ERF Working Papers Series

The Missing Link: When GVC Does Not Matter for Structural Change

Mazen Fathy and Chahir Zaki

ECONOMIC RESEARCH FORUM
منتدى البحوث الاقتصادية

Working Paper No. 1778
June 2025

THE MISSING LINK: WHEN GVC DOES NOT MATTER FOR STRUCTURAL CHANGE

Mazen Fathy[1] and Chahir Zaki[2]

Working Paper No. 1778

June 2025

Send correspondence to:
Chahir Zaki
Laboratoire d'Economie d'Orleans
chahir.zaki@feps.edu.eg

[1] Research Associate at Egypt Impact Lab, Abdul Latif Jameel Poverty Action Lab (J-PAL MENA). Email: mazen.mohamed25@hotmail.com; mmohamed@povertyactionlab.org

[2] Chaired Professor of Economics, Laboratoire d'Economie d'Orleans and Economic Research Forum. Email: chahir.zaki@feps.edu.eg; chahir.zaki@univ-orleans.fr

First published in 2025 by
The Economic Research Forum (ERF)
21 Al-Sad Al-Aaly Street
Dokki, Giza
Egypt
www.erf.org.eg

Abstract

Despite rising levels of Global Value Chains (GVC) integration in several emerging and developing economies, the latter failed to experience a significant structural change. Thus, this paper examines how participating in global supply chains can have implications on labor reallocation in the economy, and to what extent technological advances can alter this effect. To do that, we use the EORA database and calculate structural change variables. Moreover, we control for the endogeneity between these two variables. Our main findings show that overall, global value chains participation has an insignificant effect on structural change. This result holds for different measures of GVC (backward and forward) and of structural change (static and dynamic). Several mechanisms explain the missing link between GVC and structural change, namely their inability to create enough jobs, the increase in capital intensive industries, the dominance of natural resources and the skill bias technological change.

Keywords: Structural Change, GVC, Development
JEL Classifications: F14, L16, O00.

ملخص

على الرغم من ارتفاع مستويات تكامل سلاسل القيمة العالمية (GVC) في العديد من الاقتصادات الناشئة والنامية، إلا أن الأخيرة فشلت في تجربة تغيير هيكلي كبير. وبالتالي، تبحث هذه الورقة في كيفية تأثير المشاركة في سلاسل التوريد العالمية على إعادة توزيع العمالة في الاقتصاد، وإلى أي مدى يمكن للتقدم التكنولوجي تغيير هذا التأثير. للقيام بذلك، نستخدم قاعدة بيانات EORA ونحسب متغيرات التغيير الهيكلي. علاوة على ذلك، نتحكم في الترابط الداخلي بين هذين المتغيرين. تُظهر نتائجنا الرئيسية أن مشاركة سلاسل القيمة العالمية بشكل عام لها تأثير ضئيل على التغيير الهيكلي. تنطبق هذه النتيجة على مقاييس مختلفة لسلسلة القيمة العالمية (الخلفية والأمامية) والتغيير الهيكلي (الثابت والديناميكي). تفسر العديد من الآليات الحلقة المفقودة بين سلاسل القيمة العالمية والتغيير الهيكلي، وهي عدم قدرتها على خلق فرص عمل كافية، وزيادة الصناعات كثيفة رأس المال، وهيمنة الموارد الطبيعية، والتغيير التكنولوجي المتحيز للمهارات.

1. Introduction

One of the main aspects of economic development is the economy-wide productivity growth driven by the reallocation of labor from low productive sectors (ex: agriculture and fishing), to high productive sectors, such as manufacturing and services (Kuznets, 1971). A key role is attributed particularly to manufacturing, as it is argued to provide the relevant opportunity to absorb the developing economies' abundant labor force. Many studies have reported that poor countries that caught up have started a long process of industrialization. Conversely, countries lagging in manufacturing growth or even leapfrogging to services without building strong industrial capacities have not been able to increase incomes over a sustained period (McMillan et al., 2014; de Vries et al., 2015; Haraguchi et al., 2017). Moreover, in a globalized world, where trade plays a significant role on the economic, political, and social levels, trading in intermediates started to shine as a potential solution for weakly industrialized economies (Pahl & Timmer, 2020) as the latter can access global markets by only focusing on certain stages in the production chain (Baldwin, 2016). The potential economies of scale generate by global value chains (GVC) can help these countries witness a quicker structural change. Hence, this paper tries to examine why, despite an increasing insertion in GVC, developing countries did not experience a noticeable structural change.

Empirical studies addressing the impact of GVC participation on structural change are scarce. However, it can be concluded from the literature that there are two opposite forces in this relationship. A positive scale effect, where firms tend to demand more labor to meet global demand (Hollweg, 2019), and a negative effect, where more technological advances increase labor productivity, making firms more capital-intensive (Rodrik, 2018). The dominant effect will be the one to determine the net effect of GVCs on structural transformation.

Two contrasting theoretical frameworks have been advanced to explain how participation in global value chains (GVCs) affects structural transformation in developing economies. The first-often termed the "mixed blessing" hypothesis-posits that deep GVC integration induces skill-biased technological change, as firms adopt automation and advanced quality-control systems to meet stringent international standards and relocate low-tech activities offshore (Rodrik 2018). Although such shifts yield significant productivity gains in a limited set of highly capable firms, they also raise the relative demand for skilled labor, erode comparative advantage in labor-intensive production, and cap broader employment expansion in manufacturing (Pahl & Timmer 2020).

A second body of research, however, underscores the heterogeneity of GVC impacts across technologies, sectors, product lines, and firms' value-chain positions, arguing that under certain conditions GVCs can foster broad-based job creation and industrial upgrading (Hollweg 2019). Key moderating factors include the capital–labor intensity mix of specific tasks, the share of global end-market demand for exported goods, and shifts in national GVC value-added shares that stimulate domestic production of previously imported intermediates (Pahl et al. 2022; Hollweg 2019). Moreover, forward-linkage dynamics give rise to a "preparation to export"

effect-firms enhance processes and workforce skills in anticipation of market entry (Iacovone & Javorcik 2012; Molina & Muendler 2013)-while backward and horizontal linkages amplify employment gains through the integration of domestic suppliers. Together, these mechanisms suggest that the net effect of GVC participation on structural change is neither uniformly positive nor negative but contingent on a constellation of industry, firm-level, and macroeconomic conditions.

Against this background, the contribution of this paper is to address in depth how participating in global supply chains – both through backward and forward linkages – can have implications on labor reallocation in the economy, and to what extent technological advances can alter this effect. To test this relationship, we use the EORA database and a two-stage least square to take into consideration potential reverse causality between GVC and structural change. Our main findings show that overall, global value chains participation has an insignificant effect on structural change. This result holds for different measures of GVC (backward and forward) and of structural change (static and dynamic). Several main mechanisms explain the missing link between GVC and structural change, namely their inability to create enough jobs, the increase in capital intensive industries, the dominance of natural resources and the skill bias technological change. Indeed, GVC integration often leads to productivity gains rather than widespread employment expansion, as firms adopt more efficient production processes that might be capital intensive, especially in natural resources. Moreover, the skill bias technological change driven by GVC integration disproportionately benefits skilled labor while marginalizing unskilled labor—a phenomenon that could limit structural transformation.

The remainder of the paper is structured as follows. Section 2 reviews the literature. Section 3 presents the data and some stylized facts to understand their trends of both GVC and structural change. Section 4 is devoted to the empirical strategy. Section 5 analyzes the results and section 6 concludes and provides some policy implications.

2. Literature review

In their seminal work, Kuznets (1961, 1971) and Chenery (1960) show that most developed economies experienced a similar pattern of structural transformation. They argue that economic resources were concentrated in the agricultural sector in the early stages of development and started to shift into the industrial sector and then to the service sector in the later stages. More recently, literature tried to investigate the country's characteristics that can help enhance or impede structural change.

The first channel that can explain why structural change did not take place in developing countries is the presence of significant productivity gaps between sectors (Gollin et al., 2014). The larger this gap is, the more allocative inefficiencies might exist in the economy, reducing overall labor productivity.

Second, trade has been addressed theoretically on many occasions as an important contributor to structural change (Matsuyama, 2009; Uy et al., 2013; Comunale & Felice, 2022; Alessandria et al., 2023). However, trade openness for Sub-Saharan Africa had a growth-reducing effect on structural change, caused by the focus of African countries on raw materials exports, and their failure to invest the revenues from these exports to improve their manufacturing sector (Kaba et al., 2022). In other cases, following trade liberalization and intensive import competition, the least productive firms in Latin America have left the market, while remaining firms have dismissed the excess of labor, making workers end up in lower-productivity activities or even unemployed (McMillan et al.,2014; Menezes-Filho & Muendler, 2011). Nevertheless, many countries, for instance in eastern Asia, still managed to benefit significantly from trade integration in their structural transformation process (Erten & Leight, 2019; McCaig and Pavcnik, 2018). Several papers (Sen 2017; Alessandria et al., 2023) attempt to explain the reasons behind these contradictory effects, emphasizing that participation in world trade has both a positive and a negative effect on structural change. Positive effects take place through the expansion of the scale of production, as more labor will be needed to meet the accelerated global demand. Moreover, positive composition effects appear once domestic wages for unskilled workers start to rise, as predicted by the surplus labor models such as in Lewis (1954). However, a negative impact arises through the increase of labor productivity as less labor is needed in the production process with the inclusion of advanced technologies. Therefore, it can be concluded that the impact will depend on how each country integrates into the global economy (Rodrik & McMillan, 2011; Szymczak, 2024).

On a different, yet related, note, GVCs have transformed the pattern of international trade (Wang et al., 2016). Many goods and services are no longer totally produced in a single country. Instead, multiple producers located in different countries are specializing in sequential stages of the whole global production, making intermediates inputs increasingly crossing national borders multiple times (Ma et al., 2019). Participating in GVCs has recently been highlighted as a possible catalyst for weakly industrialized economies to upgrade their industrial capacities (Taglioni & Winkler, 2016; World Bank, 2017), as they can nowadays enter global markets by carrying out a particular stage in the production process. However, empirical studies explaining whether global value chains can stimulate structural transformation are scarce, marking a major gap in literature.

From a theoretical lens, two opposite perspectives emerge from the relationship between GVC and structural change (Szymczak, 2024; Carneiro et al., 2024). The first argument states that participation in the world supply chain harms structural change. This is due to the fact that there is a skill-biased technological change in GVC production. Rodrik (2018) explains that as global markets demand increased the required level of precision and adherence to quality standards, firms start going for more automation and robotization instead of manual work. Additionally, due to these continuous technological advances, many developed economies tend to transfer relatively low-tech stages of production to the developing countries given their low factor costs. However, because of technical differences between developed and developing countries, production stages outsourced that are not skill intensive in developed economies still require

skilled labor in developing ones. Therefore, the demand for skilled labor in developing countries will increase, leading to a reduction in the developing countries' comparative advantage in labor-intensive activities and consequently their gains from trade (Ma et al.; 2019). In other words, for developing countries, participating in global value chains might benefit a small group of highly productive firms, but provide limited chances for overall employment growth in the productive sector for the economy. This situation is what Pahl & Timmer (2020) call "the mixed blessing hypothesis".

At the empirical level, a group of papers tried to empirically address the effect of GVC participation on skill bias and labor reallocation, and they all managed to strengthen this hypothesis (Reijnders et al.,2019; Ma et al., 2019; Foster-McGregor et al., 2016; Portella-Carbó, 2016, Ehab and Zaki, 2021). Pahl & Timmer (2020) find that GVC participation is significantly associated with overall labor productivity growth. However, no association is witnessed with manufacturing employment growth. Yet, the analysis is done only for backward links, ignoring the exports of intermediates. In addition, Owusu (2024) finds no effect of GVC participation on structural change for a sample of developing economies, after addressing endogeneity.

These arguments, however, have been contested through a group of studies explaining that the effect of participation in GVC on labor reallocation is highly heterogeneous and cannot be reduced into this negative effect only for several reasons. First, capital intensive technologies can still have labor-intensive parts of their production process, such as ICT goods. Second, some industries are more labor-intensive than others. For instance, the exports of garments or agricultural products are more labor-intensive than the exports of automobiles. Third, even within the same industries, some product lines are more labor-intensive than others. For example, cultivation of fruit and vegetables is more labor-intensive than growing cereal crops. Fourth, the size and composition of the labor force involved in generating exports is highly dependent on the position of countries within the world supply chain (Ma et al., 2019; UNIDO, 2017; Hollweg, 2019). Fifth, how GVC participation depends on the task type and the country's position within the value chain. This means that countries in upstream parts of the value chains or assigned to tasks whose routinization possibility is not high can benefit from participation in GVC. Finally, countries may also benefit from participating in backward linkages if they complement national industries, which helps explain the complementarity effect (Szymczak, 2024; Carneiro et al., 2024).

