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## Does Global Value Chain Participation Depress Labor Shares in Manufacturing?

Hüseyin Alperen Özer,  
Halit Yanıkkaya  
and Taner Turan

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# Does Global Value Chain Participation Depress Labor Shares in Manufacturing?

**Hüseyin Alperen Özer<sup>1</sup>**

*Department of Economics,  
Gebze Technical University,  
P.K. 141, 41400, Gebze/Kocaeli, Turkey  
Tel: +90 262 605 14 59  
Email: [aozer@gtu.edu.tr](mailto:aozer@gtu.edu.tr)*

**Halit Yanıkkaya<sup>2</sup>**

*Department of Economics,  
Gebze Technical University,  
P.K. 141, 41400, Gebze/Kocaeli, Turkey  
Tel: +90 262 605 14 81  
Email: [halityanikkaya@gtu.edu.tr](mailto:halityanikkaya@gtu.edu.tr)*

**Taner Turan**

*Department of Economics,  
American University in Bulgaria  
and Gebze Technical University,  
P.K. 141, 41400, Gebze/Kocaeli, Turkey  
Tel: +90 262 605 14 20  
Email: [turan@aubg.edu](mailto:turan@aubg.edu) [turan@gtu.edu.tr](mailto:turan@gtu.edu.tr)*

## Abstract

This paper examines the impact of global value chain (GVC) participation on labor shares across different skill levels within the manufacturing sector for 44 countries from 1995 to 2022. Using disaggregated labor share data and distinguishing GVCs into forward and backward modes, this paper reveals that backward GVC participation tends to depress the labor share of low and medium-skilled workers in both developed and developing countries. In contrast, forward GVC participation boosts labor shares across all skill levels in developing countries. Interestingly, higher backward participation in GVCs tends to raise high-skilled labor share in developed countries. These heterogeneous effects suggest that the direction of GVC participation, labor skill level as well as development stage shape the distributional outcomes for manufacturing employment.

**Keywords:** GVCs, Labor Shares, Manufacturing, Skill Levels

**JEL Classifications :** C23, F16, F63, J24

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<sup>1</sup> Corresponding author

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## 1. Introduction

GVCs—the worldwide networks that organize different stages of production—can affect labor shares by reallocating tasks across countries. The fragmentation of production across borders often shifts routine and labor-intensive activities to locations with cost advantages. In this context, GVC integration may induce capital–labor substitution, thereby putting downward pressure on labor shares (see Acemoglu and Restrepo, 2018; Autor et al., 2003; Rodrik, 2018). At the same time, GVC integration can enable productivity gains which translate into higher labor shares. Although GVCs play an important role on economic performance, empirical evidence on their effects on labor shares is still limited (see, Reshef and Santoni, 2023; Guschanski and Onaran, 2023).

To this end, this paper examines how GVCs influence the labor shares of various skill levels in the manufacturing across 44 countries from 1995 to 2022. With this objective in mind, the study introduces several novelties. First, from a theoretical standpoint, disaggregating labor shares by skill level is critical because GVCs can relocate manufacturing tasks through offshoring. In line with the Heckscher–Ohlin framework, GVC integration can reinforce specialization according to countries' factor endowments, so that in skill-abundant economies the labor share of high-skilled workers tends to rise relative to that of low-skilled workers (see, Jian and Milberg, 2013; Rodrik, 2018). Secondly, following Yanikkaya et al. (2022), we disaggregate GVC participation as forward and backward linkages and investigate their impact on both skilled and unskilled labor shares. These two types of participation can have distinct implications for labor shares due to different transmission mechanisms (see, Crusciolo and Timmis, 2017). Third, we examine whether level of development differs the relationship between GVC participation and labor shares (see Riccio et al., 2024), as development is closely tied to specialization patterns and the skill composition of the workforce both of which influence labor shares.

Our empirical results indicate that engaging in backward GVCs reduces the low and medium-skilled manufacturing labor share in both developing and developed countries. In contrast, forward GVC participation boosts labor shares across all skill levels in developing countries. Interestingly, participation in backward GVCs tends to favor skilled-manufacturing labor share in developed countries.

This study is organized as follows: second section reviews the literature, the third section presents model and data, fourth section discusses the empirical results, and the last section concludes with key findings and some policy implications.

