beta_3 \ln LMI_{c,t} + \beta_4 \ln XR_{c,t} + \sum_{j=0}^{2} \beta_{5j} \ln w_{r_{c,i,t-j}} + u_{c,i,t} \quad (6)$$

where w_r is the real wage, measured as average labour compensation in real terms divided by hours worked of employees. We expect a positive impact of GVC on k.

As discussed above, we are not able to control for capital-augmenting technological change in our regression. Instead, making use of the fact that technological progress would be reflected in rising labour productivity, we estimate the effect of GVC participation on labour productivity directly:

$$\ln(y_{c,i,t}) = \sum_{j=1}^{3} \zeta_{1j} \ln y_{c,i,t-j} + \zeta_2 \ln k_{c,i,t} + \zeta_3 \ln GVC_{c,i,t-1} + \zeta_4 \ln LMI_{c,t} + \zeta_5 \ln XR_{c,t} + \sum_{j=0}^{2} \zeta_{6j} \ln w_{r_{c,i,t-j}} + v_{c,i,t} \quad (7)$$

where y is labour productivity, captured by value added per hours worked. Again, we expect a positive impact of GVC.

Finally, we estimate the real wage as

$$\ln(w_{r_{c,i,t}}) = \sum_{j=1}^{3} \lambda_{1j} \ln w_{r_{c,i,t-j}} + \lambda_2 \ln k_{c,i,t} + \lambda_3 \ln GVC_{c,i,t-1} + \lambda_4 \ln LMI_{c,t} + \lambda_5 \ln XR_{c,t} + \sum_{j=0}^{2} \lambda_{6j} \ln y_{c,i,t-j} + \epsilon_{c,i,t} \quad (8)$$

If GVC participation reduces the bargaining power of labour or increases the markup, the effect on the real wage would be negative.

Variable definitions and data sources are listed in Table A4 in the online appendix.

If firms are optimising, k is likely to be a function of past or current values of the labour share (Bentolila and Saint-Paul, 2003). Similarly, lower wages might lead to higher exports, thereby raising GVC. The bias arising when ignoring this problem of endogeneity in estimations could

explain the finding of high and significant negative effects of technological change on the labour share in previous contributions, which do not properly account for endogeneity (Doan and Wan, 2017; Karabarbounis and Neiman, 2014). The effect of GVC participation could be understated for the same reason. Our preferred approach is to use the difference-General Method of Moments (GMM) estimator introduced by Arellano and Bond (1991), because it provides readily available 'internal' instruments based on lagged values of the explanatory variables.[11,12] Additionally, we conduct robustness tests using external instruments for GVC, based on the weighted average of intra-industry intermediate export intensity for a particular industry from all countries in our sample except the country-industry which is being instrumented. This approach is similar to previous studies on the economic effects of globalisation (e.g. Blanchard et al., 2017). LMI and XR are treated as exogenous. To achieve a dynamically complete model, which is a requirement for instrument validity in GMM, we start with the estimation of a fairly general autoregressive distributed lag model (ARDL), including the contemporaneous and lagged values of all explanatory variables and three lags of the dependent variable. Subsequently, we perform a 'testing down' procedure by dropping variables with the lowest t-statistic, until we are left with at least one measure per variable. This is the reason GVC is used with a lag in the final estimations. Union density and the exchange rate enter in first differences, because we expect the change, rather than the level of those variables to impact distribution.[13] All estimations include year dummies to account for time-specific shocks common to all industries and mitigate cross-sectional dependence (Roodman, 2009).

[11] Our estimation method also accounts for level-differences and time-invariant unobservables that are captured by the country-industry specific intercept ($\alpha_{0,c,i}$). Certain industries might be more heavily involved in GVCs than others because their production processes require more intermediate goods. For example, the 'manufacturing of food products' industry is likely to export fewer intermediate products relative to their gross output than 'manufacturing of machinery and equipment' (indeed the average export intensities for these industries in our sample are 0.006 and 0.03, respectively). By first-differencing the data we account for such level differences at the country-industry level. Hence, our estimation coefficients are solely driven by the within-industry change in our data, i.e. the association between the percentage change in intra-industry intermediate export intensity and the percentage change in the labour share.

[12] As discussed below we also employ the system-GMM estimator in robustness tests.

[13] This is also confirmed by the ARDL estimation where the coefficients for the contemporaneous and lagged value have opposing signs and a Wald test indicates the same coefficient in absolute values.

ESTIMATION RESULTS

Specification (1) in Table 2 presents our baseline results. We start with estimations for manufacturing industries only, as these industries are the main drivers of GVC integration.

<Table 2>

We find a negative impact of intra-industry intermediate exports to high-wage countries ($Exports\ HW$), but no significant effect of exports to the rest of the world ($Exports\ LW$). Validity tests indicate absence of autocorrelation in the residuals and instrument validity. This confirms our hypothesis that participation in GVCs reduces the labour share and highlights the importance to distinguish between trade with high-wage countries and South-South trade. The coefficient indicates that an increase in the output share of intra-industry intermediate exports by 1 per cent decreases the labour share by 0.17 per cent in the short run, and 0.88 per cent in the long-run[14]. The capital-value added ratio has a negative impact, albeit significant at the 10 per cent-level only, which is consistent with an elasticity of substitution above one. We find a positive impact of union density reflecting unions' importance for labour's bargaining power. The effect of the exchange rate is positive and significant, suggesting that an appreciation has a positive impact on the labour share. The coefficients imply that a decline in the capital-value added ratio by 1 per cent, an increase in the growth rate of union density by 1 per cent, or an appreciation of the exchange rate by 1 per cent increase the labour share, respectively, by 0.80, 0.51 and 0.76 per cent in the long-run.

Estimations for service sectors in specification (2) confirm these results, but the capital-value added ratio now has a positive effect, whereas union density and the exchange rate turn statistically insignificant. The lack of robustness for our control variables indicates that determinants of the labour share, including the elasticity of substitution between capital and labour, differ across manufacturing and service industries. Nevertheless, GVC participation decreases the labour share in both industry groups.

Specification (3) reports results for manufacturing and services jointly. All variables except for union density turn statistically insignificant and the failure to reject the Hansen test of instrument validity and the relatively low AR2 test statistic indicate potential model misspecification. This is not particularly surprising given the results in specifications (1) and

[14] Long-run coefficients are calculated by dividing the coefficients from specification (1) by one minus the sum of the coefficients of the lagged dependent variable.

(2), which suggest that separate analyses for manufacturing and service industries are warranted. We focus our subsequent analysis on manufacturing industries.

Specification (4) reproduces our baseline specification using the within-estimator rather than the GMM estimator, i.e. without instrumenting our covariates. Exports to high-wage countries remain statistically significant, albeit with a reduced coefficient, and exports to low-wage countries are now significant with a negative impact as well. The capital-value added ratio turns statistically insignificant with a positive sign. The remaining variables are robust and the coefficient for the lagged dependent variable shows the expected downward bias in comparison to our baseline estimation. Overall, this confirms our choice of the difference-GMM estimator and implies that accounting for endogeneity is essential.

The Great Recession had a strong impact on the labour market and bargaining relations and may distort the effect of underlying determinants of income distribution (Guschanski and Onaran, 2021). To account for this, we restrict our sample to the 1995–2007 period in specification (5). All variables, except for the capital-value added ratio which turns statistically insignificant, remain robust.

Specifications (6-8) use labour compensation of high-, medium-, and low-skilled workers as a ratio to value added as the dependent variable. Data is limited to the 1995–2009 period and we restrict our sample to end in 2007 to avoid the 2008 financial crisis and provide comparability to specification (5).[15] We include the share of people with the relevant level of education ($Skill\ Share$) as a control variable to account for the changing educational composition of the population. The negative effect of intra-industry intermediate exports to high-wage countries is only statistically significant for medium-skilled labour. It appears that medium-skilled workers are most strongly impacted by GVC participation. It is possible that low-skilled workers rarely participate in export production, which increasingly requires higher skill levels as firms move up the GVC. In contrast, high-skilled labour might be relatively more successful in extracting part of the productivity gains, due to stronger bargaining power and increased demand for their skills. Nevertheless, in contrast to Feenstra and Hansen (1996), we find no evidence that high-skilled workers gain from trade in intermediate products. While medium-skilled workers lose out the most, labour in aggregate loses out relatively to capital.

[15] Results are robust to estimations for the 1995-2009 period. While we keep the lag structure identical to the baseline, results are also robust to the exclusion of the third lagged dependent variable, which is insignificant for medium- and low-skilled workers. Estimations for service industries yield similar results although exports turn statistically insignificant while maintaining their negative coefficient for low- and medium-skilled labour. Results are available upon request.

We obtain a positive coefficient for the capital-value added ratio for all three skill groups, in line with the overall positive effect in specification (5), which captures the same period. The effect is statistically significant only for high-skilled workers, which indicates a particularly low elasticity of substitution in line with expectations that high-skilled labour has a strong complementarity with capital. However, it contradicts the idea that the labour share declined due to an increase in the capital-value added ratio, as medium- and low-skilled labour is still a complement for capital (as the coefficient is positive albeit insignificant) or technology-neutral (interpreting the coefficient as zero as it is insignificant). Union density displays a positive effect for medium- and low-skilled labour and a negative coefficient for high-skilled workers, although it is not statistically significant. However, results for specifications (6-8) have to be interpreted with caution as validity tests indicate potential model specification issues. Also, potential measurement issues related to informal employment might be particularly relevant for low-skilled labour.