However, the impact of GVC on job growth is contingent on two more variables in addition to technical changes, namely demand growth and changes in GVC shares (Pahl et al., 2022). First, growth in global end markets demand is a key determinant. In fact, the growth of GVC jobs will be faster in a country that has a larger share of its jobs in the supply chain of products having a growing demand (Hollweg, 2019). Thanks to the latter, firms start to increase their scale and consequently increase their employment levels, even though production is becoming more capital-intensive in some sectors. In other words, through firms' scale effects, higher productivity is acting in favor of aggregate output and GVC job growth (Shepherd, 2013; World

Bank, 2020; Alessandria et al. 2023). Second, changes in the country's shares in global GVC value added moderates the effect of GVC on job creation. Indeed, a country's share is growing when it starts to produce intermediates at home that used to be imported before (like in the East Asian economies). Such behavior will incentivize new firms to produce these intermediate goods and to demand workers, which will lead to a reallocation of labor towards these firms.

Besides scale effect, GVC participation can contribute to structural change even before the firms start to export. This mechanism is valid for the case of forward linkages only, where firms get ready to export by improving production processes and employing more experienced workers to be able to compete in the global market. This is what has been called the preparation to export effect (Iacovone & Javorcik, 2012; Molina & Muendler, 2013). Yet, considering the effect of GVC participation on structural change only through the reallocation of labor into GVC firms does not show the whole picture. Employment reallocation can happen both directly within exporting firms as well as indirectly through these firms' demand for goods and services from domestic input providers (domestic integration). The extent to which GVCs interact with domestic labor reallocation is thus dependent on the linkages between exporting firms and domestic suppliers (Hollweg, 2019).

Therefore, participating in GVCs can act in some cases as a catalyst for growth-enhancing structural change. However, it is highly dependent as said on how the country participates and its position in the value chain. In the last decades, a group of countries benefited from its participation in trade in intermediates in their path to development. For instance, Shingal (2015) summarizes case studies on Vietnamese and Bangladeshi garments, Vietnamese and South African textiles, and Kenyan and South African horticulture. Overall, these case studies show that GVC participation is improving welfare, in the sense that it provides opportunities for more productive jobs, mostly for people who were essentially working in agriculture or informal sector. Similar results were observed for multiple economies, such as South Asia in the apparel sector (Lopez-Acevedo and Robertson, 2016), Mexico and Ethiopia in their manufacturing sector, Lesotho in apparel sector which accounted for 10% of the country's workforce and half of manufacturing employment in 2009 (World Bank, 2020), as well as OCED and emerging economies like Brazil, India, Indonesia, China and South Africa (Shepherd and Stone, 2012). In addition, the latter also finds that GVC firms tend to have higher employment levels compared to domestic ones, and the positive effects of trade on labor demand are stronger for emerging markets than for OECD countries.

To sum up, there is no agreement on whether global value chains' participation can be clear determinant of a country's structural transformation process or not. Thus, this research's contribution is therefore to analyze to what extent participation in GVC promotes structural transformation. The analysis is done on both the backward and forward linkages and will integrate different mechanisms which help understand this relationship.

3. Data & stylized facts

For the dependent variable – structural change – the paper uses the definition represented by McMillan et al. (2014):

$$\frac{\Delta Y_t}{Y_{t-k}} = \frac{\sum_{i=1}^{n} \theta_{i,t-k}\, \Delta y_{i,t}}{Y_{t-k}} + \frac{\sum_{i=1}^{n} \Delta \theta_{i,t}\, y_{i,t}}{Y_{t-k}} \quad (1)$$

where: Y_t and $y_{i,t}$ are the economy-wide and sectoral labor productivity levels, respectively. θ_i denotes the employment share for each sector (i) in the economy. The Δ operator shows the variation in productivity or employment shares between (t – k) and (t). The term on the left-hand side represents the economy-wide labor productivity growth, and the first term on the right-hand side represents the within-sector component of productivity growth. It measures the weighted sum of productivity growth for each sector, where the weights are the employment share of each sector. The second term shows the structural change in the economy, as it captures how the reallocation of labor between sectors affects productivity and is measured by the product of the productivity level and the variation of employment shares across sectors.

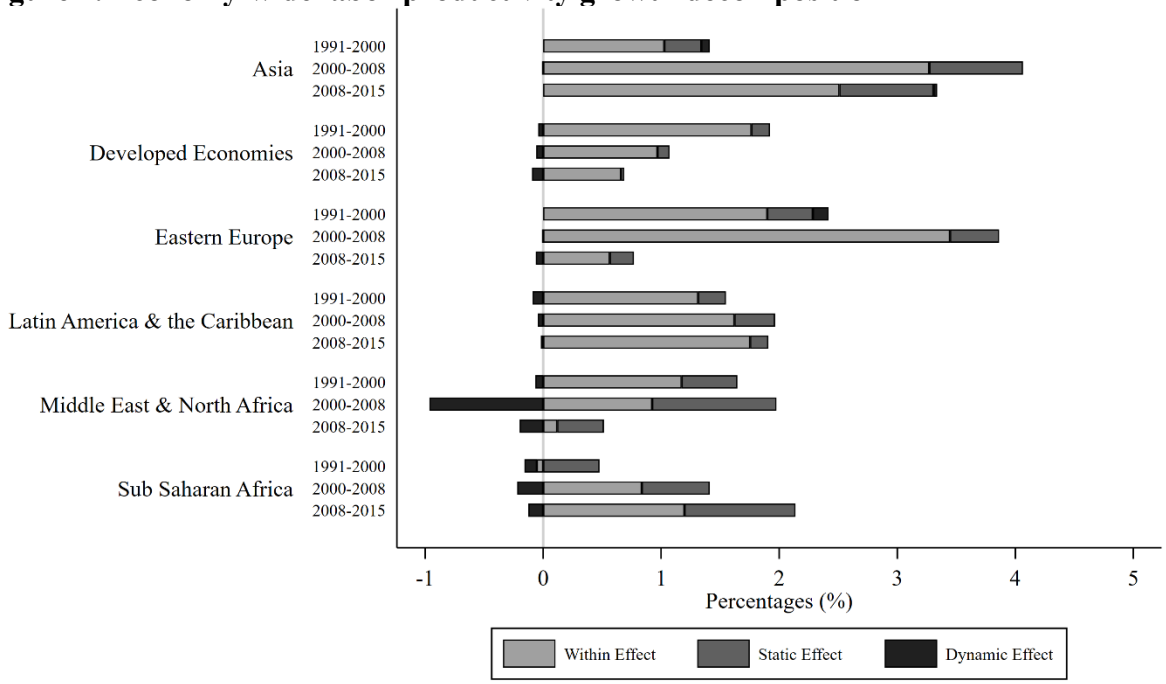
Moreover, the structural change effect can be divided into 2 additional components (de Vries et al., 2015): static and dynamic reallocation effects depending on the expansion of sectors. When the former is positive, in net terms, the economy is shifting labor into initially high labor productivity sectors. However, when the latter is positive, the economy, in net terms, is reallocating labor into sectors with growing labor productivity. It is important to note that sectoral productivity is computed by dividing each sector's value added by the corresponding level of sectoral employment. Both components are divided by the initial economy-wide labor productivity so that it yields a percentage change.

To calculate the structural change term, data of value added per economic activity is collected from the United Nations Statistics Department dataset (UNSD). The dataset contains value added for six sectors disaggregated according to the International Standard Industrial Classification (ISIC Rev.3), measured in 2015 constant USD. As for the employment data, sectoral employment shares were obtained from the World Development Indicators (WDI) based on the ILO modeled estimation for three aggregated sectors, which are: agriculture, industry and services. This paper uses the three-sector division of the economy as in the WDI. Therefore, the UNSD six sectors were grouped into three sectors as represented in Table 1.A. For the main explanatory variable, namely GVC, the data is collected from the EORA-MRIO dataset. The database is a set of input-output tables covering twenty-six sectors in 187 countries for the period 1990-2015 for both backward and forward linkages.

The decomposition of labor productivity growth into within-sector, static, and dynamic effects in Figure 1 reveals that the first is the main source of labor productivity growth for all regions. However, significant regional variations prevail regarding the impact of labor shifts on overall productivity growth. For instance, Asia experienced the highest labor productivity growth among all regions, driven predominantly by within-sector improvements across all sub-periods.

Also, structural change contributed significantly, with static effects playing a larger role than dynamic ones, indicating some efficiency in reallocating resources but limited reallocation to growing sectors. In a more disaggregated representation, this outstanding performance witnessed in Asia in terms of structural change, is mainly driven by East and Southeast Asian countries. These countries managed to substantially increase their productivity growth, relying – along-side within-sector upgrading – on the reallocation of labor from agriculture and fishing into manufacturing and service sectors.

Figure 1. Economy-wide labor productivity growth decomposition



Source: Authors' own elaboration based on UNSD and WDI

Developed economies exhibit the lowest productivity growth, which is decreasing in each period, and being driven almost entirely by within-sector improvements, with static and dynamic effects contributing minimally or negatively. This reflects the stability and the maturity of their economic structures, and hence low levels of structural change. For Eastern Europe, structural change was a key driver, particularly during the 1990s due to a significant reallocation of labor between sectors, following the transition from centrally planned to free market economies. Additionally, strong static effects continued in the early 2000s, reflecting resource reallocation toward more productive sectors during the post-transition period. This high productivity growth trend stopped post the financial crisis, being less than 1% increase annually.

In contrast, Latin America & the Caribbean exhibited slower growth, with structural change playing a mixed role. Static effects were positive but weak, while dynamic effects were negative for all periods, signaling inefficiencies in resource reallocation and potential misallocation of labor. Similarly, Middle East & North Africa struggled with allocative inefficiencies, especially after 2000, which had dragged down labor productivity growth. Finally, Sub-Saharan Africa (SSA) showed consistently low productivity growth, with static effects contributing marginally

and dynamic effects remaining negative throughout the period, reflecting limited structural transformation and below potential labor productivity growth in general. Despite the enormous potential it has, SSA did not exploit well its resources, especially its low-skilled labor stock, which led to a below-optimal increase in labor productivity. Moreover, despite contributing to nearly 30% of the labor productivity growth, structural change in SSA is still mediocre as it is one of the largest exporters of primary and unprocessed products (Odjo et al., 2024).

For a deeper analysis of structural transformation among regions, it is important to see how sectoral employment as well as labor productivity have evolved. Looking at the variations in the sectoral employment shares represented in Figure (2), the agriculture employment share has decreased, with different destinations for each region. Between 1991 and 2015, labor in Latin America has shifted from both agriculture and industry to the service sector, what has been described by Rodrik (2015) as a premature deindustrialization. In fact, these regions have shifted their labor directly into service sectors, without establishing strong national industries. Despite reallocating labor to industries, most of the workers in SSA were reallocated to services, which are predominantly low productivity ones (Mensah et al.; 2022). Moreover, LAC, SSA and MENA did not manage to reallocate much labor out of the agriculture sector. Thus, most of these developing and emerging regions did not exploit well the labor stock they possess, explaining the poor structural change performance they achieved over the studied period.

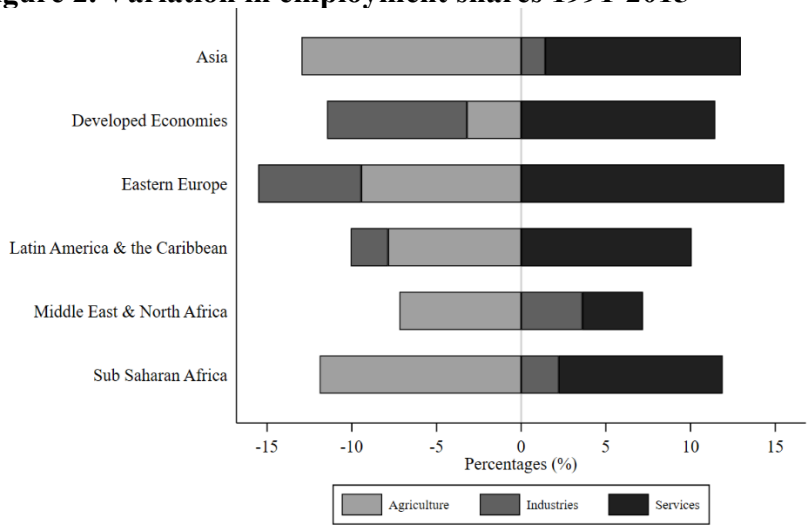
On the other hand, both Asian and Eastern European economies managed to reallocate a considerable amount of labor from the agriculture sector, with the service sector to be the main destination. The difference is that in Asia, a share of the reallocated labor is now working in the industry sector. For Eastern European economies, a deindustrialization took place as a share of labor working in the industry sector has been reallocated into the service. Developed economies as well witnessed a deindustrialization process, with a higher percentage of industry workers being reallocated to services. Therefore, as concluded by Kuznets (1971), as the economy develops, labor starts to shift from the agricultural sector to the industrial sector and subsequently to the services sector.