## 2. Literature Review

GVCs are fundamentally underpinned by offshoring whereby multinational companies may relocate the segments of production to other countries to benefit from low labor costs. This has two distinct effects on the labor shares in both developed and developing countries. First, in developed countries, relocating labor-intensive stages of production abroad makes domestic production more capital- and skill-intensive, reducing the labor share of low- and medium-skilled workers (see, Feenstra and Hanson, 1995, Dao et al., 2017; Abdih and Danninger, 2017). Second, in developing countries, hosting offshored production can raise employment and wages in export-oriented sectors and thus raise low-skilled labor shares (see, Hollweg, 2019).

Beyond offshoring, GVC participation also influences labor shares through technology diffusion and capital deepening. Participation in GVCs often accelerates the adoption of new technologies and automation, which are frequently skill biased (see, Bloom et al., 2016). The diffusion of high-level technologies through GVC linkages tends to complement high-skilled labor while displacing low-skilled workers. As a result, wage disparities between skilled and unskilled labor are likely to persist and automation-induced labor displacement may decline labor share (see, Chen et al., 2018). Participation in GVCs also tends to make production more capital-intensive. As capital's role in the production expands relative to labor, a higher share of income flows to capital owners, naturally (see, Karabarbounis and Neiman, 2014).

However, the effects of GVCs on labor shares are not purely technological. They also operate through workers' bargaining positions. When production is fragmented across borders via offshoring, multinational firms can credibly threaten to relocate tasks to other countries with more advantageous labor costs (see, Dao et al., 2017). This "exit option" may weaken labor's bargaining position in wage negotiations even if relocation does not occur which depress labor shares (see, Guschanski and Onaran, 2023; Harrison, 2005; Rodrik, 1998). Additionally, participation in GVCs may erode collective bargaining power in developing countries via subcontracting, informal employment, and temporary contractual arrangements. As workforce cohesion weakens, the capacity to negotiate better wages diminishes, reinforcing downward pressure on labor's share (see, Anner, 2020).

The mechanism between GVC participation and labor shares is not inherently adverse. In some cases, integration into global production networks may boost labor shares by enhancing industry scale, productivity and skill development (see, Milberg and Winkler, 2010). By linking into GVCs, countries may expand their employment opportunities via higher scale in the export-

oriented industries which provide higher income for workers (see, Horvath et al., 2020). Also, post-GVC entry might increase the wage premia by moving into higher-value and knowledge-intensive tasks (see, Brambilla et al., 2017). As countries upgrade within GVCs labor demand becomes more skill intensive which can raise wages and increase the labor share of value added (see, Hummel et al., 2014). By embedding workers in advanced and skill-intensive activities, GVC participation serves as a catalyst for the human capital upgrading (see, Grundke et al., 2017).

A growing body of empirical work shows that GVC integration significantly influences labor shares. Guschanski and Onaran (2023) show that a 1% increase in intra-industry intermediate exports lowers the labor share in seven emerging economies, with the most pronounced impact on medium-skilled labor in manufacturing. Fontagné et al. (2024) report that deeper specialization in upstream GVCs activities reduces the labor share through declining payments to the fabrication utilities. Reshef and Santoni (2023) find that the sharp decline in labor shares between 2001 and 2007 coincides closely with the rapid expansion of forward GVC participation, following China's WTO integration. Also, they indicate that GVCs reallocate value away from labor toward capital by increasing upstream specialization and capital intensity.

### 3. Model and Data

To investigate the labor share effects of GVC participation in the manufacturing sector, we estimate a simple model following Guschanski and Onaran (2023):

$$\begin{aligned} \text{Manufacturing Labor Share}_{c,t} = & a + \beta \text{Controls}_{c,t} + \beta_1 \text{Backward GVC Participation}_{c,t} + \beta_2 \\ & \text{Forward GVC Participation}_{c,t} + v_t + z_c + \varepsilon_{c,t} \end{aligned} \quad (1)$$

In Equation (1), manufacturing labor share is defined as the value-added share of compensation across different skill structures (low, medium, high and the total). The control variables include labor productivity (calculated as value added per worker) and capital deepening (calculated as capital stock per worker). Backward GVC participation is measured by the share of foreign value-added in exports, while forward GVC participation is quantified as the domestic value-added of exports re-exported subsequently (see, Koopman et al., 2014). Lastly,  $v_t$ ,  $z_c$  and  $\varepsilon_{c,t}$  represent time dummies, country dummies (including both exporter and importer countries) and the error term, respectively.