Results in Table 2 indicate that GVC participation, in particular the supply of intermediate products to advanced economies, has reduced the labour share in emerging economies, predominantly by reducing labour income of medium-skilled workers. While the results hold for manufacturing as well as service industries, the effect on the former is stronger. GVC participation could have reduced the labour share through an increase in the capital-value added ratio in manufacturing industries, but not in service industries where an increase in the capital-value added ratio would increase the labour share. Furthermore, the negative effect of the capital-value added ratio is not robust across different specifications and seems to be relevant only from 2008 onwards. The insignificant coefficient in specification (5) further indicates that the elasticity of substitution has increased over time, consistent with the mechanism proposed by Lian (2019). Most importantly, we find a negative coefficient for $Exports\ HW$, despite controlling for the capital-value added ratio. This implies that GVC participation impacts distribution either by contributing to (capital-augmenting) technological change, by increasing the markup or by reducing the bargaining power of labour.

To compare the effects of different explanatory variables, equation (9) reports standardised coefficients based on specification (1) in Table 2. Standardised coefficients measure the effect of a one standard deviation change of the explanatory variables, thereby allowing comparison of the relative effect size of variables with different variances and units of measurement. Only statistically significant variables are reported.

$$S_{c,i,t} = -0.331\, k_{c,i,t} - 0.560\, Exports\ HW_{c,i,t-1} + 0.100\, \Delta UD + 0.155\, \Delta XR_{c,i,t} + \varepsilon_{c,i,t} \quad (9)$$

The results show that $Exports\ HW$, our preferred measure of GVC participation, exerts the largest impact on the labour share among the explanatory variables. In particular, the effect is almost twice as large as that of the capital-value added ratio.

We conduct a battery of robustness tests on our baseline specification, reported in Table A5 in the online appendix. In specifications (1) and (2) we use external instruments based on exports of industries in other countries, as described in Section 4. In specification (1) we add these instruments as additional external instruments to our baseline specification. Specification (2) is based on a simpler and less-efficient two-stage least square (2-SLS) estimator and a more parsimonious model including only the lagged dependent variable, our export measures, and the exogenous regressors. In addition to the external instruments for exports to high- and low-wage countries, we instrument the lagged dependent variable with its own second and third lag to mitigate the Nickell-bias. Specifications (3–4) use the system-, rather than difference-GMM estimator, which employs additional moment conditions that can be applied to the model estimated in levels instead of differences. In specifications (5–6) we use the mean-group estimator to account for potential bias that might arise if the pooling assumption does not hold, i.e. when coefficients for different country-industries in our sample differ. This estimator circumvents the problem of parameter heterogeneity by conducting estimations separately for all country-specific industries and then averaging the coefficients. However, as it does not account for endogeneity (Pesaran et al., 1999), the overall effect is an average of potentially biased coefficients. Specifications (7–8) apply weights to our baseline specification, which are based on the share of the respective industry in total value added.

All estimations for manufacturing industries (specifications 1–3, 5 and 7) confirm our baseline results. In particular, when we employ external instruments, the coefficient for exports to high-wage countries is very similar in size to our baseline (-0.15 in specification 2, Table A5, vs -0.17 in specification 1, Table 2). This gives further support to our identification strategy and the GMM estimator.[16]

The Hansen-test for instrument validity is not passed in specification (3), due to a low Incremental Hansen test on the instruments used in the level equation (p-value of 0.06). This negates the necessary condition for the applicability of the system-GMM estimator (so-called

[16] Results are also robust when the capital-value added ratio is included in the 2-SLS estimation, using lags of capital-value added as instruments.

effect stationarity) and renders this estimation method unreliable, thereby confirming our choice of difference-GMM as our baseline estimation method. The capital-value added ratio is only statistically significant in specification (5), where it has a positive effect on the labour share. This casts further doubt on the relevance of the productivity channel. Estimations for services do not yield statistically significant results except for specification (8) using the weighted-GMM estimator, where we find a negative impact of $Exports\ HW$, consistent with our baseline.

In online appendix Table A6 we report alternative model specifications. We measure GVC participation as total (rather than intra-industry) intermediate exports (*Broad Exports*) in specification (1), add offshoring, measured as intra-industry intermediate imports in specification (2), and additionally final imports of consumption and capital goods in specification (3). Specifications (4) and (5) include inward and outward foreign direct investment (FDI) as alternative measures of GVC participation, but due to data availability our sample is restricted to Turkey and Korea. Specification (6) controls for non-FDI flows (mainly portfolio and debt flows) as a ratio to GDP at the country level. Specification (7-10) include additional measures of bargaining power, specifically total foreign assets plus liabilities (financial globalisation), an index of labour market legislation (Adams, et al., 2016), national minimum wages as a ratio to average labour compensation per worker, and total government consumption as a share of GDP.

Results in Table A6 confirm our previous findings. There is a robust negative impact of GVC participation on the labour share in emerging economies, and this is consistent across alternative, albeit less precise, measures of GVCs, such as total exports of intermediate products (specification 1) and inward FDI (specification 4). However, the coefficient is smaller and statistically significant at the 10 per cent-level only, suggesting that our narrow measure of intra-industry intermediate exports to advanced economies is more relevant for income distribution than broader measures of trade exposure. Offshoring does not exercise a negative impact on the labour share in emerging economies (specifications 2-3), although there is evidence of a negative effect of outward FDI, an alternative measure of offshoring, on the labour share in Turkey and Korea (specification 5). Turkey and Korea have the highest GDP per capita in our sample and thus a higher incentive to offshore production to countries with lower wages, which might explain the negative impact of outward FDI.

Union density has a robust positive impact on the labour share, except for specifications (4-5) which are restricted to Turkey and Korea. As discussed in Section 3, suppression of union activity was a key feature of the strategy for industrial upgrading in both countries, which might

explain this finding. We find no effect of non-FDI flows in specification (6), suggesting that trade flows are more important drivers of the labour share than financial flows. Similarly, there is no statistically significant effect of financial globalisation, labour market legislation or the minimum wage (specifications 7-9). In contrast, we find evidence of a positive effect of government consumption on the labour share in specification (10). Interpreting government consumption as a proxy for expenditure on social safety nets implies that labour's bargaining power increases if workers can rely on the provision of basic services in case of job loss.[17] The capital-value added ratio is not robust, turning statistically insignificant in six out of ten specifications in Table A6, casting further doubt on the relevance of this variable.

To shed light on the exact channel via which GVC participation impacts the labour share, we conduct estimations using the capital-value added ratio, labour productivity and the real wage as dependent variables. In light of our previous results, we expect to find that GVC participation increases labour productivity, or reduces the real wage, or both. However, either of those findings is sufficient to obtain a negative effect of GVCs on the labour share. Additionally, if GVCs reduce the labour share due to an increase in the capital-value added ratio, we expect a positive impact of intermediate exports on the capital-value added ratio. Table 3 presents the results.

<Table 3>

The dependent variable is the capital-value added ratio for specifications (1-3), labour productivity for specifications (4-6), and the real wage for specifications (7-9). Specifications (1), (4) and (7) in bold are restricted to manufacturing industries and are thus closely related to our baseline.

Intra-industry intermediate exports do not have a statistically significant impact on the capital-value added ratio in either manufacturing or service industries according to specifications (1-3). Even though an increase in the capital-value added ratio reduces the labour share in manufacturing according to our previous findings in Table 2 specification (1), there is no evidence that GVC integration is a driver of the capital-value added ratio. This casts further

[17] Nevertheless, results can only be considered indicative because the Hansen-test is not passed. It would be desirable to use more detailed measures, such as public spending on social protection or health and education, which is unfortunately unavailable for our sample period.

doubt on the hypothesis that GVCs impact the labour share via an increase in the capital-value added ratio.

In contrast, we find a positive effect of intermediate exports on labour productivity in manufacturing in specification (4), which is consistent with the hypothesis that GVC participation contributes to industrial upgrading, for example via capital-augmenting technological change. There is no effect in service industries (specification 5) and consequently, the variable is significant at the 10 per cent-level only for the pool of all industries (specification 6). Results have to be taken with a grain of salt, as the Hansen test is not passed, and the AR2-test indicates autocorrelation in the residuals.

Finally, we find a negative impact of GVCs on the real wage in specification (7) for manufacturing industries. In contrast to estimations for labour productivity (Specifications 4-6), all validity tests are passed. The positive effect is limited to manufacturing industries only, as estimations for services and total industries show a negative, albeit statistically insignificant coefficient.

This suggests that the negative effect of GVC participation on the labour share is not only a consequence of increasing labour productivity that is not passed on to workers. Rather, our results show that the real wage would have been higher, for a given level of productivity, if firms would not have participated in GVCs. This lends further support to our hypothesis that GVC participation allows firms to charge a higher markup, and/or reduces the bargaining power of labour.