Besides, productivity gaps matter. This is why labor in agriculture should move to sectors that have above average and growing levels of labor productivity (Martins, 2019). Consequently, countries that managed to shift workers out of the agriculture sector have relatively low productivity gaps in their economy[3]. This is why, with higher productivity gaps, developing countries should experience a more significant structural change than developed ones. In Figure (3) it can be seen that, in 1991, SSA, MENA and Asia had the most significant sectoral productivity gaps, mainly caused by the misallocation of labor among sectors, with the highest share of employment in agriculture. From the figure, it is expected that labor in low productivity sectors should shift to sectors with relative labor productivity above zero. It is important to note that the reallocation of labor seen in Figure (2) may partially explain the minimized productivity gaps observed in 2015 in Figure (3). Eastern Europe economies managed to considerably

[3] According to Martins (2019), mining sector is thirty-seven times more productive than agriculture in Africa, but only 5 times in developed countries.

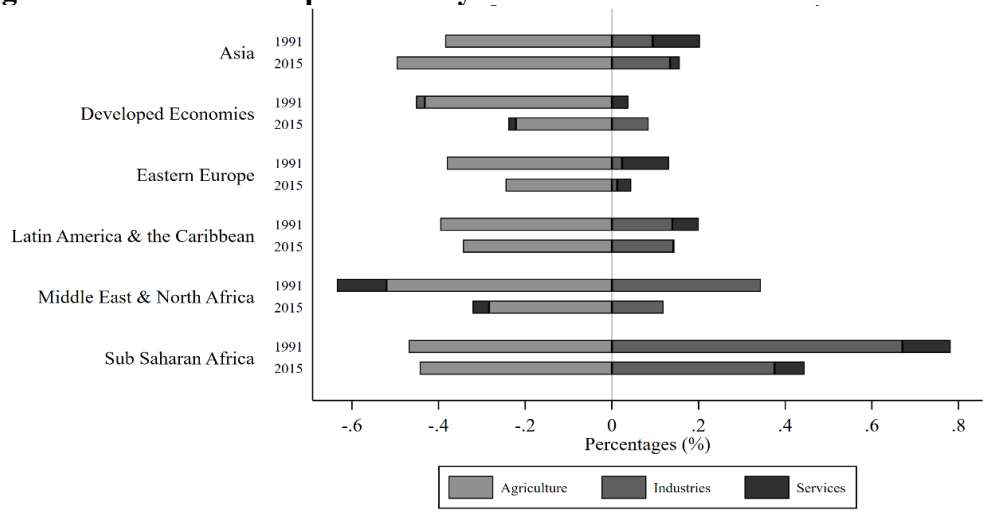
reallocate their labor more efficiently, leading to a decrease in productivity gaps[4]. LAC's situation has mildly changed, marking a failure in their path of structural change as previously concluded by McMillan et al. (2014). Finally, despite their efforts to reduce differences between sectoral labor productivity, Asia and SSA countries still have the highest productivity gaps, marking significant potential for additional structural transformation. A more visual representation of these employment and productivity level trends is provided for each region in the appendix (Figure A.1).

Figure 2. Variation in employment shares 1991-2015



Source: Authors' own elaboration based on WDI

Figure 3. Relative labor productivity



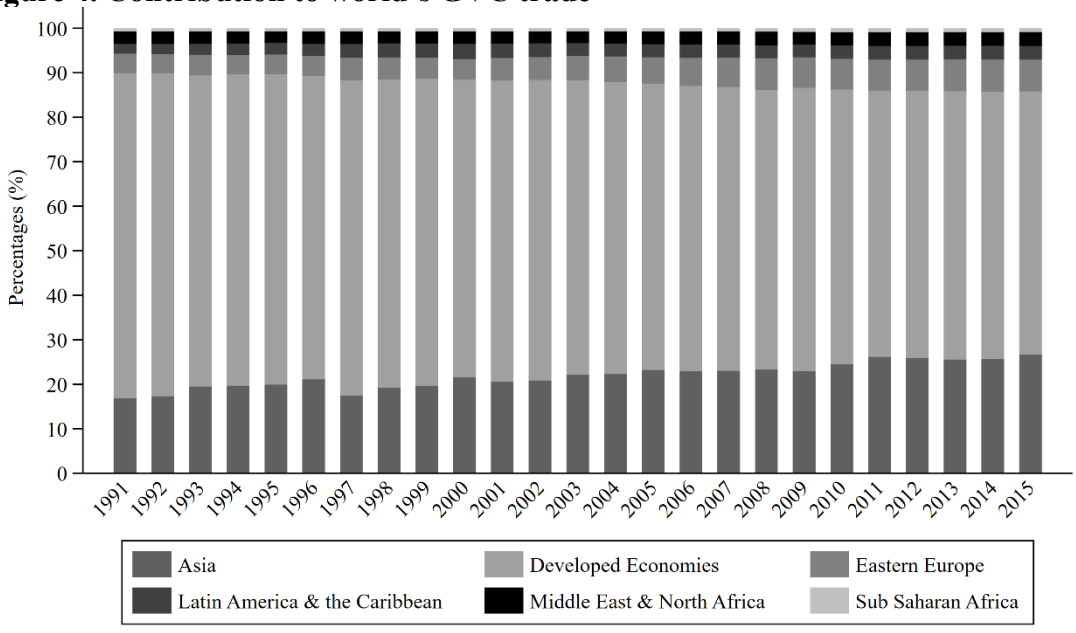
Note: Relative labor productivity is calculated as the logarithm of the ratio of sectoral productivity to aggregate productivity. Productivity gaps are represented by wider areas in the chart. The width of a bar equals one unit, then the sector's productivity is 10 times higher than the average (if positive) or a tenth of the average (if negative).
Source: Authors' own elaboration based on UNSD

[4] Significant decrease in productivity gaps is also witnessed in the MENA region. However, the absence of countries relying essentially on natural resources (Iraq, Iran, and Libya) as well as the absence of unindustrialized economies (Sudan and Yemen) from the sample may have underestimated the real productivity gap levels in the MENA region.

After examining these different patterns of structural change, it is important to provide an overview of GVC for different regions. Throughout the period of analysis, developed economies had the largest share in the world supply chain (Figure 4), both in backward and forward linkages. However, their share is constantly decreasing over time, mainly in favor of Asian and Eastern European economies. For the former, their share in the GVCs has been constantly increasing – going from 17% of the world GVC in 1991 to 27% in 2015 – with the increase in its domestic value added in the partners' exports (forward linkages) to be its main driver (see Figure A.2). This marks significant industrialization efforts made by Asian economies, especially eastern ones. Foreign value added (backward linkages) contribution of Asian GVC was also increasing on the international level (see Figure A.3).

Despite a less important increase, Eastern European economies managed to increase their share in the GVCs trade, especially during the 1990s and with the start of the new millennium. Eastern European economies were at first focusing on backward linkages in the 1990s. However, they start strengthening their forward linkages in the manufacturing and service sectors with the start of the 2000s as shown in Figure A.2 and A.3 (Cieślik et al., 2019). The accession of many of its countries to the EU and the establishment of developed and strong industries are among the potential reasons behind this performance. Unfortunately, their participation stagnated after 2008, as many of them were affected by the financial crisis. SSA, LAC and MENA had on average the same contribution to the global supply chain over time, marking their failure to integrate into new chains and diversify their production capacities.

Figure 4. Contribution to world's GVC trade

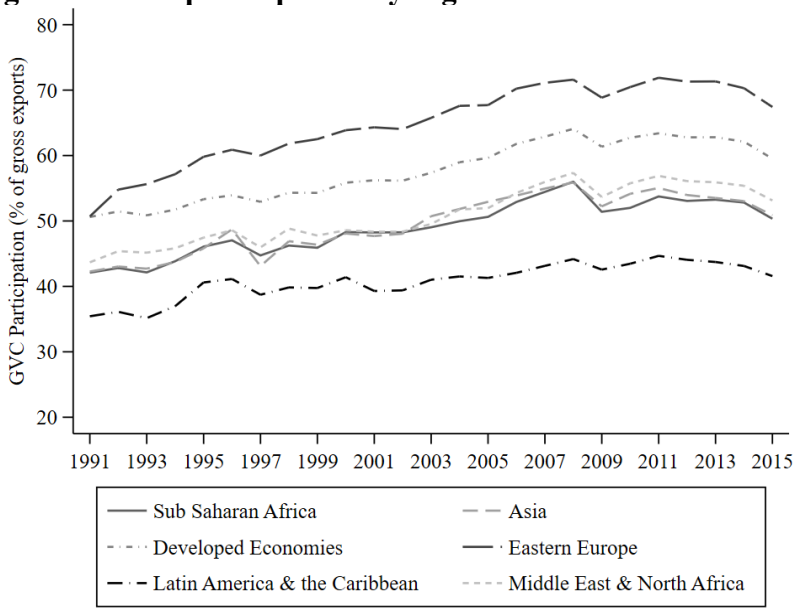


Note: Authors' own elaboration based on EORA Dataset

On another note, in line with the literature, it can be witnessed in Figure (5) that after the financial crisis hit the world in 2008, the general trend across all regions is either a decrease or a stagnation in the share of GVCs to gross exports. Indeed, between 2008 and 2015, GVC

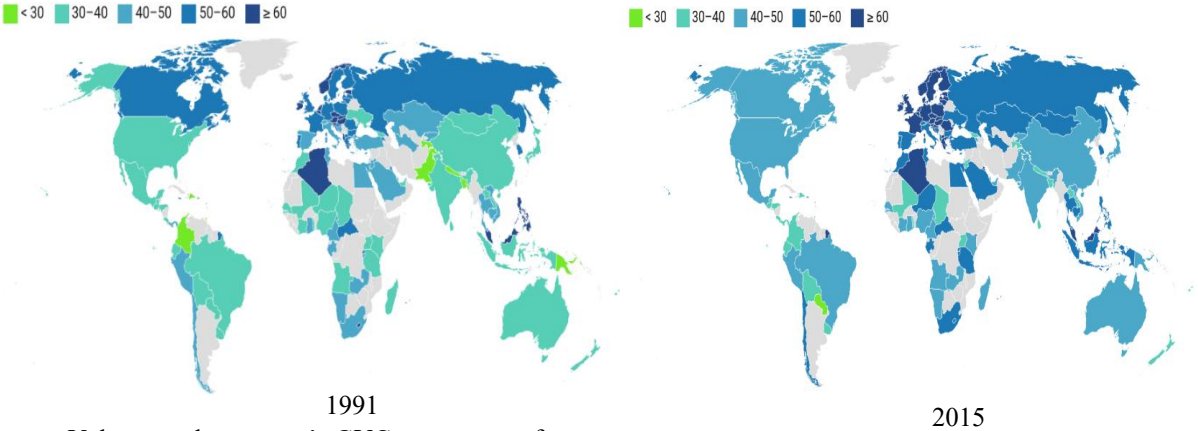
participation at the global level dropped by 4 percentage points (pp) (from 61% to 57% of global gross exports), with 4.5 pp in the developed economies, 3 pp in Asia and 6 pp in Eastern Europe. This stagnation is a consequence of multiple variations in the world's economy, mainly with the rise of protectionism worldwide. This protectionism took the form of a slowdown in tariff cuts, and the use of more non-tariff measures, such as export subsidies, restrictions on licensing or even FDI and domestic clauses in public procurement (Cigna et al., 2022). Despite the negative implications of the financial crisis, it can be said that overall countries are becoming more integrated in the global value chains (World Bank, 2020), as represented in Figure (6).

Figure 5. GVC participation by region



Note: Regional values are calculated as unweighted averages
Source: Authors' own elaboration based on EORA Dataset

Figure 6. Global value chains around the world



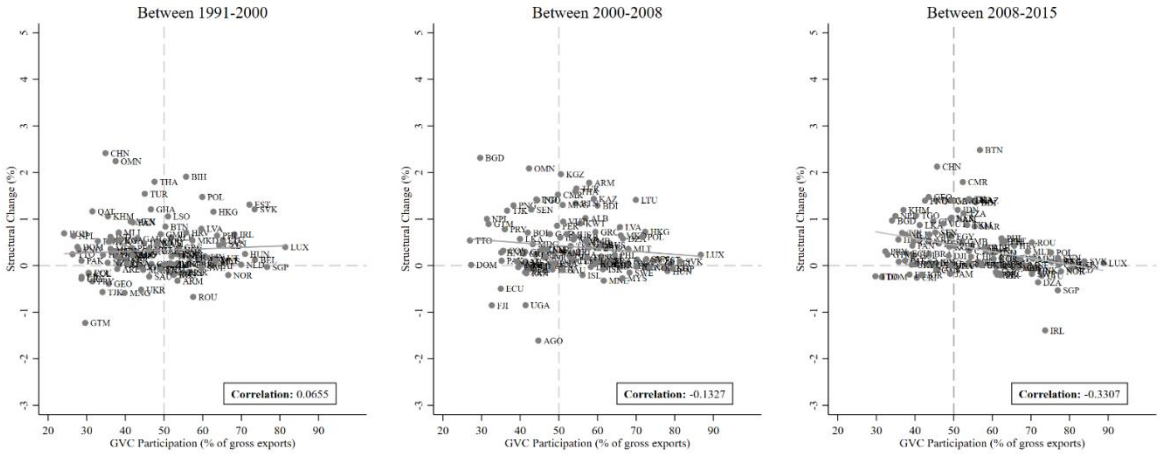
Values are the country's GVC percentage of gross exports.
Source: Authors' own elaboration based on the EORA Dataset

Taking a deeper look at the dynamics of GVC trade, European countries have the highest share of intermediates goods of their gross exports, with GVC trade representing 69% of the gross

exports of Eastern European economies in 2007, before dropping to 62% in 2018 (Figure 5). Eastern European economies are focusing more on forward linkages, whereas western Europe, as in the rest of most developed economies, are more into backward linkages and offshoring. This reliance on backward linkages means that more low-tech tasks are now allocated out of the region. These tasks as explained before are less skilled ones, and mainly transferred to Asian and African economies, either through offshoring of multinationals, or through these countries managing to upgrade their production capacities and being able to provide similar intermediate goods with competing prices. Consequently, with the focus of developed economies on backward linkages (Figure A.3), Asian and African economies started to increase their participation in global trade through the exports of intermediates, with the former performing better than the latter. Moreover, developed economies and the MENA region have had similar trends across the period studied, marking their integration in trade relations. This integration is mainly taking the form of minerals, oil, and natural gas supply between North Africa and the EU and between Gulf economies and the EU, USA and Japan, with relatively low integration in more value-added products.

Last but not least, Figure (7) plots the association between GVC and structural change for the different sub-periods 1991-2000, 2000-2008 and 2008-2015. The choice of these two years specifically – 2000 and 2008 – to mark the beginning of a new period is justified by the "Dot-com crisis" and the "Subprime crisis" respectively. As discussed in the literature, the information revolution, and the rise of automation since 2000 may have reduced the relative importance of the manufacturing sector and emphasized the importance of the services sector. This shows how the "Dot-com crisis" can affect structural change. On another hand, the "Subprime crisis" led to macroeconomic instability, which according to Martins (2019) fuels economic uncertainty, and thus is unlikely to promote structural change. Two remarks are worth to be mentioned. First, while the association between these variables was positive and weak in the first period, it became negative afterwards, confirming the fact that, on average, GVC integration failed to significantly boost structural change, especially after the financial crisis. Second, as was mentioned before, until 2000, most Eastern European countries were above the fitted line, thanks to their convergence to other European countries right before joining the EU.

Figure 7. Correlation structural change and GVC participation over time



Note: GVC participation is averaged for each period.Structural change is calculated in compound annual growth rates for each period
Source: Authors' own elaboration.

After examining these different patterns, the next section explains the empirical strategy implemented to study the relationship as well as the channels through which GVC participation may influence the path of structural transformation.

4. Methodology

As mentioned earlier, the dependent variable, the structural change term, is represented by the between-sector productivity contribution to the overall productivity growth based on McMillan et al. (2014) as follows:

$$Y_{it} = \alpha + \beta X_{it} + \delta GVC_{it} + \tau_i + \xi_{it} \quad (2)$$

where Y_{it} denotes structural change of country *i* in year *t*, GVC_{it} measures global value chain participation and X_{it} denotes the vector of control variables. τ_i is the country-specific dummy variables and ξ_{it} is the idiosyncratic disturbance term.

For our variables of interest, namely GVC, three indices are used: the share of global value chains to gross exports, as well as the domestic value added embodied in other countries' exports (forward linkages) and foreign value added (backward linkages), both as shares to gross exports. All three variables are included in the regressions in natural logarithms. Previous literature represents the GVC effect on labor productivity growth only through backward linkages (Pahl & Timmer, 2020; Constantinescu et al., 2019). The reliance on only the foreign inputs as a representation of GVC participation ignores forward linkages which is essential for the study of structural change, as domestic firms that are exporting their inputs may demand more labor from the low productive sectors with the increasing global demand as explained earlier. Our vector of controls includes the initial agriculture employment share (that measures initial conditions), rule of law (to measure the quality of institutions that is crucial for structural change), currency misalignment (measuring exchange rate policy), gross fixed capital

formation as a share to GDP (given that the investment effort is indispensable for structural change) and tariff rate (a proxy for trade policy and trade openness).

Several empirical remarks are worth mentioning. First, we estimate our model using fixed effects (FE). The main advantage of using FE is that it reduces the likelihood of omitted variable bias by allowing intercepts to vary for each country, thus accounting for time-invariant country characteristics such country size and potential cross-country differences in the measurement of value added and employment (Pahl & Timmer, 2020). To choose between FE and random effects in the panel model, all the regressions were tested using Hausman test with the null hypothesis of non-existence of correlation between unobservable individual effects and the explanatory variables. The null hypothesis was rejected for all the panel regressions, confirming the relevance of a FE model. Second, to comply with standard assumptions for the disturbance term, cluster-robust standard errors are estimated to address potential heteroskedasticity and serial correlation. Third, for the estimation, the effect will be analyzed over three periods aforementioned (1991-2000, 2000-2008 and 2008-2015). The explanatory variables are represented as the average values of each variable over each period except for agricultural share in employment that is represented as the value at the beginning of each period. Structural change is represented as the between sector productivity growth over each period. Finally, GVC variables are introduced at the macroeconomic and sectoral levels to disentangle the impact of sector-specific GVC (in agriculture, industries and services) on structural change.

However, there is clearly a reverse causality between GVC and structural change. Countries that experienced significant structural change had large productivity gains and thus are more likely to integrate into GVC. This is why the FE model may be subject to endogeneity (Pahl & Timmer, 2020), which can lead to biased coefficients. Therefore, two stages least square model is used, with the endogenous variables to be instrumented by 2 instruments: the GVC share of gross exports for the main trade partner, and the distance to main GVC hubs (USA, Germany, and China). The latter is constructed as the weighted sum of the distance to main GVC, and the weight is the share of each hub to global GVC trade. The rationale behind these two instruments is as follows. First, regarding the proximity to the main GVC hubs, we follow Fernandez et al. (2022) given that such a proximity is likely to affect GVC integration with lower transport cost and higher market access. Second, the main trade partner performance in GVC can create externalities and incentivize the country to integrate in similar or complementary value chains. All our instruments are valid and pass the Hansen J statistic and Kleibergen-Paap one, as it will be shown later.

5. Empirical results

The baseline regressions are presented in Table 1. Regarding our controls, the results are in line with the literature on the determinants of structural change at the economy-wide level. The initial employment share, which represents the initial condition of the economy, is positive and statistically significant across all sectors, indicating that economies with a higher initial share of employment in agriculture tend to experience greater structural change. This finding aligns

with the theoretical framework of McMillan et al. (2014), which emphasizes the role of labor reallocation from low-productivity sectors, such as agriculture, toward higher-productivity sectors as a key driver of structural transformation. The large stock of labor concentrated in agriculture provides substantial scope for productivity gains through sectoral shifts. Another important determinant is gross fixed capital formation, which exhibits a strong positive and statistically significant relationship with structural change. This result underscores the critical role of physical capital investment in enabling economies to shift resources toward more productive activities, facilitating structural transformation. High rates of capital investment provide the necessary infrastructure and productive capacity to support labor reallocation and sectoral upgrading, which is needed for the industrialization process (Fei and Ranis, 1963 and Niho, 1976). In contrast, tariff rates are negatively associated with structural change. Higher tariffs act as barriers to trade, limiting access to international markets and hindering deeper integration into global trade. This finding suggests that trade liberalization policies could play an essential role in fostering structural transformation, being a driver of competition and innovation.

As per our variable of interest, both the GVC index and sector-specific GVC participation show a weakly positive and statistically significant association with structural change. However, the magnitude of this effect varies by sector. While industries and services exhibit stronger associations between GVC participation and structural change, the agriculture sector has a smaller but significant effect. However, as was mentioned before, these results might be biased given the endogeneity that might arise due to reverse causality or omitted variable bias. Table 2 presents results from instrumental variable regressions (IV-2SLS) designed to address endogeneity concerns related to GVC participation. Recall that we use two instruments, namely the proximity to the main GVC hubs and the GVC participation of the main trade partner. After accounting for these issues, the causal effect of GVC participation on structural change becomes statistically insignificant across all sectors. This result is consistent with recent findings by Owusu (2024), who also reported negligible causal effects of GVC trade on structural transformation. Based on our previous analysis, the result can be due to several potential reasons. First, several emerging and developing economies are part of value chains but specialized in exporting primary commodities (oil, minerals and agricultural products) such as African and Latin American countries. Second, most of these countries, in line with the literature on the "institutional curse", failed to use rents coming from their resources to diversify their economies because of deficient institutions such as the MENA region (Selim and Zaki, 2015). Thus, they stagnated in upstream activities with limited value added as these activities are less sensitive to the quality of institutions. The next section attempts to examine this missing link between GVC and structural change.

To ensure the robustness of our findings, we conduct two additional sets of regressions. First, we examine GVC in specific sectors (mining, manufacturing, labor intensive manufacturing and capital-intensive manufacturing sectors). The results of these disaggregated activities (Table A.2) show that GVC does not exert a significant impact on structural change. Second, we use an alternative dataset for GVC participation -Trade in Value Added (TiVA) that offers

a complementary perspective on global trade linkages and value-added contributions. It provides a useful benchmark for validating the results obtained from the primary GVC dataset. The results from this robustness check (Table A.3) align closely with those reported in Table 2. Indeed, the causal impact of GVC participation on structural change remains statistically insignificant across all sectors (agriculture, industries, and services).

To further investigate the robustness of these findings, a heterogeneity analysis was conducted to explore whether the causal effect of GVC participation varies across different structural change and GVC dimensions. First, we examine the impact of the GVC index on the two components of structural change: static reallocation effects (movement of labor toward initially higher-productivity sectors) and dynamic reallocation effects (movement of labor toward sector with growing productivity). The results (see Table 3) indicate that the GVC index has an insignificant effect on both components, consistent across all sectoral GVC indices. This suggests that GVC participation does not significantly influence either static or dynamic aspects of structural transformation. Second, we analyzed the effects of backward and forward linkages within GVCs (see Table 4). Again, the results show no significant relationship between these linkages and structural change. This finding signals that the negligible causal effect of GVC trade on structural transformation is not driven by specific aspects of backward or forward integration into global production networks.

In a nutshell, these results suggest that while GVC participation correlates with structural change under baseline regressions, its direct causal impact may be limited once endogeneity is addressed. Hence, the next section investigates potential mechanisms that may explain the insignificant impact of Global Value Chain (GVC) participation on structural change at the economy-wide level.