We have conducted a variety of robustness tests on the specifications in Table 3. Results are robust to omitting the capital-value added ratio, which is statistically insignificant in all estimations. Similarly, results are robust to using the number of people engaged rather than hours worked by employees to calculate real wages and labour productivity.[18]

CONCLUSION

Our analysis provides evidence that globalisation leads to a decline in the labour share in emerging economies. More specifically, we find that the integration into GVCs is an important driver of this process, which has particularly affected medium-skilled workers. An increase in intra-industry intermediate exports to advanced economies by 1 per cent decreases the labour

[18] Data on hours worked is not available for China, which is dropped from our sample in Table 3, but included in robustness test using the number of people engaged. All robustness tests are available upon request.

share in emerging economies by 0.88 per cent on average. We show that the effect is driven by offshoring from advanced to emerging economies rather than South-South trade, and apparent in manufacturing as well as service industries. However, our results cast doubt on the channel proposed by previous research, which posits that the labour share declined as a consequence of increasing capital intensity (Dao et al., 2019; Elsby et al., 2013). While we find some evidence of a negative effect of the capital-value added ratio on the labour share, the result is not robust across different specifications and estimation methodologies. Furthermore, GVC participation does not increase the capital-value added ratio according to our findings. There is more evidence consistent with trade-induced technological change through 'learning by exporting' (De Loecker and Warzynski, 2012) and process-upgrading, since GVCs increase labour productivity. Yet, productivity gains are not shared with labour.

We outline two possible explanations for this finding: first, as discussed in the literature on social upgrading, GVC participation has reduced the bargaining power of labour due to increased use of outsourcing and the setting up of temporary production sites. Second, as evidenced in the economics literature on markup power, moving up the GVC allows firms to produce more sophisticated goods with lower price elasticity and a lower degree of competition. This permits to charge a higher markup, subsequently reducing the labour share. We find that GVC participation reduces real wages, thus providing indicative support for these explanations.

Aside from GVCs, the fall in the labour share is due to a strong deterioration in union density. In contrast, government consumption increases the bargaining power of labour, while labour market institutions and gross financial flows were not statistically significant.

These results have implications for research and policy. The effect of GVC integration on bargaining power has so far not been analysed in the economic literature on the labour share in emerging economies, as opposed to research on the labour share in advanced economies (Guschanski and Onaran, 2021). Literature in development studies has more successfully integrated the impact of GVC participation on productivity on the one hand and bargaining power on the other hand, in a synthetic analysis of industrial and social upgrading (e.g. Barrientos et al., 2011, Marslev et al., 2022). However, these contributions have not discussed the impact of GVCs on the markup power of firms, which is prominent in the economic literature, and would enrich the debate in development studies. Empirical research on advanced economies has highlighted that part of the decline in the labour share is driven by increasing concentration within industries (Autor et al., 2017). As firms benefitting from GVCs are

usually large (World Bank, 2020), the two processes might be connected. Future research could use firm-level data for emerging economies to test this empirically.

Previous contributions have shown that offshoring from advanced to emerging economies puts downward pressure on the labour share in advanced economies (Guschanski and Onaran, 2021), while this article indicates that workers in emerging economies, the hosts of the offshored tasks, are equally losing out relatively to capital. Trade integration can increase productivity, but policies should be in place to ensure that labour and capital can share the gains more equally. Equitable trade requires a level playing field between capital and labour, which can be achieved via an improvement in trade union legislation or the expansion of social safety nets. Supplier firms in emerging economies, while squeezing labour, are themselves subject to severe price competition and profit squeeze by buyer firms in advanced economies (Anner, 2020). Regulations that hold firms in advanced economies responsible for working conditions along their value chain could help to address this issue and should be strengthened (World Bank, 2020). Such a law was passed in France and more recently in Germany and is currently under discussion at the level of the European Union. Finally, our results suggest that an attempt to increase the labour share through skill-upgrading alone will not be effective for improving equality, as medium-skilled workers have experienced the strongest negative impact of GVC participation.

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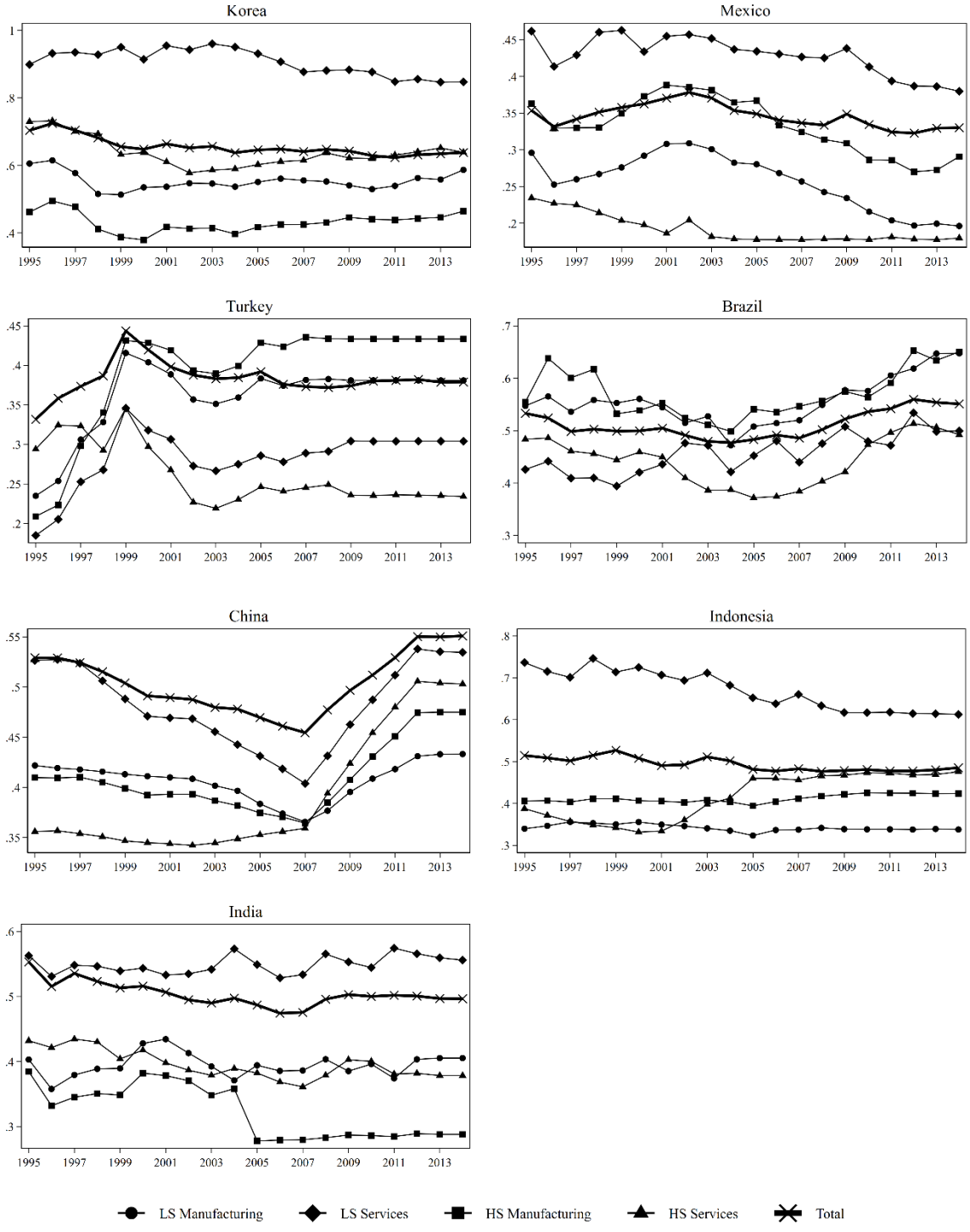
FIGURES AND TABLES