Table 1. GVC and structural change - baseline results

Dependent variable:	**(1)**	**(2)**	**(3)**	**(4)**
Structural Change term	**Total GVC**	**Agriculture**	**Industries**	**Services**
Initial agriculture employment share	0.050***	0.044***	0.044***	0.049***
	(0.009)	(0.009)	(0.009)	(0.009)
Rule of law	0.006	0.007	0.007	0.006
	(0.004)	(0.005)	(0.005)	(0.004)
Currency misalignment	-0.002	-0.002	-0.003	-0.002
	(0.003)	(0.003)	(0.003)	(0.003)
Gross fixed capital formation (% of GDP)	0.035***	0.038***	0.036***	0.036***
	(0.009)	(0.010)	(0.009)	(0.010)
Tariff rate	-0.012*	-0.018***	-0.017***	-0.015**
	(0.007)	(0.006)	(0.006)	(0.006)
GVC index	0.013***	0.004*	0.006*	0.008***
	(0.004)	(0.003)	(0.003)	(0.003)
Constant	-0.012**	-0.003	-0.012**	-0.004
	(0.005)	(0.011)	(0.006)	(0.007)
Number of observations	331	331	331	331
Number of Countries	118	118	118	118
R-squared	0.243	0.215	0.214	0.229

*Note: The first row represents the GVC measurement: overall and in the agriculture, industries and services sectors. Robust standard errors are in parentheses *** p<.01, ** p<.05, * p<.1.*

Table 2. GVC and structural change - IV-2SLS results

Dependent variable:	**(1)**	**(2)**	**(3)**	**(4)**
Structural Change term	**Total**	**Agriculture**	**Industries**	**Services**
Initial agriculture employment share	0.044***	0.044***	0.043***	0.044***
	(0.010)	(0.013)	(0.009)	(0.010)
Rule of law	0.007	0.007	0.007	0.007
	(0.005)	(0.005)	(0.005)	(0.005)
Currency misalignment	-0.003	-0.002	-0.003	-0.003
	(0.003)	(0.003)	(0.003)	(0.003)
Gross fixed capital formation (% of GDP)	0.036***	0.038***	0.036***	0.036***
	(0.010)	(0.010)	(0.010)	(0.010)
Tariff rate	-0.019**	-0.018*	-0.018**	-0.019**
	(0.008)	(0.011)	(0.008)	(0.008)
GVC index	0.004	0.004	0.004	0.003
	(0.007)	(0.018)	(0.007)	(0.006)
Number of observations	325	325	325	325
Number of Countries	112	112	112	112
R-squared	0.218	0.215	0.212	0.216
Hansen J statistic (p-value)	0.867	0.692	0.896	0.876
Kleibergen-Paap rk Wald F statistic	17.935	0.397	8.255	13.204
Kleibergen-Paap rk LM statistic (p-value)	0.000	0.571	0.000	0.000

*Note: The first row represents the GVC measurement: overall and in the agriculture, industries and services sectors. Robust standard errors are in parentheses *** p<.01, ** p<.05, * p<.1.*

Table 3. GVC and static vs. dynamic structural change

	Static reallocation term				Dynamic reallocation term			
	(1) Total	(2) Agriculture	(3) Industries	(4) Services	(1) Total	(2) Agriculture	(3) Industries	(4) Services
Initial agriculture employment share	0.041***	0.034**	0.040***	0.042***	0.003	0.010	0.003	0.002
	(0.013)	(0.016)	(0.012)	(0.013)	(0.010)	(0.013)	(0.009)	(0.010)
Rule of law	0.008	0.009	0.007	0.007	-0.001	-0.002	-0.000	-0.001
	(0.006)	(0.006)	(0.006)	(0.005)	(0.003)	(0.004)	(0.003)	(0.003)
Currency misalignment	-0.003	-0.004	-0.004	-0.003	0.001	0.002	0.001	0.001
	(0.003)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Gross fixed capital formation (% of GDP)	0.033***	0.033***	0.032***	0.033***	0.004	0.005	0.004	0.004
	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Tariff rate	-0.008	-0.015	-0.007	-0.008	-0.013**	-0.006	-0.014**	-0.013**
	(0.009)	(0.011)	(0.010)	(0.009)	(0.006)	(0.011)	(0.007)	(0.006)
GVC index	0.008	-0.003	0.010	0.007	-0.006	0.007	-0.008	-0.005
	(0.007)	(0.019)	(0.008)	(0.006)	(0.006)	(0.018)	(0.007)	(0.004)
Number of observations	325	325	325	325	325	325	325	325
Number of Countries	112	112	112	112	112	112	112	112
R-squared	0.164	0.088	0.149	0.156	0.019	-0.043	0.011	0.013
Hansen J statistic (p-value)	0.165	0.105	0.198	0.171	0.060	0.032	0.089	0.055
Kleibergen-Paap rk Wald F statistic	17.935	0.397	8.255	13.204	17.935	0.397	8.255	13.204
Kleibergen-Paap rk LM statistic (p-value)	0.000	0.571	0.000	0.000	0.000	0.571	0.000	0.000

*Note: The third row represents the GVC measurement: overall and in the agriculture, industries and services sectors. Robust standard errors are in parentheses *** p<.01, ** p<.05, * p<.1.*

Table 4. Backward vs. forward GVC and structural change

Dependent variable: Structural Change term	Forward Linkages				Backward Linkages			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
	Total	Agriculture	Industries	Services	Total	Agriculture	Industries	Services
Initial agriculture employment share	0.044***	0.044***	0.043***	0.045***	0.044***	0.046***	0.043***	0.044***
	(0.010)	(0.012)	(0.009)	(0.010)	(0.010)	(0.013)	(0.010)	(0.011)
Rule of law	0.007	0.008	0.007	0.007	0.007	0.010	0.007	0.007
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.008)	(0.005)	(0.004)
Currency misalignment	-0.003	-0.003	-0.003	-0.003	-0.002	-0.003	-0.003	-0.002
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Gross fixed capital formation (% of GDP)	0.037***	0.037***	0.036***	0.037***	0.036***	0.032**	0.036***	0.036***
	(0.010)	(0.010)	(0.009)	(0.010)	(0.010)	(0.015)	(0.010)	(0.010)
Tariff rate	-0.018**	-0.019**	-0.018*	-0.018**	-0.018**	-0.027	-0.019**	-0.019***
	(0.009)	(0.008)	(0.009)	(0.009)	(0.008)	(0.017)	(0.008)	(0.007)
GVC index	0.004	0.003	0.003	0.003	0.004	-0.006	0.003	0.002
	(0.007)	(0.009)	(0.007)	(0.006)	(0.008)	(0.017)	(0.008)	(0.004)
Number of observations	325	325	325	325	325	325	325	325
Number of Countries	112	112	112	112	112	112	112	112
R-squared	0.220	0.224	0.212	0.218	0.201	0.179	0.202	0.192
Hansen J statistic (p-value)	0.960	0.715	0.936	0.963	0.801	0.780	0.762	0.777
Kleibergen-Paap rk Wald F statistic	9.567	0.996	5.363	10.176	5.273	0.569	3.014	17.512
Kleibergen-Paap rk LM statistic (p-value)	0.000	0.212	0.001	0.000	0.032	0.595	0.151	0.002

*Note: The third row represents the GVC measurement: overall and in the agriculture, industries and services sectors. Robust standard errors are in parentheses *** p<.01, ** p<.05, * p<.1.*

6. The missing link between GVC and structural change

Several channels are analyzed to explain the missing link between GVC and structural change: namely their inability to create enough jobs, the increase in capital intensive industries, the dominance of natural resources and the skill bias technological change (SBTC).

6.1. Job creation as a channel

One plausible explanation for the limited effect of GVC participation on structural change is its inability to drive significant job creation at the macroeconomic level. To test this hypothesis, we use sectoral employment data and examine the relationship between GVC participation and the growth rate of employment shares in industries and services—two sectors typically associated with structural transformation. The results, presented in Table 5 (columns 1 and 2), show that GVC participation has an insignificant impact on the growth rate of both industry and service employment shares. This finding suggests that while GVC trade may provide opportunities for some firms to expand production, as highlighted by Faorle (2016) and Pahl and Timmer (2020), these effects do not translate into meaningful employment gains at the country level. The lack of macroeconomic job creation aligns with prior literature indicating that GVC integration often leads to productivity gains rather than widespread employment expansion, as firms adopt more efficient production processes that are capital intensive. This explains why these countries did not experience significant structural change[5].

6.2. Capital intensity of the economy

The previous results are also confirmed by the two additional variables, namely the share of labor compensation to GDP (column 3 in Table 5) and the capital/labor ratio (column 6 in Table 5). These two variables measure the structure of the economy and help us determine whether GVC can make the economy more capital or labor intensive. Our results show that, while the impact of GVC on the share of labor to GDP is statistically insignificant, the capital to labor ratio is positively affected by GVC. Hence, emerging and developing economies might not be able to experience a significant structural change as they become more capital intensive and, again, do not create enough jobs. This is in line with the results of Ndubuisi and Owusu (2023) who argue that job creation is due only to firm entry into GVC given that continuous GVC firms have an overall net job loss. Sectoral GVC results yield similar results (see Table A6 in the appendix).

6.3. Natural resources

Most developing countries attract GVC in natural resources given that their endowments and thus their comparative advantage (Baglioni et al., 2017). Clearly, these sectors are generally capital intensive and have a limited value added. Hence, to further examine the previous results, we explore the impact of GVC on exports of fuel (column 4 in Table 5) and the share of natural

[5] Similar results are obtained when we regress the GVC index on the growth rates of industry and service employment levels. See Table A4.

resources rents to GDP (column 5 in Table 5). Our results show the strong, positive and statistically significant impact of GVC on the two variables, pointing out that GVC led to an increase in fuel exports and thus the share of natural resources rents to GDP[6]. This result is in line with the literature arguing that any positive contribution of GVC to sustainable development for resource-rich states is quickly undermined (Smith, 2015). Moreover, our findings build on the literature of the resource curse that shows that resource abundance is associated with poor development outcomes (Gelb 1988 and Sachs and Warner, 1995), mainly due to bad institutions (Cabrales and Hauk, 2011 and Selim and Zaki, 2015). Thus, this helps understand why GVC in several emerging and developing countries failed to witness structural change.

6.4. Skill-Biased Technological Change (SBTC)

Another potential mechanism is the skill-biased technological change (SBTC), which may hinder the broader impact of GVC participation in structural change. According to this hypothesis, when countries open-up to trade, they shift their production technology that favors skilled over unskilled labor by increasing its relative productivity and, therefore, its relative demand. To investigate this channel, we rely on the World Bank's Labor Content of Exports (LACEX) dataset (Cali et al., 2016), which distinguishes skilled and unskilled labor contributions to exports. This dataset allows us to analyze whether SBTC, driven by GVC integration, disproportionately benefits skilled labor while marginalizing unskilled labor—a phenomenon that could limit structural transformation.

The results reveal a negative and significant interaction between GVC participation and skilled labor contribution to exports after addressing endogeneity concerns (see Table 5, column 7). This finding supports previous studies (Pahl & Timmer, 2020; Reijnders et al., 2019) that document how GVC trade tends to favor skilled labor due to its reliance on advanced technologies and complex supply chain processes (Ehab and Zaki, 2021). Furthermore, the effect is more pronounced in industries compared to services, with manufacturing emerging as the primary driver within industrial sectors. Table A.4 provides additional evidence by distinguishing between labor-intensive and capital-intensive manufacturing within GVCs. The interaction between skilled labor contribution and labor-intensive manufacturing exhibits a higher magnitude, suggesting that these sectors are particularly sensitive to SBTC dynamics, and thus GVC reduces structural change. Capital-intensive manufacturing shows a lower magnitude.

Taken together, these findings suggest that the lack of job creation and the SBTC lend support to explain the missing link between GVC participation and structural change. While GVC integration enhances productivity and drives technological advancements, its benefits appear concentrated within specific firms or subsectors rather than contributing to broader economy-wide transformation. The skill-biased nature of GVC trade further exacerbates inequality in labor market outcomes, favoring skilled workers while limiting opportunities for unskilled

[6] Similar results are obtained for sectoral GVC results (see Table A5 in the appendix).

workers—a dynamic that may hinder inclusive structural transformation. These results align with broader literature emphasizing the nuanced impacts of GVC participation. For instance, while firm-level studies often report positive effects on productivity and competitiveness, country-level analyses frequently highlight challenges such as limited employment creation or unequal distribution of benefits across sectors.

Table 5. Exploring the mechanisms

Dependent Variables	(1) CAGR of industry employment share	(2) CAGR of service employment share	(3) Labor compensation share of GDP	(4) Fuel exports % of merchandise exports	(5) Total natural resources rents % of GDP	(6) Ln(capital/labor)	(7) Structural change term
Initial agriculture employment share	0.064*	0.081***	0.088	0.053	-0.010	-1.774***	0.059***
	(0.038)	(0.022)	(0.098)	(0.139)	(0.036)	(0.426)	(0.009)
Rule of law	-0.012	0.016**	0.052	-0.084	-0.012	-0.090	0.004
	(0.018)	(0.008)	(0.047)	(0.054)	(0.019)	(0.153)	(0.004)
Currency misalignment	-0.005	-0.004	0.048**	0.024	-0.021	0.174*	0.000
	(0.009)	(0.005)	(0.024)	(0.037)	(0.014)	(0.105)	(0.003)
Gross fixed capital formation (% of GDP)	0.120***	0.018	-0.246**	-0.066	-0.013	0.220	0.022*
	(0.032)	(0.018)	(0.095)	(0.128)	(0.052)	(0.441)	(0.012)
Tariff rate	-0.050	-0.006	-0.089	0.282***	0.055*	-0.776*	-0.018*
	(0.038)	(0.019)	(0.113)	(0.097)	(0.033)	(0.446)	(0.009)
GVC index	0.008	0.018	-0.226***	0.532***	0.109***	1.041**	0.013
	(0.027)	(0.016)	(0.085)	(0.116)	(0.031)	(0.403)	(0.009)
Skilled labor contribution to exports							-0.032**
							(0.016)
GVC index*Skilled labor contribution to exports							-0.081***
							(0.025)
Number of observations	325	325	279	325	325	320	267
Number of Countries	112	112	95	112	112	110	91
R-squared	0.119	0.145	0.171	-0.028	0.113	0.524	0.306
Hansen J statistic (p-value)	0.696	0.654	0.912	0.734	0.502	0.076	0.149
Kleibergen-Paap rk Wald F statistic	17.935	17.935	26.405	17.935	17.935	18.564	9.355
Kleibergen-Paap rk LM statistic (p-value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000

*Note: The sixth row represents the overall GVC level. Robust standard errors are in parentheses *** p<.01, ** p<.05, * p<.1.*

7. Conclusion

Several developing countries failed to experience a strong structural change. At the same time, GVC started to shine as a potential solution for weakly industrialized economies as they can access global markets by only focusing on certain stages in the production chain. In fact, the potential economies of scale generated by GVC can help these countries witness a quicker structural change. However, emerging and developing countries were trapped in GVC that have a limited value added, capital intensive and thus failed to move factors of production from less productive sectors to more productive ones. Hence, this paper tries to examine why, despite an increasing insertion in GVC, developing countries did not experience a noticeable structural change. To test this relationship, we use the EORA database and a two-stage least square to take into consideration potential reverse causality between GVC and structural change.

Our main findings show that overall, global value chains participation has an insignificant effect on structural change. This result holds for different measures of GVC (backward and forward) and of structural change (static and dynamic). Several main mechanisms explain the missing link between GVC and structural change, namely their inability to create enough jobs, the increase in capital intensive industries, the dominance of natural resources and the skill bias technological change. Indeed, GVC integration often leads to productivity gains rather than widespread employment expansion, as firms adopt more efficient production processes that might be capital intensive, especially in natural resources. Moreover, the skill bias technological change driven by GVC integration disproportionately benefits skilled labor while marginalizing unskilled labor—a phenomenon that could limit structural transformation.

From a policy perspective, our results highlight two important implications. First, if emerging and developing countries are to exploit the full potential of GVCs, the latter should be attracted to manufacturing activities that have a higher value added and that are positioned more in downstream activities. This was particularly the case of some Asian countries who were able to attract FDI, infuse the technology imported to the rest of the domestic economy and thus innovate and experience a noticeable structural change (World Bank, 2024). Second, investing in the skills of workers to help them face the challenges implied by competition, openness and GVC is indispensable. This will help increase the demand for skilled workers and match with the requirements of high-value added sectors.

References

Baglioni, E., Campling, L., & Havice, E. (2017). The nature of the firm in global value chains. The corporation: A critical, multi-disciplinary handbook, 314-25.

Carneiro, S., Neves, P. C., Afonso, O., & Sochirca, E. (2023). Meta-analysis: global value chains and employment. Applied Economics, 56(19), 2295–2314. https://doi.org/10.1080/00036846.2023.2186365

Cabrales, A., & Hauk, E. (2011). The quality of political institutions and the curse of natural resources. *The Economic Journal*, 121(551), 58-88.

Comunale, M., & Felice, G. (2022). Trade and structural change: An empirical investigation. International Economics, 171, 58–79. https://doi.org/10.1016/j.inteco.2022.04.007

Farole, T. (2016). Do global value chains create jobs?. IZA World of Labor.

Fernandes, A. M., Kee, H. L., & Winkler, D. (2021). Determinants of Global Value Chain Participation: Cross-Country Evidence. The World Bank Economic Review, 36(2), 329–360. https://doi.org/10.1093/wber/lhab017

Niho, Y. (1976). The Role of Capital Accumulation in the Industrialization of a Labor Surplus Economy. Journal of Development Economics, 3(2), 161–169. https://doi.org/10.1016/0304-3878(76)90018-3

Szymczak, S. (2024). The impact of global value chains on wages, employment, and productivity: a survey of theoretical approaches. Journal for Labour Market Research, 58(1). https://doi.org/10.1186/s12651-024-00367-w

John C. H. Fei, & Ranis, G. (1963). Innovation, Capital Accumulation, and Economic Development. *The American Economic Review*, *53*(3), 283–313. http://www.jstor.org/stable/1809159

Alessandria, G., Johnson, R. C. and Yi, K.-M. (2023) 'Perspectives on trade and structural transformation', *Oxford Development Studies*, 51(4), pp. 455–475. doi: 10.1080/13600818.2023.2279665.

Baldwin, R. (2016). *The Great Convergence: Information Technology and the New Globalization*. Harvard University Press.

Chenery, H.B. (1960). Patterns of industrial growth. *American Economic Review* 50, 624–654.

Cieślik, E., Biegańska, J., & Środa-Murawska, S. (2019). Central and Eastern European States from an International Perspective: Economic Potential and Paths of Participation in Global Value Chains. *Emerging Markets Finance and Trade*, *57*(13), 3587–3603.

Cigna, S., Gunnella, V., & Quaglietti, L. (2022). Global Value Chains: Measurement, Trends and Drivers. *ECB Occasional Paper No. 2022/289*.

De Vries, G. J., Timmer, M. P., & De Vries, K. (2015). Structural Transformation in Africa: Static Gains, Dynamic Losses. *Journal of Development Studies*, *51*(6), 674–688. https://doi.org/10.1080/00220388.2014.997222

Ehab, M., & Zaki, C. (2020). Global value chains and service liberalization: do they matter for skill-upgrading? *Applied Economics*, *53*(12), 1342–1360. https://doi.org/10.1080/00036846.2020.1830938

Erten, B., & Leight, J. (2021). Exporting Out of Agriculture: The Impact of WTO Accession on Structural Transformation in China. *The Review of Economics and Statistics*, *103*(2), 364–380. https://doi.org/10.1162/rest_a_00852

Foster-McGregor, N., Poeschl, J., & Stehrer, R. (2016). Offshoring and the Elasticity of Labour Demand. *Open Economies Review*, *27*(3), 515–540. https://doi.org/10.1007/s11079-015-9384-6

Gelb, Alan. 1988. Oil Windfalls: Blessing or Curse. New York: Oxford University Press (for the World Bank).

Gollin, D., Lagakos, D., & Waugh, M. E. (2014). Agricultural Productivity Differences across Countries. *American Economic Review*, *104*(5), 165–170. https://doi.org/10.1257/aer.104.5.165

H. Hollweg, C. (2019). Global value chains and employment in developing economies. *Global Value Chain Development Report 2019*, 63–81. https://doi.org/10.30875/503c185b-en

Haraguchi, N., Cheng, C. C., & Smeets, E. (2017). The Importance of Manufacturing in Economic Development: Has This Changed? *World Development*, *93*, 293–315. https://doi.org/10.1016/j.worlddev.2016.12.013

Iacovone, L., & Javorcik, B. S. (2012). Getting Ready: Preparation for Exporting. *CEPR Discussion Paper 8926.*
Kaba, K., Lin, J., & Renard, M. (2022). Structural Change And Trade Openness in sub-Saharan African Countries. *The World Economy*, *45*(7), 2101–2134. https://doi.org/10.1111/twec.13261
Kuznets, S. (1961) Quantitative Aspects of the Economic Growth of Nations: VI. Long-Term Trends in Capital Formation Proportion. *Economic Development and Cultural Change* 9, 1–124. http://www.jstor.org/stable/1151713?origin=JSTOR-pdf
Kuznets, S. (1971). Economic Growth of Nations. Total Output and Production Structure. *Political Science Quarterly*, *86*(4), 654. https://doi.org/10.4159/harvard.9780674493490
Lewis, W. A. (1954). Economic Development with Unlimited Supplies of Labour. *The Manchester School*, *22*(2), 139–191. https://doi.org/10.1111/j.1467-9957.1954.tb00021.x
Lopez-Acevedo, G., & Robertson, R. (2016). Stitches to Riches? Apparel Employment, Trade, and Economic Development in South Asia. *Washington, DC: World Bank eBooks*. https://doi.org/10.1596/978-1-4648-0813-5
Ma, S., Liang, Y., & Zhang, H. (2019). The Employment Effects of Global Value Chains. *Emerging Markets Finance and Trade*, *55*(10), 2230–2253. https://doi.org/10.1080/1540496x.2018.1520698
Martins, P. S. (2019). Structural change: Pace, patterns, and determinants. *Review of Development Economics*, *23*(1), 1–32. https://doi.org/10.1111/rode.12555
Matsuyama, K. (2009). Structural Change in an Interdependent World: A Global View of Manufacturing Decline. *Journal of the European Economic Association*, *7*(2–3), 478–486. https://doi.org/10.1162/jeea.2009.7.2-3.478
McCaig, B., & Pavcnik, N. (2018). Export Markets and Labor Allocation in a Low-Income Country. *The American Economic Review*, *108*(7), 1899–1941. https://doi.org/10.1257/aer.20141096
McMillan, M., & Rodrik, D. (2011). Globalization, structural change and productivity growth. *Making Globalization Socially Sustainable*, 49–84. https://doi.org/10.30875/b10cb347-en
McMillan, M., Rodrik, D., & Verduzco-Gallo, I. (2014). Globalization, Structural Change, and Productivity Growth, with an Update on Africa. *World Development*, *63*, 11–32. https://doi.org/10.1016/j.worlddev.2013.10.012
Menezes-Filho, N. A., & Muendler, M. (2011). Labor Reallocation in Response to Trade Reform. *National Bureau of Economic Research*. https://doi.org/10.3386/w17372
Molina, D., & Muendler, M. (2013). Preparing to Export. *National Bureau of Economic Research*. https://doi.org/10.3386/w18962
Ndubuisi, G., & Owusu, S. (2023). Global Value Chains, Job Creation, and Job Destruction among Firms in South Africa. STEG Working Paper, https://steg. cepr. org/sites/default/files/2023-08/WP073% 20NdubuisiOwusuGlobalValueChainsJobCreation. pdf.
Pahl, S., & Timmer, M. P. (2020). Do Global Value Chains Enhance Economic Upgrading? A Long View. *Journal of Development Studies*, *56*(9), 1683–1705. https://doi.org/10.1080/00220388.2019.1702159
Pahl, S., Timmer, M. P., Gouma, R., & Woltjer, P. J. (2022). Jobs and Productivity Growth in Global Value Chains: New Evidence for Twenty-five Low- and Middle-Income Countries. *The World Bank Economic Review*, *36*(3), 670–686. https://doi.org/10.1093/wber/lhac003
Portella-Carbó, F. (2016). Effects of international trade on domestic employment: an application of a global multiregional input–output super-multiplier model (1995–2011). *Economic Systems Research*, *28*(1), 95-117. https://doi.org/10.1080/09535314.2016.1142429
Reijnders, L. S., Timmer, M. P., & Ye, X. (2021). Labour demand in global value chains: Is there a bias against unskilled work? *The World Economy*, *44*(9), 2547–2571. https://doi.org/10.1111/twec.13092
Rodrik, D. (2015). Premature deindustrialization. *Journal of Economic Growth*, *21*(1), 1–33. https://doi.org/10.1007/s10887-015-9122-3
Rodrik, D. (2018). New Technologies, Global Value Chains, and Developing Economies. *National Bureau of Economic Research*. https://doi.org/10.3386/w25164
Sachs, Jeffrey, and Andrew Warner. 1995. “Natural Resource Abundance and Economic Growth”. NBER Working Paper 5398. Cambridge, Mass.