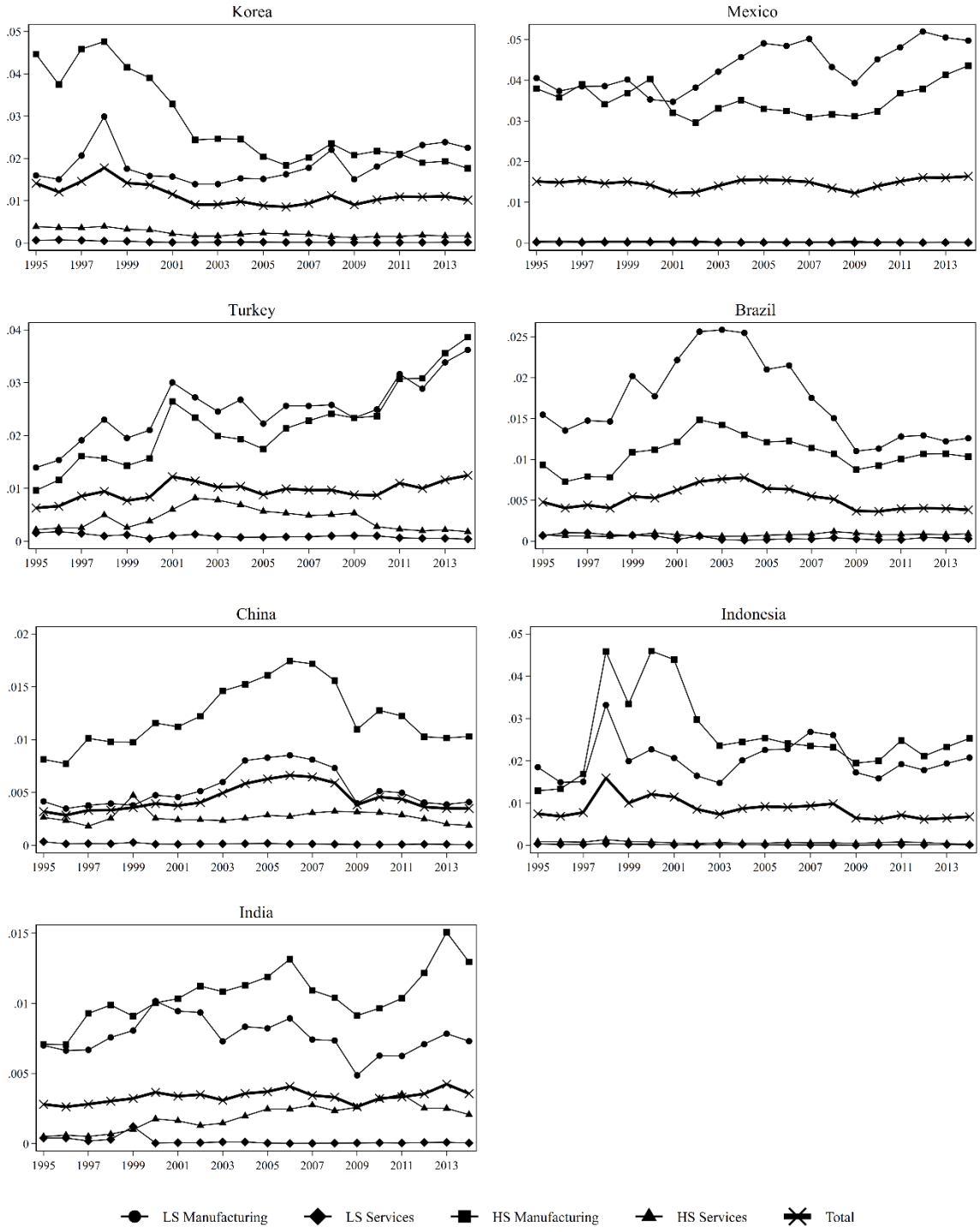
Figure 1. Labour share by sector groups, 1995-2014



Notes: 'Total' includes all industries. Industry-level graphs exclude: Agriculture, Hunting, Forestry and Fishing; and Mining and Quarrying; Coke and Refined Petroleum; Public Administration and Defence; Compulsory Social Security; Education; Human Health and Social Work Activities and Real Estate. HS and LS stand for high- and low-skill industries, respectively.

Source: Own calculations based on WIOD.

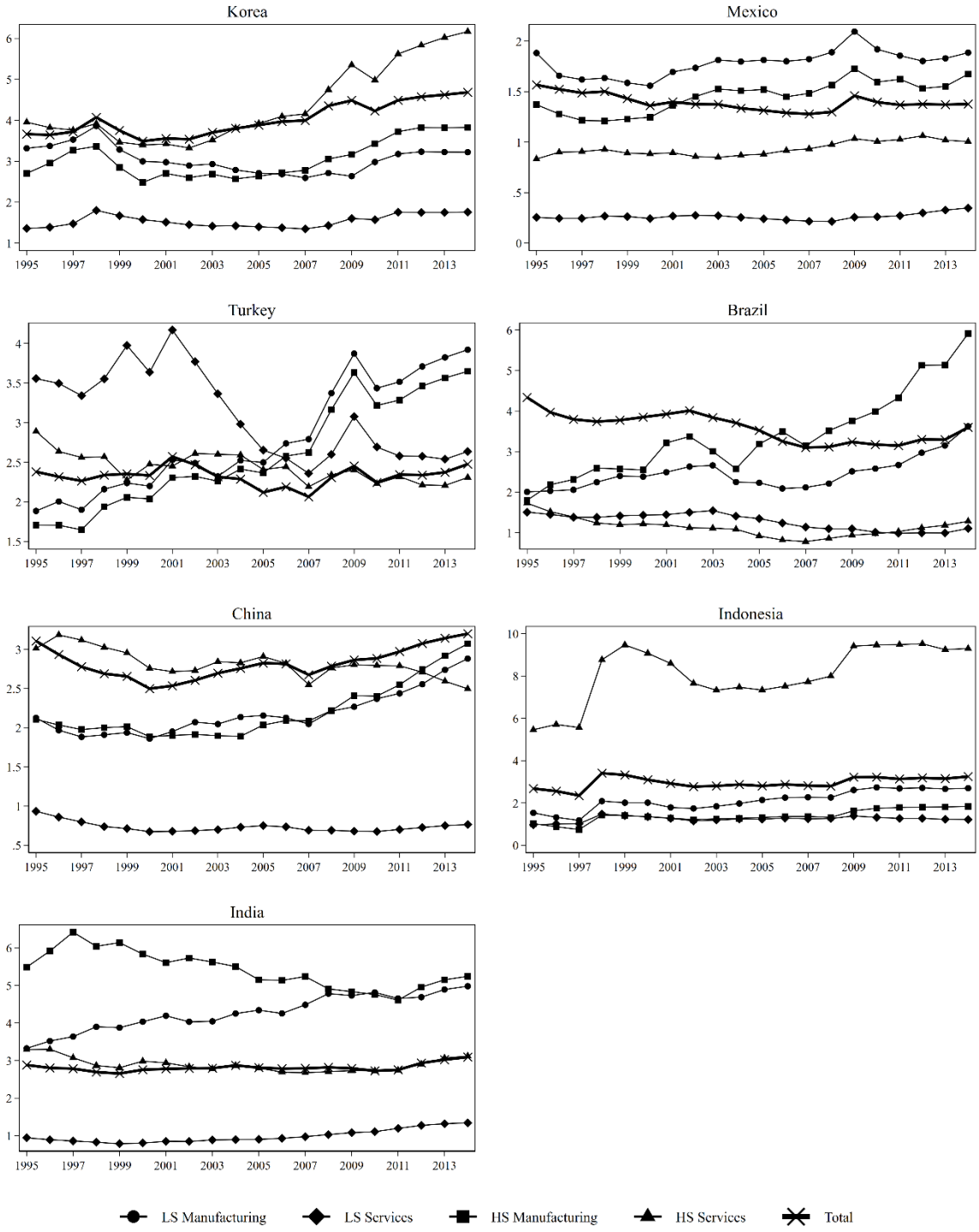
Figure 2. Intra-industry intermediate exports to advanced economies, 1995-2014



Notes: 'Total' includes all industries. Industry-level graphs exclude: Agriculture, Hunting, Forestry and Fishing; and Mining and Quarrying; Coke and Refined Petroleum; Public Administration and Defence; Compulsory Social Security; Education; Human Health and Social Work Activities and Real Estate. HS and LS stand for high- and low-skill industries, respectively.

Source: Own calculations based on WIOD.

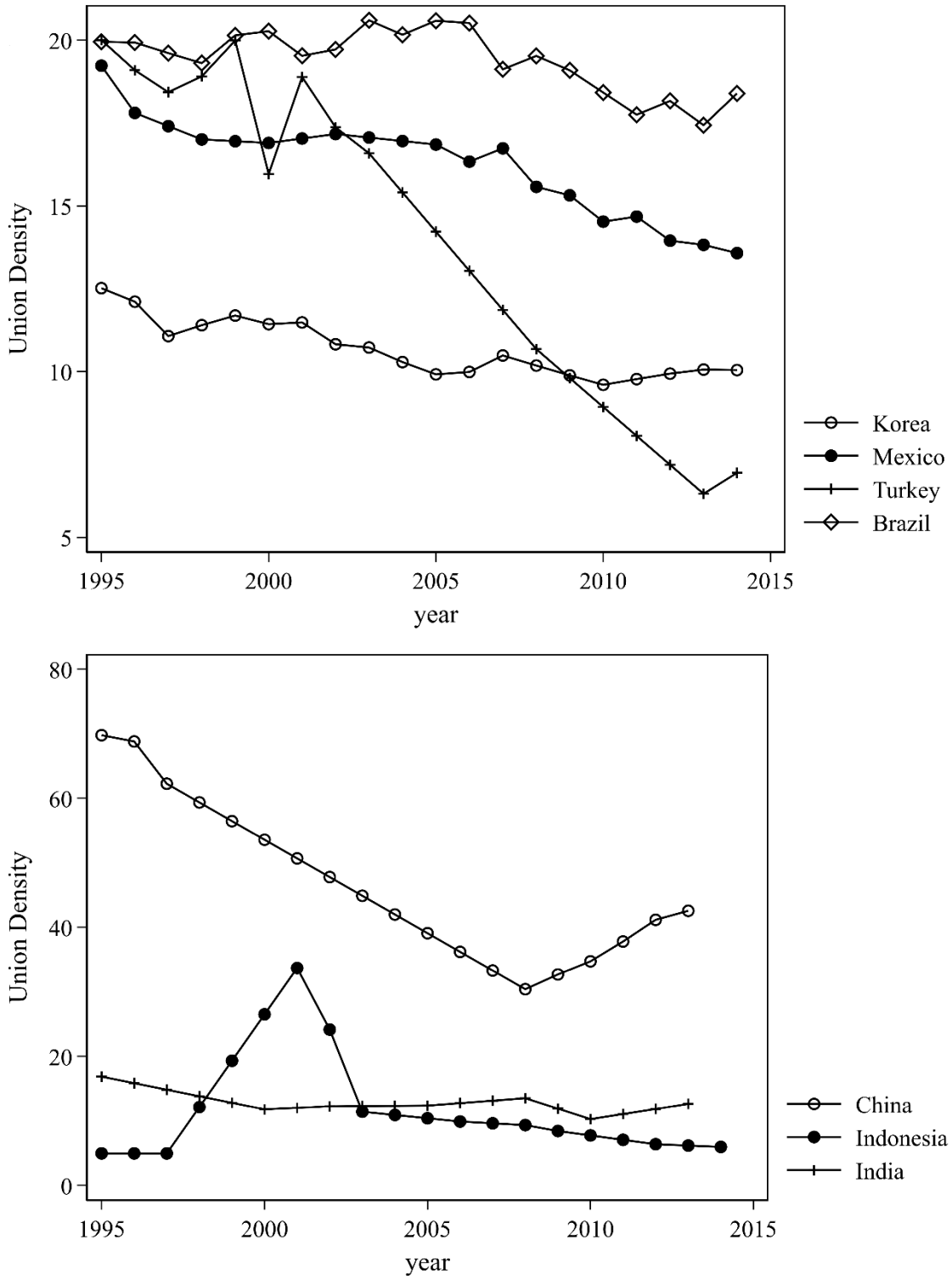
Figure 3. Capital-value added ratio, 1995-2014



Notes: 'Total' includes all industries. Industry-level graphs exclude: Agriculture, Hunting, Forestry and Fishing; and Mining and Quarrying; Coke and Refined Petroleum; Public Administration and Defence; Compulsory Social Security; Education; Human Health and Social Work Activities and Real Estate. HS and LS stand for high- and low-skill industries, respectively.

Source: Own calculations based on WIOD.

Figure 4. Trade union density, 1995-2014



Notes: Data is linearly interpolated between available values.

Source: ICTWSS (Visser, 2019).

Table 1. Summary of channels and effects on the labour share

GVC participation effects	Effect on labour productivity	Effect on real wages	Effect on wages of high-skilled workers	Effect on wages of low-skilled workers	Relevant process
$k \uparrow$	+		+	—	Industrial upgrading
$A \uparrow$	+		+	—	
$\gamma \downarrow$		—	+	—	Social upgrading
$m \uparrow$		—	+	—	

Notes: k = capital-value added ratio; A = capital-augmenting technological change; γ = labour's bargaining power; m = markup

Table 2. The effect of GVC participation on the labour share

	1	2	3	4	5	6	7	8
Sector group	Manufac.	Services	Total	Manufac.	Manufac.	Manufac.	Manufac.	Manufac.
Skill group	All	All	All	All	All	HS	MS	LS
$\ln(\text{Capital/ VA})_t$	-0.151*	0.092*	-0.020	0.033	-0.132	0.365**	0.009	-0.086
	(0.052)	(0.058)	(0.775)	(0.109)	(0.167)	(0.048)	(0.965)	(0.590)
$\ln(\text{Exports LW})_{t-1}$	0.004	0.004	-0.006	-0.012**	0.021	-0.146	0.089***	0.039
	(0.876)	(0.576)	(0.549)	(0.039)	(0.384)	(0.137)	(0.008)	(0.391)
$\ln(\text{Exports HW})_{t-1}$	-0.166**	-0.004*	-0.003	-0.014**	-0.148**	-0.183	-0.272***	0.007
	(0.014)	(0.068)	(0.357)	(0.026)	(0.037)	(0.368)	(0.000)	(0.927)
$\Delta\ln(\text{Union Density})_t$	0.095***	0.039	0.039*	0.039***	0.084**	-0.038	0.070	0.081
	(0.001)	(0.326)	(0.082)	(0.006)	(0.026)	(0.638)	(0.144)	(0.223)
$\Delta\ln(\text{XR})_t$	0.143***	-0.000	0.009	0.073***	0.130**	0.163	0.136**	0.045
	(0.006)	(0.989)	(0.613)	(0.000)	(0.033)	(0.181)	(0.010)	(0.521)
$\ln(\text{S})_{t-1}$	0.907***	0.784***	0.716***	0.869***	0.872***	0.700***	0.294	0.525
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.003)	(0.366)	(0.201)
$\ln(\text{S})_{t-2}$	0.091**	0.100*	0.099***	0.060*	0.080	0.180***	0.015	0.019
	(0.024)	(0.063)	(0.004)	(0.077)	(0.116)	(0.003)	(0.744)	(0.784)
$\ln(\text{S})_{t-3}$	-0.186***	-0.059	-0.111***	-0.204***	-0.201***	-0.184**	-0.112**	-0.103
	(0.000)	(0.268)	(0.002)	(0.000)	(0.001)	(0.038)	(0.043)	(0.156)
$\ln(\text{Skill Share})_t$						-0.540***	0.572***	-1.217***
						(0.000)	(0.000)	(0.001)
Constant				-0.371***				
				(0.000)				
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hansen	0.462	0.361	0.061		0.760	0.004	0.391	0.051
AR1	0.000	0.000	0.000		0.003	0.003	0.497	0.247
AR2	0.848	0.389	0.139		0.757	0.598	0.119	0.544
Instruments	34	34	34		27	28	28	28
Industries	82	84	166	82	82	82	82	82
F-test	6.195	50.567	15.126	115.296	4.716	10.546	8.902	36.798
Observations	1289	1253	2542	1371	738	738	738	738
Period	95-14	95-14	95-14	95-14	95-07	95-07	95-07	95-07

Notes: The dependent variable (*S*) is the sectoral adjusted labour share. Estimation method is 'difference GMM' with one instrument column per variable, except for specification (4) which uses the within-estimator. P-values below the estimation coefficients in parenthesis. ***, **, * denote statistical significance at the 1%, 5% and 10% level. Hansen is the p-value of the Hansen test of overidentifying restrictions for all instruments. AR1 and AR2 is the p-value of the Arellano-Bond test for autocorrelation of first and second order in the residuals. Instruments, Industries, and F-test, are the number of instruments used, number of cross-sections, and the F-test statistic.

Sources: Own calculations. Data sources are listed in appendix A4.

Table 3. The effect of GVCs on real wages and labour productivity

Dependent variable	Capital/ VA			Labour Productivity			Real Wages		
Specification	**1**	2	3	**4**	5	6	**7**	8	9
Sector Group	**Manufac.**	Services	Total	**Manufac.**	Services	Total	**Manufac.**	Services	Total
$\ln(\text{Exports LW})_{t-1}$	**-0.014**	-0.001	-0.016	**0.004**	-0.017	-0.010	**0.016**	0.005	0.002
	(0.812)	(0.943)	(0.586)	**(0.895)**	(0.120)	(0.418)	**(0.607)**	(0.590)	(0.907)
$\ln(\text{Exports HW})_{t-1}$	**0.121**	0.003	-0.001	**0.168*** **	0.003	0.008*	**-0.208*** **	-0.003	-0.006
	(0.180)	(0.448)	(0.932)	**(0.005)**	(0.244)	(0.089)	**(0.005)**	(0.263)	(0.207)
$\Delta\ln(\text{union density})_t$	**-0.025**	0.092**	0.041	**-0.101*** **	-0.100*	-0.102***	**0.099** **	0.023	0.066
	(0.528)	(0.048)	(0.287)	**(0.008)**	(0.054)	(0.008)	**(0.028)**	(0.655)	(0.106)
$\Delta\ln(\text{XR})_t$	**-0.229** **	-0.144*	-0.070	**-0.110** **	-0.023	0.002	**0.171*** **	0.008	0.020
	(0.018)	(0.065)	(0.535)	**(0.028)**	(0.438)	(0.946)	**(0.004)**	(0.849)	(0.576)
$\ln(\text{Capital/ VA})_{t-1}$				**0.150**	-0.015	0.081	**-0.131**	0.047	-0.080
				(0.119)	(0.752)	(0.502)	**(0.167)**	(0.282)	(0.304)
$\ln(\text{Capital/ VA})_{t-1}$	**0.549*** **	0.737*	0.474*						
	(0.001)	(0.054)	(0.083)						
$\ln(\text{Capital/ VA})_{t-2}$	**-0.119*** **	-0.041	-0.028						
	(0.001)	(0.719)	(0.643)						
$\ln(\text{Capital/ VA})_{t-3}$	**-0.050**	0.046	0.022						
	(0.179)	(0.475)	(0.506)						
$\ln(\text{Productivity})_t$							**0.924*** **	1.032***	1.251***
							(0.000)	(0.000)	(0.000)
$\ln(\text{Productivity})_{t-1}$				**0.909*** **	0.573***	0.765***	**-0.733** **	-0.769***	-0.859***
				(0.000)	(0.000)	(0.000)	**(0.014)**	(0.000)	(0.000)
$\ln(\text{Productivity})_{t-2}$				**-0.026**	0.025	-0.002			
				(0.544)	(0.534)	(0.923)			
$\ln(\text{Productivity})_{t-3}$				**-0.001**	0.053	0.030			
				(0.985)	(0.136)	(0.334)			
$\ln(\text{Real Wage})_t$	**0.384** **	0.015	-0.007	**0.816*** **	0.601***	0.466**			
	(0.046)	(0.948)	(0.974)	**(0.000)**	(0.001)	(0.012)			
$\ln(\text{Real Wage})_{t-1}$	**0.170**	0.012	0.426	**-0.664*** **	-0.409**	-0.378***	**0.784*** **	0.811***	0.763***
	(0.316)	(0.961)	(0.118)	**(0.000)**	(0.027)	(0.007)	**(0.000)**	(0.000)	(0.000)
$\ln(\text{Real Wage})_{t-2}$							**0.045**	-0.000	0.010
							(0.152)	(0.990)	(0.590)