Selim, H., & Zaki, C. (2016). The institutional curse of natural resources in the Arab world. Understanding and avoiding the oil curse in resource-rich arab economies, 322-72.
Sen, K. (2019). What Explains the Job Creating Potential of Industrialisation in the Developing World? *Journal of Development Studies*, *55*(7), 1565–1583. https://doi.org/10.1080/00220388.2017.1404033
Shepherd, B. (2013). Global Value Chains and Developing Country Employment: A Literature Review. *OECD Trade Policy Papers*. https://ideas.repec.org/p/oec/traaab/156-en.html
Smith, F. (2015). Natural resources and global value chains: What role for the WTO?. International Journal of Law in Context, 11(2), 135-152.
Taglioni, D., & Winkler, D. (2016). Making Global Value Chains Work for Development. *Washington, DC: World Bank EBooks*. https://doi.org/10.1596/978-1-4648-0157-0
United Nations Industrial Development Organization (2017). Structural Change for Inclusive and Sustainable Industrial Development. *Vienna*.
Uy, T., Yi, K., & Zhang, J. (2013). Structural change in an open economy. *Journal of Monetary Economics*, *60*(6), 667–682. https://doi.org/10.1016/j.jmoneco.2013.06.002
Wang, Z., Wei, S., Yu, X., & Zhu, K. (2016). Characterizing Global Value Chains: Production Length and Upstreamness. *National Bureau of Economic Research*.
World Bank (2017). Global Value Chain Development Report 2017: Measuring and Analyzing the Impact of GVCs on Economic Development. *Washington, DC: World Bank EBooks*.
World Bank (2020) Trading for Development in the Age of Global Value Chains. (2019). *Washington, DC: World Bank EBooks*. https://doi.org/10.1596/978-1-4648-1457-0
Shingal, A. (2015). Labour market effects of integration into GVCs: Review of literature. World Trade Institute.
Shepherd, B., & Stone, S. (2012). Global Production Networks and Employment: A Developing Country Perspective.

Appendix

Table A1. List of countries

Albania
Algeria
Angola
Armenia
Australia
Austria
Bahrain
Bangladesh
Belgium
Bhutan
Bolivia
Bosnia and Herzegovina
Brazil
Bulgaria
Burundi
Cambodia
Cameroon
Canada
Central African Republic
Chile
China
Colombia
Costa Rica
Croatia
Cyprus
Czechia
Côte d'Ivoire
Denmark
Djibouti
Dominican Republic
Ecuador
Egypt
Estonia
Fiji
Finland
France
Gabon
Gambia
Georgia
Germany
Ghana
Greece
Guatemala
Honduras
Hong Kong
Hungary
Iceland
India
Indonesia
Ireland
Israel
Italy
Jamaica
Japan
Jordan
Kazakhstan
Kenya
Kuwait
Kyrgyzstan
Latvia
Lesotho
Lithuania
Luxembourg
Madagascar
Malaysia
Mali
Malta
Mauritius
Mexico
Mongolia
Montenegro
Morocco
Namibia
Nepal
Netherlands
New Zealand
Niger
North Macedonia
Norway
Oman
Pakistan
Panama
Papua New Guinea
Paraguay
Peru
Philippines
Poland
Portugal
Romania
Russian Federation
Rwanda
Saudi Arabia
Senegal
Singapore
Slovakia
Slovenia
South Africa
South Korea
Spain
Sri Lanka
Sweden
Switzerland
Tajikistan
Tanzania
Thailand
Togo
Trinidad and Tobago
Tunisia
Turkmenistan
Türkiye
Uganda
Ukraine
United Arab Emirates
United Kingdom
United States
Uruguay
Vanuatu
Vietnam

Table A2. GVC and structural change – detailed sectoral results

Dependent variable: Structural Change term	(1) Mining	(2) Manufacturing	(3) Manuf. Labor intensive	(4) Manuf. Capital intensive
Initial agriculture employment share	0.044***	0.044***	0.043***	0.044***
	(0.010)	(0.013)	(0.009)	(0.010)
Rule of law	0.007	0.007	0.007	0.007
	(0.005)	(0.005)	(0.005)	(0.005)
Currency misalignment	-0.003	-0.002	-0.003	-0.003
	(0.003)	(0.003)	(0.003)	(0.003)
Gross fixed capital formation (% of GDP)	0.036***	0.038***	0.036***	0.036***
	(0.010)	(0.010)	(0.010)	(0.010)
Tariff rate	-0.019**	-0.018*	-0.018**	-0.019**
	(0.008)	(0.011)	(0.008)	(0.008)
GVC index	0.004	0.004	0.004	0.003
	(0.007)	(0.018)	(0.007)	(0.006)
Number of observations	325	325	325	325
Number of Countries	112	112	112	112
R-squared	-0.233	0.207	0.196	0.210
Hansen J statistic (p-value)	0.796	0.892	0.832	0.891
Kleibergen-Paap rk Wald F statistic	0.055	5.780	5.230	3.510
Kleibergen-Paap rk LM statistic (p-value)	0.940	0.007	0.020	0.027

*Note: The second row represents the GVC measurement: overall and in the agriculture, industries and services sectors. Robust standard errors are in parentheses *** p<.01, ** p<.05, * p<.1.*

Table A3. GVC and structural change – results with TIVA

Dependent variable: Structural Change term	**(1)**	**(2)**	**(3)**	**(4)**
	Total	Agriculture	Industries	Services
Initial agriculture employment share	0.036***	0.034***	0.040**	0.035***
	(0.011)	(0.013)	(0.015)	(0.011)
Rule of law	0.007	0.007	0.006	0.007
	(0.005)	(0.005)	(0.005)	(0.004)
Currency misalignment	-0.005	-0.004	-0.005	-0.005
	(0.003)	(0.005)	(0.004)	(0.003)
Gross fixed capital formation (% of GDP)	0.037***	0.038***	0.039***	0.037***
	(0.012)	(0.010)	(0.012)	(0.010)
Tariff rate	-0.018**	-0.018**	-0.017**	-0.018**
	(0.008)	(0.009)	(0.008)	(0.008)
GVC index	-0.000	-0.002	0.002	-0.002
	(0.006)	(0.007)	(0.010)	(0.003)
Number of observations	198	198	198	198
Number of Countries	67	67	67	67
R-squared	0.265	0.237	0.279	0.259
Hansen J statistic (p-value)	0.512	0.529	0.473	0.594
Kleibergen-Paap rk Wald F statistic	32.436	1.627	8.752	14.057
Kleibergen-Paap rk LM statistic (p-value)	0.000	0.191	0.013	0.000

*Note: The second row represents the GVC measurement: overall and in the agriculture, industries and services sectors. Robust standard errors are in parentheses *** p<.01, ** p<.05, * p<.1.*

Table A4. GVC and growth of employment share – sectoral results

	Compound annual growth rate of industry employment share			Compound annual growth rate of services employment share		
	(1)	(2)	(3)	(4)	(5)	(6)
	Agriculture	Industries	Services	Agriculture	Industries	Services
Initial agriculture employment share	0.057	0.063*	0.065	0.079***	0.078***	0.083***
	(0.048)	(0.036)	(0.040)	(0.025)	(0.021)	(0.023)
Rule of law	-0.011	-0.013	-0.012	0.016**	0.015	0.015*
	(0.018)	(0.019)	(0.018)	(0.008)	(0.009)	(0.008)
Currency misalignment	-0.005	-0.005	-0.005	-0.002	-0.005	-0.003
	(0.011)	(0.009)	(0.009)	(0.005)	(0.005)	(0.005)
Gross fixed capital formation (% of GDP)	0.120***	0.120***	0.120***	0.026	0.018	0.019
	(0.035)	(0.032)	(0.032)	(0.020)	(0.019)	(0.017)
Tariff rate	-0.057	-0.049	-0.051	-0.006	-0.005	-0.007
	(0.048)	(0.039)	(0.038)	(0.023)	(0.021)	(0.018)
GVC index	-0.003	0.010	0.006	0.022	0.021	0.015
	(0.067)	(0.029)	(0.022)	(0.029)	(0.019)	(0.012)
Number of observations	325	325	325	325	325	325
Number of Countries	112	112	112	112	112	112
R-squared	0.101	0.124	0.113	0.112	0.075	0.161
Hansen J statistic (p-value)	0.618	0.712	0.706	0.271	0.748	0.659
Kleibergen-Paap rk Wald F statistic	0.397	8.255	13.204	0.397	8.255	13.204
Kleibergen-Paap rk LM statistic (p-value)	0.571	0.000	0.000	0.571	0.000	0.000

*Robust standard errors are in parentheses *** p<.01, ** p<.05, * p<.1.*

Table A5. GVC and natural resources – sectoral results

	Fuel Exports (% of merchandise exports)			Total natural resources rents (% of GDP)		
	(1)	(2)	(3)	(4)	(5)	(6)
	Agriculture	Industries	Services	Agriculture	Industries	Services
Initial agriculture employment share	0.165	-0.039	0.097	-0.014	-0.026	0.000
	(0.564)	(0.147)	(0.158)	(0.086)	(0.040)	(0.039)
Rule of law	-0.102	-0.124**	-0.123	-0.012	-0.021	-0.020
	(0.142)	(0.056)	(0.088)	(0.025)	(0.022)	(0.022)
Currency misalignment	0.096	-0.002	0.029	-0.012	-0.027*	-0.020
	(0.151)	(0.046)	(0.034)	(0.024)	(0.015)	(0.014)
Gross fixed capital formation (% of GDP)	0.268	-0.068	-0.047	0.040	-0.014	-0.009
	(0.470)	(0.168)	(0.117)	(0.082)	(0.056)	(0.052)
Tariff rate	0.501	0.301**	0.247**	0.065	0.062	0.048
	(0.668)	(0.130)	(0.102)	(0.095)	(0.042)	(0.033)
GVC index	1.010	0.573***	0.425***	0.145	0.122**	0.088***
	(1.158)	(0.155)	(0.110)	(0.168)	(0.047)	(0.026)
Number of observations	325	325	325	325	325	325
Number of Countries	112	112	112	112	112	112
R-squared	-5.631	-0.384	-0.042	-0.897	-0.034	0.061
Hansen J statistic (p-value)	0.387	0.500	0.694	0.173	0.646	0.545
Kleibergen-Paap rk Wald F statistic	0.397	8.255	13.204	0.397	8.255	13.204
Kleibergen-Paap rk LM statistic (p-value)	0.571	0.000	0.000	0.571	0.000	0.000

*Robust standard errors are in parentheses *** p<.01, ** p<.05, * p<.1.*

Table A6. GVC and capital intensity – sectoral results

	Labor compensation share of GDP			Ln(capital/labor)		
	(1) Agriculture	(2) Industries	(3) Services	(4) Agriculture	(5) Industries	(6) Services
Initial agriculture employment share	0.023	0.119	0.068	-1.808	-1.893***	-1.717***
	(0.151)	(0.102)	(0.094)	(1.120)	(0.397)	(0.463)
Rule of law	0.082*	0.063	0.073*	-0.080	-0.180	-0.168
	(0.047)	(0.057)	(0.040)	(0.235)	(0.190)	(0.170)
Currency misalignment	0.053	0.051*	0.044*	0.249	0.113	0.192*
	(0.032)	(0.028)	(0.024)	(0.217)	(0.121)	(0.106)
Gross fixed capital formation (% of GDP)	-0.254**	-0.255**	-0.276***	0.565	0.146	0.330
	(0.108)	(0.109)	(0.095)	(0.704)	(0.429)	(0.472)
Tariff rate	0.030	-0.078	-0.093	-0.824	-0.700	-0.808*
	(0.106)	(0.122)	(0.111)	(0.981)	(0.510)	(0.417)
GVC index	-0.318	-0.227**	-0.189***	1.252	1.220**	0.833***
	(0.197)	(0.089)	(0.072)	(1.729)	(0.575)	(0.301)
Number of observations	279	279	279	320	320	320
Number of Countries	95	95	95	110	110	110
R-squared	-0.621	-0.020	0.216	-0.208	0.419	0.493
Hansen J statistic (p-value)	0.531	0.754	0.737	0.090	0.137	0.094
Kleibergen-Paap rk Wald F statistic	2.294	14.020	21.138	0.423	8.155	13.778
Kleibergen-Paap rk LM statistic (p-value)	0.103	0.000	0.000	0.579	0.000	0.000