ln(Real Wage)$_{t-3}$							**-0.056***	-0.027	-0.050**
							(0.091)	(0.314)	(0.029)
Year fixed effects	**Yes**	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hansen	**0.446**	0.056	0.023	**0.078**	0.059	0.029	**0.217**	0.083	0.016
AR1	**0.080**	0.197	0.156	**0.000**	0.012	0.011	**0.001**	0.000	0.000
AR2	**0.301**	0.405	0.456	**0.026**	0.393	0.110	**0.174**	0.247	0.053
Instruments	**34**	34	34	**38**	38	38	**38**	38	38
Industries	**70**	73	143	**70**	73	143	**70**	73	143
F-test	**10.761**	15.791	13.175	**65.651**	74.012	104.261	**48.040**	350.407	145.842
Observations	**1109**	1098	2207	**1109**	1098	2207	**1109**	1098	2207
Period	**95-14**	95-14	95-14	**95-14**	95-14	95-14	**95-14**	95-14	95-14

Notes: Estimation method is 'difference GMM' with one instrument column per variable. P-values below the estimation coefficients in parenthesis. ***, **, * denote statistical significance at the 1%, 5% and 10% level. Hansen is the p-value of the Hansen test of overidentifying restrictions for all instruments. AR1 and AR2 is the p-value of the Arellano-Bond test for autocorrelation of first and second order in the residuals. Instruments denote the number of instruments used. Instruments, Industries, and F-test, are the number of instruments used, number of cross-sections, and the F-test statistic.

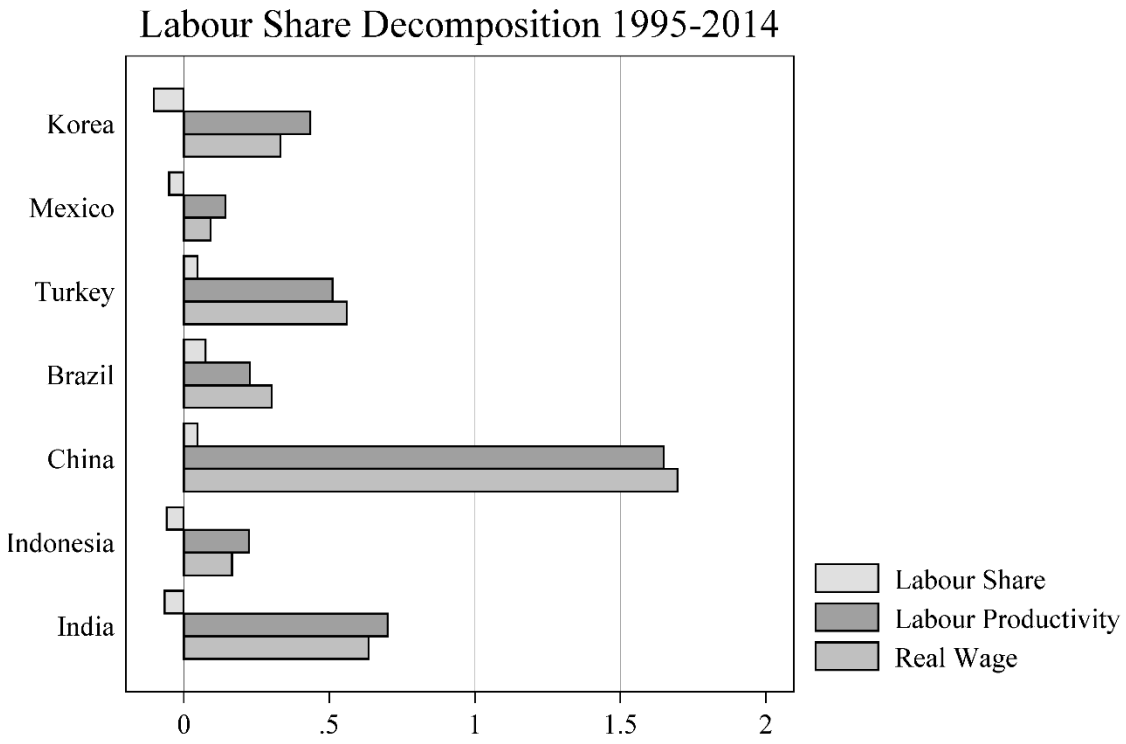
Sources: Own calculations. Data sources are listed in appendix A4.

APPENDIX

A1: Industrial and social upgrading – a mapping of industries

In this section, we map the industries in our sample along a matrix that describes changes in the labour share, labour productivity, and the real wage. The labour share is measured as labour compensation as a ratio to value added, labour productivity is measured as the ratio of real value added to people engaged, and the real wage as real labour compensation per person engaged.[19] Figure A1.1 reports the growth rates of the three variables at the country level.

Figure A1.1. Growth rates of the labour share, labour productivity and real wages



Source: Own calculations based on WIOD.

When measured at the country level, labour productivity and real wages increased in all countries during the 1995-2014 period. This is consistent with a case of simultaneous industrial and social upgrading.

[19] We use persons engaged rather than hours worked in the denominator, as data for hours worked is not available for China.

Next, we examine the evolution of these variables at the industry level. To allow a more detailed analysis we discern from equation (2) six different cases that illustrate the relationship between changes in labour productivity, real wages, the labour share, and industrial and social upgrading. Cases I-III imply an increase in the labour share, whereas cases IV-VI imply a decline. Cases I, IV and V are consistent with industrial upgrading, as labour productivity increases (Δy>0). Cases I, II and IV are associated with social upgrading, narrowly defined by increasing real wages (Δw_r>0). However, only cases I and IV are consistent with both social and industrial upgrading. Case I implies that labour has benefitted more than capital from GVC participation, whereas case IV implies the opposite. This is summarised in Table A1.2.

Table A1.2. Different cases of industrial and social upgrading

Cases	ΔS	Conditions	Industrial Upgrading	Social Upgrading
I	ΔS>0	Δy >0 & Δw_r>0 & $\Delta y < \Delta w_r$	✓	✓
II	ΔS>0	Δy <0 & Δw_r>0		✓
III	ΔS>0	Δy <0 & Δw_r<0 & $\Delta y < \Delta w_r$		
IV	ΔS<0	Δy >0 & Δw_r>0 & $\Delta y > \Delta w_r$	✓	✓
V	ΔS<0	Δy >0 & Δw_r<0	✓	
VI	ΔS<0	Δy <0 & Δw_r<0 & $\Delta y > \Delta w_r$		

Notes: S = labour share; y = labour productivity; w_r= real wage

Table A1.3 maps our data to the different cases for each country. The second column lists the total number of industries for which reliable data is available[20], the third column lists the number of industries where the labour share declined, and the remaining columns the number of industries that correspond to the six cases in Table A1.2.

[20] After adjustment as described in Section 4.

Table A1.3. Industry mapping

Labour Share			ΔS>0			ΔS<0		
Labour Productivity			Δy >0	Δy <0		Δy >0		Δy <0
Real Wage			Δw_r>0		Δw_r<0	Δw_r>0	Δw_r<0	
	Industries	ΔS<0	**I**	**II**	**III**	**IV**	**V**	**VI**
Korea	25	13	10	1	1	10	1	2
Mexico	24	21	3	0	0	10	10	1
Turkey	22	6	13	3	0	2	2	2
Brazil	25	9	10	4	2	4	2	3
China	23	5	18	0	0	5	0	0
Indonesia	24	12	7	2	3	5	1	6
India	23	13	9	1	0	11	1	1
Σ	166	79	70	11	6	47	17	15
%-share	100%	48%	42%	7%	4%	28%	10%	9%

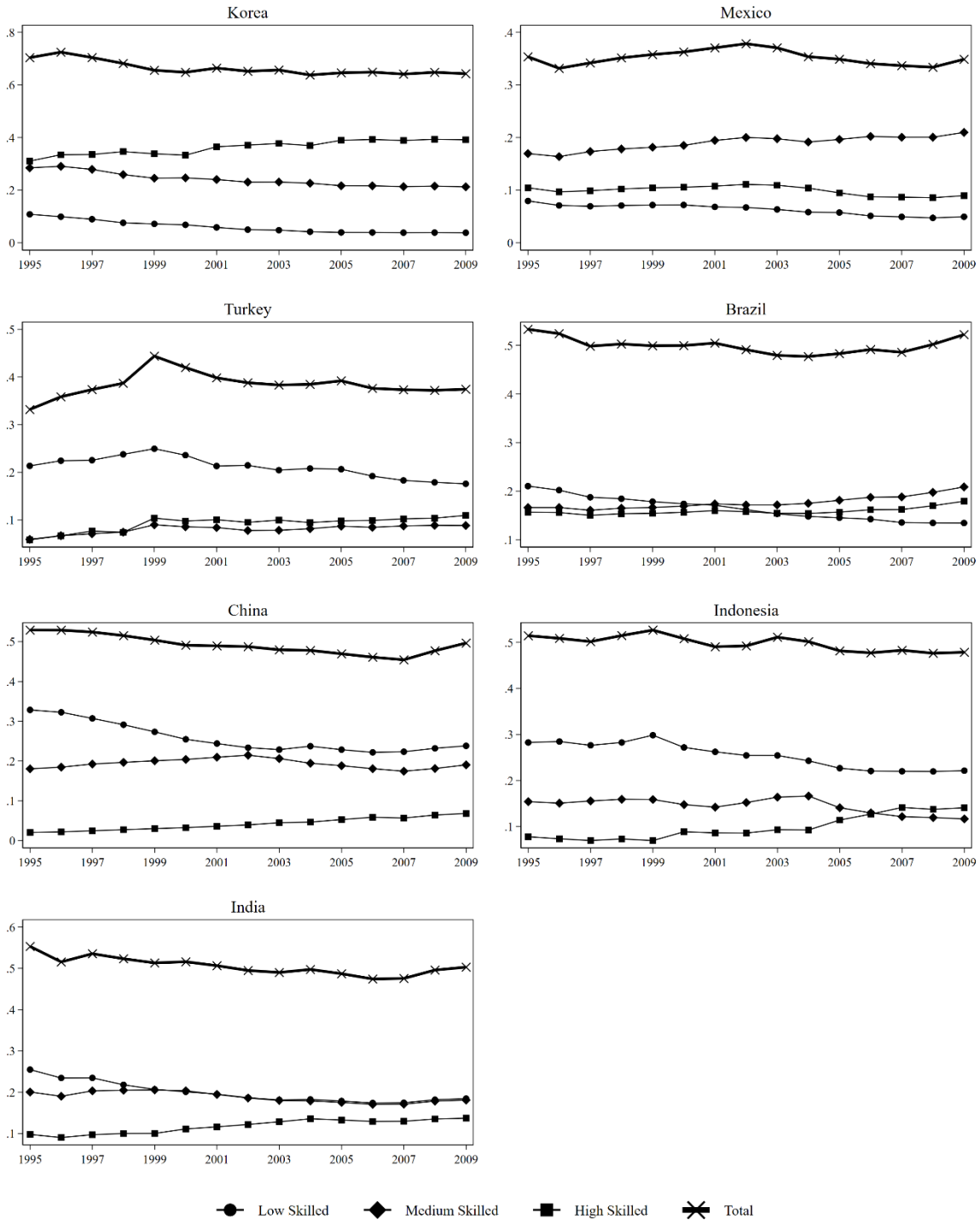
Notes: S = labour share; y = labour productivity; w_r= real wage

Source: Own calculations based on WIOD.

Overall, moving from the country to the industry level gives a more nuanced picture. We find evidence that is consistent with different combinations of industrial and social upgrading. 135 industries (81%) experienced increases in labour productivity, consistent with industrial upgrading. Labour benefitted more than capital from the increased productivity in roughly half of those cases, as evidence by an increasing labour share (70 industries). Strikingly, in 17 industries that experienced increasing labour productivity, the real wage declined, indicating that labour lost out not only in relative but also in absolute terms.[21] The majority of these industries (10) are situated in Mexico, equally split between manufacturing and service sectors. Of these, the largest decline in real wages happened in manufacturing industries such as 'Basic and Fabricated Metal', 'Food, Beverages and Tobacco' and 'Other Non-Metallic Minerals'. These industries also experienced a large increase in GVC participation (intermediate intra-industry exports to advanced economies increased by 51%, 46% and 7% respectively). 32 industries or 19% of all industries (concentrated in Brazil, 9 industries, and Indonesia, 11 industries) experienced a decline in labour productivity, consistent with industrial downgrading. Most of these industries (21) also experienced declining real wages, consistent with a low-road strategy where competitiveness is maintained through wage suppression.

[21] FOXCONN can be seen as an example of a firm that has achieved industrial upgrading as evidenced by their internationalisation and expansion into higher value added products, while maintaining a culture of forced and unpaid overtime work, and military-style management practices (Barrientos et al., 2011).

Figure A2. Labour share by skill group



Notes: Labour compensation of high-, medium- and low-skilled workers (as defined by their level of education) as a ratio to total value added. 'Total' reports aggregate labour compensation as a ratio to value added.

Source: Own calculations based on WIOD.

Table A3. Industry classification

ISIC4 code	Description
A	Agriculture, Hunting, Forestry and Fishing
B	Mining and quarrying
C10-C12	Manufacture of food products, beverages and tobacco products
C13-C15	Manufacture of textiles, wearing apparel and leather products
C16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
C17-18; J58-60	Manufacture of paper and paper products; Printing and reproduction of recorded media; Motion picture, video and television programme production, sound recording and music publishing activities; programming and broadcasting activities
C19	Manufacture of coke and refined petroleum products
C20-21	Manufacture of chemicals and chemical products; Manufacture of basic pharmaceutical products and pharmaceutical preparations
C22	Manufacture of rubber and plastic products
C23	Manufacture of other non-metallic mineral products
C24-25	Basic Metals and Fabricated Metal
C26-27	Manufacture of computer, electronic and optical products; Manufacture of electrical equipment
C28	Manufacture of machinery and equipment n.e.c.
C29-30	Manufacture of motor vehicles, trailers and semi-trailers and other transport equipment
C31-33, E37-39	Manufacture of furniture; other manufacturing; Repair and installation of machinery and equipment; Sewerage; waste collection, treatment and disposal activities; materials recovery; remediation activities and other waste management services
D35-36	Electricity, gas, steam and air conditioning supply; Water collection, treatment and supply
F	Construction
G45	Wholesale and retail trade and repair of motor vehicles and motorcycles
G46	Wholesale trade, except of motor vehicles and motorcycles
G47	Retail trade, except of motor vehicles and motorcycles
H49	Land transport and transport via pipelines
H50	Water transport
H51	Air transport
H52	Warehousing and support activities for transportation
H53; J61	Postal and courier activities; Telecommunications;
I	Accommodation and food service activities
K64-66	Financial Intermediation
L68	Real estate activities
J62-J63; M69-75; N	Computer programming, consultancy and related activities; information service activities

Table A4. Variable definitions, sources, and descriptive statistics

Variable definition	Observations	Mean	Standard Deviation	Source
$\text{labour share} = S_{i,j} = \frac{\text{labour compensation}_{i,j}}{\text{value added}_{i,j}}$	2,542	0.450	0.191	WIOD
$\text{labour share}(\text{high} - \text{skilled})_{i,j} = \frac{\text{labour compensation}(\text{high}-\text{skilled})_{i,j}}{\text{value added}_{i,j}}$	738	0.092	0.075	WIOD
$\text{labour share}(\text{medium} - \text{skilled})_{i,j} = \frac{\text{labour compensation}(\text{medium} - \text{skilled})_{i,j}}{\text{value added}_{i,j}}$	738	0.183	0.075	WIOD
$\text{labour share}(\text{low} - \text{skilled})_{i,j} = \frac{\text{labour compensation}(\text{low} - \text{skilled})_{i,j}}{\text{value added}_{i,j}}$	738	0.161	0.087	WIOD
$\text{Capital/ VA} = k_{i,j} = \frac{\text{capital stock}_{i,j}}{\text{value added}_{i,j}}$	2,542	3.080	3.377	WIOD
$\text{Exports LW}_{i,j} = \frac{(\text{intra} - \text{industry intermediate exports from the rest of the world})_{i,j}}{\text{gross output}_{i,j}}$	2,542	0.012	0.027	WIOD
$\text{Exports HW}_{i,j} = \frac{(\text{intra} - \text{industry intermediate exports from high wage countries})_{i,j}}{\text{gross output}_{i,j}}$	2,542	0.011	0.019	WIOD
$\text{union density}_j = \frac{\text{union members}_j}{\text{total employees}_j}$	2,542	0.176	0.107	ICTWSS 5.1
$XR_j = \text{nominal USD exchange rate}$	2,542	0.226	0.352	WIOD
$\text{labour productivity}_{i,j} = \frac{\text{real value added}_{i,j}}{\text{hours worked}_{i,j}}$	2,207	6.555	3.375	WIOD
$\text{real wage}_{i,j} = \frac{\text{real average labour compensation}_{i,j}}{\text{hours worked}_{i,j}}$	2,207	5.677	3.460	WIOD
$\text{offshoring LW}_{i,j} = \frac{(\text{intra} - \text{industry intermediate imports from the rest of the world})_{i,j}}{\text{gross output}_{i,j}}$	1,289	0.022	0.030	WIOD
$\text{offshoring HW}_{i,j} = \frac{(\text{intra} - \text{industry intermediate imports from high wage countries})_{i,j}}{\text{gross output}_{i,j}}$	1,289	0.027	0.035	WIOD
$\text{Final imports} = \frac{(\text{final imports of consumption and capital goods})_{i,j}}{\text{gross output}_{i,j}}$	1,289	0.088	0.153	WIOD
$\text{Govt}_i = \frac{\text{government consumption}_j}{\text{gross domestic product}_j}$	1,064	0.252	0.154	World Bank
$\text{minimum wage}_{i,j} = \frac{\text{national minimum wages}_j}{\text{average labour compensation per hours worked}_{i,j}}$	1,289	13.035	3.410	OECD, ILO & WIOD