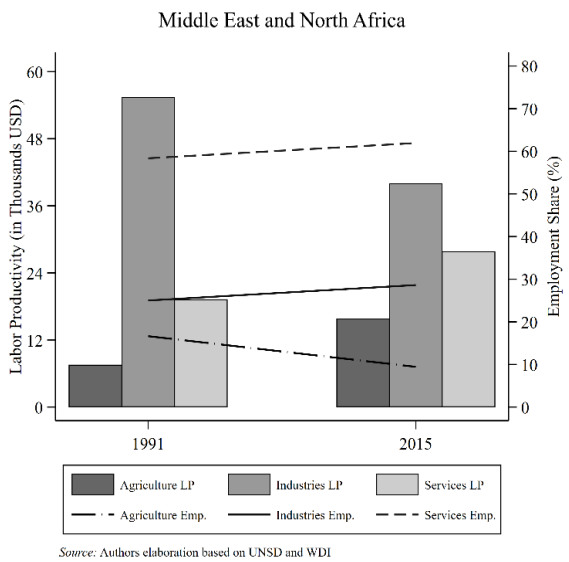
*Robust standard errors are in parentheses *** p<.01, ** p<.05, * p<.1.*

Table A7. Skilled labor contribution to gross exports – detailed sectors

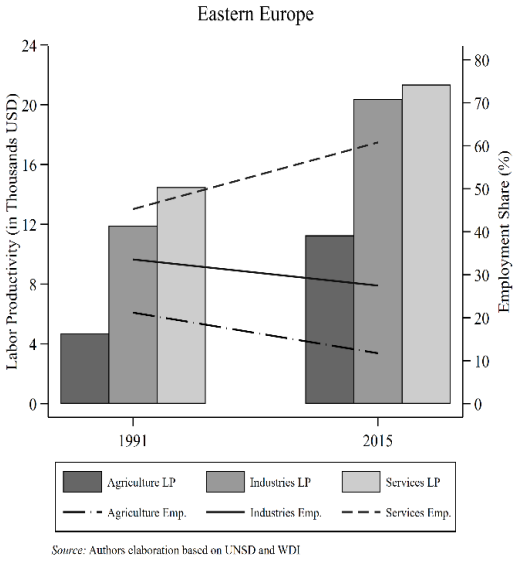
Dependent variable: Structural Change term	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
	Agriculture	**Industries**	**Services**	**Mining**	**Manufacturing**	**Manuf. Labor intensive**	**Manuf. Capital intensive**
Initial agriculture employment share	0.048***	0.058***	0.051***	0.044**	0.057***	0.045***	0.055***
	(0.011)	(0.009)	(0.013)	(0.017)	(0.009)	(0.012)	(0.010)
Rule of law	0.007	0.007	-0.003	0.012	0.005	0.004	0.002
	(0.005)	(0.004)	(0.008)	(0.007)	(0.004)	(0.005)	(0.005)
Currency misalignment	0.000	0.001	-0.001	0.002	0.002	0.001	0.001
	(0.003)	(0.003)	(0.004)	(0.005)	(0.003)	(0.004)	(0.003)
Gross fixed capital formation (% of GDP)	0.031**	0.023*	0.033***	0.030**	0.023*	0.030**	0.023*
	(0.012)	(0.012)	(0.012)	(0.015)	(0.013)	(0.013)	(0.013)
Tariff rate	-0.027***	-0.021**	-0.012	-0.006	-0.019*	-0.028***	-0.022**
	(0.008)	(0.010)	(0.011)	(0.031)	(0.011)	(0.009)	(0.009)
Skilled labor contribution to exports	0.134	-0.051*	-0.431*	-0.542	-0.078**	-0.640*	-0.110**
	(0.323)	(0.030)	(0.219)	(0.633)	(0.031)	(0.374)	(0.046)
GVC index	-0.006	0.004	0.021	0.021	0.006	0.003	0.005
	(0.010)	(0.007)	(0.013)	(0.033)	(0.008)	(0.009)	(0.008)
GVC index* Skilled labor contribution to exports	-0.018	-0.080***	-0.217**	-0.218	-0.101***	-0.304*	-0.124***
	(0.116)	(0.029)	(0.106)	(0.227)	(0.030)	(0.165)	(0.043)
Number of observations	267	267	267	267	267	267	267
Number of Countries	91	91	91	91	91	91	91
R-squared	0.204	0.270	-0.006	-0.351	0.240	0.163	0.280
Hansen J statistic (p-value)	0.072	0.207	0.877	0.694	0.539	0.323	0.631
Kleibergen-Paap rk Wald F statistic	2.396	7.923	2.910	0.356	5.797	3.899	3.827
Kleibergen-Paap rk LM statistic (p-value)	0.037	0.000	0.018	0.646	0.001	0.001	0.004

*Robust standard errors are in parentheses *** p<.01, ** p<.05, * p<.1.*

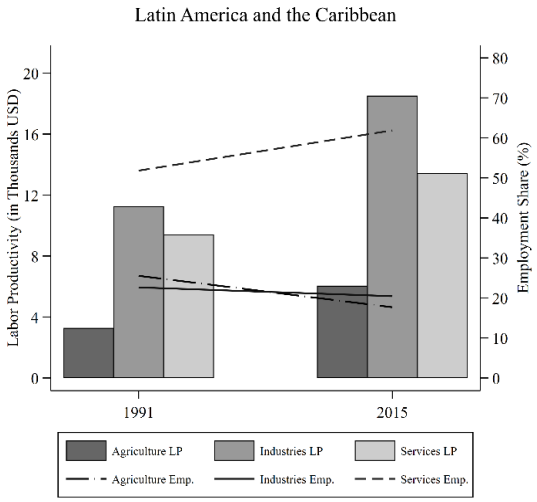
Figure A1. Labor productivity and employment share by region



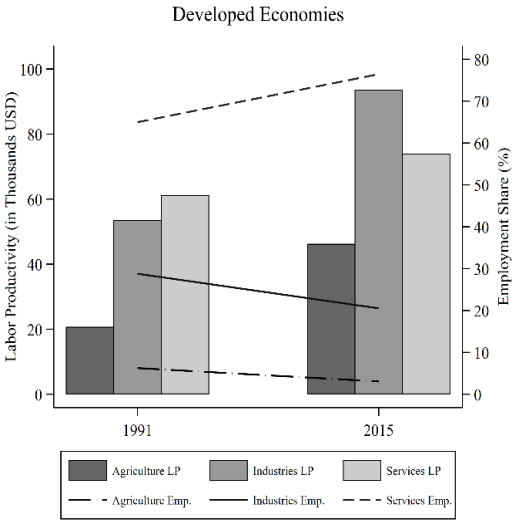
Source: Authors elaboration based on UNSD and WDI



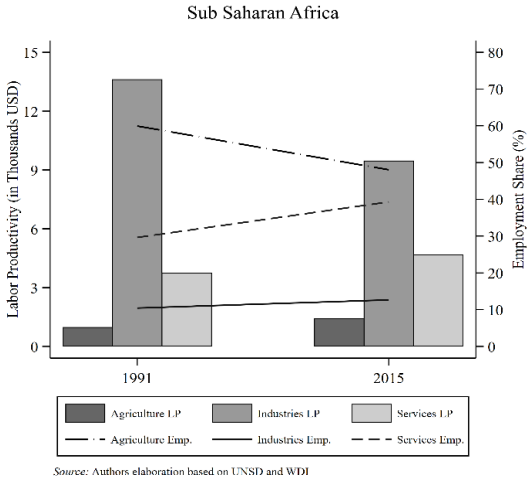
Source: Authors elaboration based on UNSD and WDI



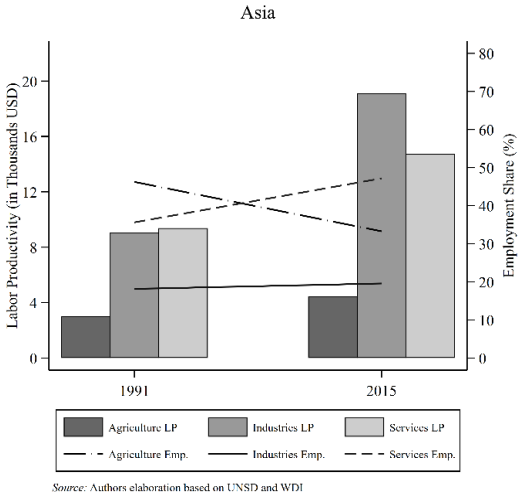
Source: Authors elaboration based on UNSD and WDI



Source: Authors elaboration based on UNSD and WDI

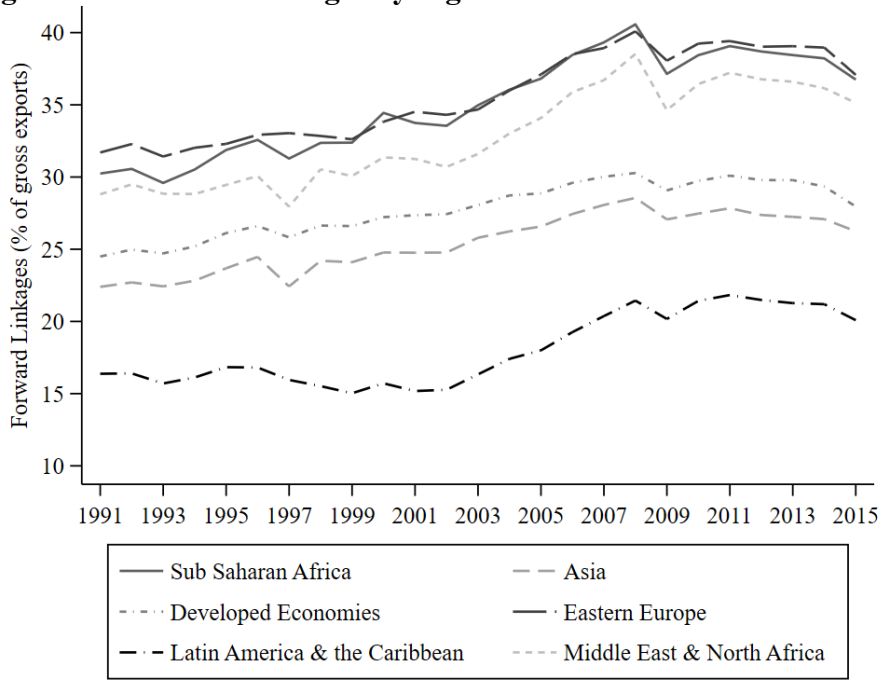


Source: Authors elaboration based on UNSD and WDI



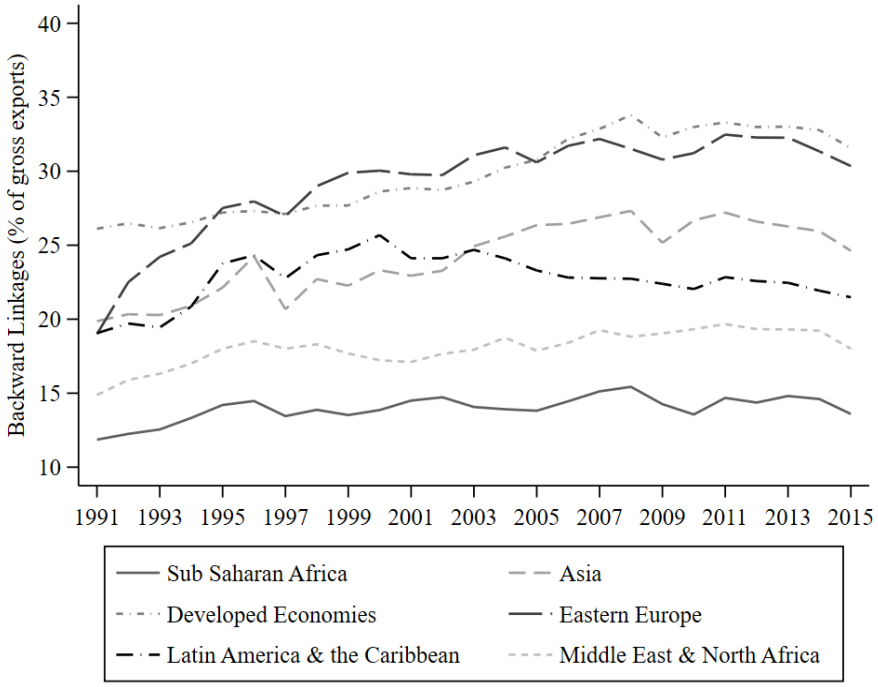
Source: Authors elaboration based on UNSD and WDI

Figure 2A. Forward linkages by region



Note: Regional values are calculated as unweighted averages
Source: Authors' own elaboration based on EORA Dataset

Figure 3A. Backward linkages by region



Note: Regional values are calculated as unweighted averages
Source: Authors' own elaboration based on EORA Dataset