Note: *i* stands for industry and *j* stands for country

Table A5. Alternative estimation methods

Estimation Method	External instruments		System-GMM		Mean-Group		Weighted Diff-GMM	
Specification	1	2	3	4	5	6	7	8
Sector group	Manufac.	Manufac.	Manufac.	Services	Manufac.	Services	Manufac.	Services
$\ln(\text{Capital/ VA})_t$	-0.104		0.022	-0.018	0.166**	0.239	-0.047	0.025
	(0.146)		(0.674)	(0.264)	(0.017)	(0.121)	(0.686)	(0.692)
$\ln(\text{Exports LW})_{t-1}$	-0.006	-0.063*	-0.031	0.006	0.130**	0.021	-0.040*	-0.001
	(0.797)	(0.070)	(0.176)	(0.188)	(0.046)	(0.659)	(0.073)	(0.929)
$\ln(\text{Exports HW})_{t-1}$	-0.111**	-0.149**	-0.066**	-0.000	-0.115**	-0.032	-0.108**	-0.003*
	(0.021)	(0.021)	(0.031)	(0.947)	(0.028)	(0.642)	(0.012)	(0.087)
$\Delta\ln(\text{Union Density})_t$	0.081***	0.104***	0.065***	0.034	0.087	0.054	0.061**	0.032
	(0.003)	(0.008)	(0.005)	(0.366)	(0.758)	(0.801)	(0.037)	(0.482)
$\Delta\ln(\text{XR})_t$	0.103**	0.156***	0.098***	0.018	0.164	0.046	0.111**	-0.009
	(0.011)	(0.005)	(0.004)	(0.585)	(0.256)	(0.748)	(0.011)	(0.764)
$\ln(\text{S})_{t-1}$	0.776***	0.692***	0.831***	0.956***	0.404**	0.357*	0.676***	0.726***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.041)	(0.084)	(0.000)	(0.000)
$\ln(\text{S})_{t-2}$	0.079*		0.067**	0.138**	-0.104	-0.315**	0.069	0.092
	(0.061)		(0.043)	(0.026)	(0.414)	(0.030)	(0.128)	(0.112)
$\ln(\text{S})_{t-3}$	-0.165***		-0.196***	-0.145**	-0.102	-0.121	-0.156***	-0.080
	(0.000)		(0.000)	(0.027)	(0.383)	(0.272)	(0.000)	(0.147)
Constant			-0.888***	-0.036	-1.222	-0.187		
			(0.001)	(0.630)	(0.126)	(0.868)		
Year fixed effects	Yes	No	Yes	Yes			Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes			Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hansen	0.166		0.075	0.162			0.157	0.205
AR1	0.000		0.000	0.000			0.003	0.004
AR2	0.973		0.634	0.088			0.523	0.268
Instruments	36	10.518	56	57			34	34
Industries	82	82	82	84	82	80	82	84
F-test	10.256	87.755	71.233	478.155			11.829	36.829
Observations	1289	1371	1371	1341	1371	1313	1289	1253
Period	95-14	95-14	95-14	95-14	95-14	95-14	95-14	95-14

Notes: The dependent variable (*S*) is the sectoral adjusted labour share. Estimation method indicated in row 1. P-values below the estimation coefficients in parenthesis. ***, **, * denote statistical significance at the 1%, 5% and 10% level. Hansen is the p-value of the Hansen test of overidentifying restrictions for all instruments. AR1 and AR2 is the p-value of the Arellano-Bond test for autocorrelation of first and second order in the residuals. Instruments denote the number of instruments used. Instruments, Industries, and F-test, are the number of instruments used, number of cross-sections, and the F-test statistic.

Sources: Own calculations. Data sources are listed in appendix A4.

Table A6. Alternative measures of GVC participation and other determinants of the labour share

Sector group	1 Manufac.	2 Manufac.	3 Manufac.	4 Manufac.	5 Manufac.	6 Manufac.	7 Manufac.	8 Manufac.	9 Manufac.	10 Manufac.
$\ln(\text{Capital/ VA})_t$	-0.106	-0.040	-0.028	0.150*	-0.046	-0.134*	-0.162**	-0.144*	-0.050	-0.098
	(0.309)	(0.677)	(0.774)	(0.057)	(0.609)	(0.079)	(0.044)	(0.072)	(0.549)	(0.246)
$\ln(\text{Exports LW})_{t-1}$		-0.021	-0.008			-0.004	0.002	0.003	-0.015	-0.016
		(0.372)	(0.763)			(0.866)	(0.949)	(0.917)	(0.509)	(0.479)
$\ln(\text{Exports HW})_{t-1}$		-0.102**	-0.111**			-0.202***	-0.195**	-0.161**	-0.150***	-0.099**
		(0.018)	(0.026)			(0.006)	(0.017)	(0.019)	(0.001)	(0.027)
$\ln(\text{Broad Exports LW})_{t-1}$	0.001									
	(0.989)									
$\ln(\text{Broad Exports HW})_{t-1}$	-0.132*									
	(0.065)									
$\ln(\text{Offshoring LW})_{t-1}$		-0.021	-0.020							
		(0.460)	(0.456)							
$\ln(\text{Offshoring HW})_{t-1}$		0.040	0.046							
		(0.455)	(0.378)							
$\Delta\ln(\text{union density})_t$	0.079***	0.072**	0.070**	-0.015	0.023	0.116***	0.114***	0.092***	0.071**	0.089***
	(0.010)	(0.011)	(0.021)	(0.733)	(0.650)	(0.001)	(0.001)	(0.003)	(0.015)	(0.004)
$\Delta\ln(\text{XR})_t$	0.114**	0.095**	0.096**	0.116***	0.019	0.195***	0.192***	0.139***	0.117**	0.076*
	(0.012)	(0.015)	(0.018)	(0.003)	(0.713)	(0.001)	(0.000)	(0.009)	(0.012)	(0.095)
$\ln(\text{Final Imports})_{t-1}$			-0.031							
			(0.464)							
Inward FDI_{t-1}				-0.143*						
				(0.086)						
Outward FDI_{t-1}					-0.603*					
					(0.090)					
$\ln(\text{non-FDI flows})_{t-1}$						-0.040				
						(0.140)				
$\ln(\text{Finglob})_{t-1}$							-0.052			
							(0.318)			
$\ln(\text{Labour Laws})_{t-1}$								0.034		
								(0.624)		

Δln(Minimum Wage)$_t$									0.135	
									(0.168)	
Δln(Gov-Cons)$_t$										0.252**
										(0.030)
ln(Labour share)$_{t-1}$	0.826***	0.734***	0.776***	0.610***	0.586***	0.945***	0.918***	0.894***	0.669***	0.678***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.009)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ln(Labour Share)$_{t-2}$	0.082**	0.092**	0.084**	-0.101	-0.218*	0.089**	0.094**	0.093**	0.106***	0.044
	(0.044)	(0.019)	(0.027)	(0.452)	(0.088)	(0.029)	(0.025)	(0.022)	(0.004)	(0.297)
ln(Labour Share)$_{t-3}$	-0.187***	-0.188***	-0.188***	-0.158*	-0.092	-0.184***	-0.164***	-0.183***	-0.180***	-0.107**
	(0.000)	(0.000)	(0.000)	(0.082)	(0.286)	(0.000)	(0.002)	(0.000)	(0.000)	(0.023)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hansen	0.473	0.227	0.400	0.067	0.539	0.745	0.830	0.456	0.867	0.039
AR1	0.000	0.000	0.000	0.017	0.052	0.000	0.000	0.000	0.000	0.001
AR2	0.806	0.519	0.495	0.998	0.343	0.763	0.937	0.835	0.722	0.311
Instruments	34	42	46	14	14	35	35	35	38	38
Industries	82	82	82	22	22	70	70	82	70	82
F-test	9.314	8.347	13.571	16.807	7.907	5.191	4.862	6.514	5.577	7.442
Observations	1289	1289	1289	297	132	1109	1109	1289	1064	1289
Period	95-14	95-14	95-14	95-14	95-14	95-14	95-14	95-14	95-14	95-14

Notes: The dependent variable is the sectoral adjusted labour share. Estimation method is 'difference GMM' with one instrument column per variable. P-values below the estimation coefficients in parenthesis. ***, **, * denote statistical significance at the 1%, 5% and 10% level. Hansen is the p-value of the Hansen test of overidentifying restrictions for all instruments. AR1 and AR2 is the p-value of the Arellano-Bond test for autocorrelation of first and second order in the residuals. Instruments, Industries, and F-test, are the number of instruments used, number of cross-sections, and the F-test statistic.

Sources: Own calculations. Data sources are listed in appendix A4.