Our data on labor, capital, value-added, and GVCs are sourced from the EXIOBASE-3 multiregional input-output tables, covering 44 countries from 1995 to 2022 (see, Stadler et al.,

2018). To gain more initial insights, we provide mean values for our five-year-averaged dataset in Table 1. The descriptive statistics reveal notable differences in labor share patterns between developing and developed countries. Most notably, total labor share is substantially higher in developed economies than in developing ones. Consistently, developed countries also exhibit higher levels of capital stock and labor productivity. Manufacturing backward and forward participations are broadly similar across income groups, but developed countries have slightly lower backward participation and slightly higher forward participation. Lastly, we estimate equation (1) using a Two-Stage Least Squares (TSLS) estimator to address the endogeneity, which may arise because GVCs and labor shares are jointly determined. Deeper GVC integration can shift the demand for various types of labor, thereby influencing labor market and ultimately the distribution of labor shares across skill groups. Higher wages and employment may also feed the incentives to participate more in manufacturing GVCs. To mitigate the endogeneity concerns, we instrument GVC participation with the distance-weighted GVC participation, following Owusu (2025). Through policy emulation channel, countries tend to imitate trade and industrial policies of geographically proximate peers, so higher GVC participation in nearby countries is a strong predictor of a country's own GVC integration.

(INSERT TABLE 1 HERE)

#### 4. Empirical Results

Table 2 shows our baseline estimations for the effect of GVC participation on labor shares in both developing and developed countries, without considering skill levels<sup>3</sup>. Regarding the control variables, capital stock per worker depresses labor shares because higher capital intensity may shift income toward capital rather than labor. Notably, labor productivity increases the labor share in both developing and developed countries, suggesting that productivity gains strengthen workers' ability to capture a larger portion of value added. Participation in forward GVCs increases the total labor share in developing countries, because supplying intermediate manufacturing exports stimulates demand for labor. Also, providing intermediate inputs for exports might expose developing countries to advanced technologies which increase the wages (see, Farole, 2016).

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<sup>3</sup> As a robustness check, we also re-estimate equation (1) using a fixed-effects estimator which confirms our baseline findings.

(INSERT TABLE 2 HERE)

We also investigate whether skill level is important for GVC effects on labor shares. Because one would expect different segments of manufacturing value chains rely on distinct skill sets, and GVC participation can lead to labor displacement through technology adoption and imported intermediates. Moreover, we split the sample into developed and developing countries to capture structural differences in the impact of GVC participation on labor shares, as the two cohorts differ significantly in production technologies, institutional quality, skill endowments, and positions within manufacturing GVCs. For this purpose, Tables 3, 4 and 5 present empirical results for developing and developed countries considering skill levels, respectively.

For both developing and developed countries, higher backward participation decreases low- and medium skilled labor share as in Tables 3 and 4. This result reflects that imported intermediates typically substitute domestically produced and labor-intensive inputs, reducing the demand for low- and medium-skilled workers. (see, Rodrik, 1998) in both developing and developed countries. On the other hand, higher backward participation favors high skilled labor share in developed countries as seen in Table 5. From a Heckscher–Ohlin perspective, developed countries are relatively abundant in skilled labor, hence deeper backward GVC participation complements their specialization in skill-intensive stages of manufacturing exports, raising high-skilled labor share. Interestingly, participating in forward GVCs enhances labor shares at all skill levels except high skilled in developed countries. Considering the well-known Leontief paradox, one possible explanation is that the factor content of forward GVC exports from developed countries may not be predominantly high-skill exports. Hence, the gains from forward GVC integration may favor more low- and medium-skilled labor shares than those of the high-skilled. This result also implies that exporting manufacturing intermediaries not only boosts productivity but also expands the demand for low and medium skill (see, Bernhart and Pollak, 2016).

(INSERT TABLE 3 HERE)

(INSERT TABLE 4 HERE)

(INSERT TABLE 5 HERE)

## **5. Conclusion**

In this study, we investigate how GVC participation affects labor shares across different skill levels in manufacturing for 44 countries from 1995 to 2022. Our empirical results indicate some significant variations based on the direction of GVC engagement (backward and forward

linkages) and the development level of countries. Specifically, our empirical results indicate that higher backward GVC integration depresses low and medium skilled labor share, while forward GVC integration significantly enhances labor shares at all skill levels in developing countries. Conversely, in developed countries, backward GVC participation reduces the labor share of low- and medium-skilled workers while increasing that of high-skilled workers, whereas forward GVC participation tends to raise the labor share of low- and medium-skilled labor.

Our results underlie some important policy interventions. For developing countries, given the positive impact of forward GVC linkages on labor shares at different skills, policymakers could provide incentives to participate more effectively in higher segments of the value-chain by strengthening industrial policies that support GVC participation and positions. Conversely, backward GVC participation tends to reduce the labor share of low- and medium-skilled workers, developing countries should not only strengthen labor-market institutions and redistributive mechanisms, but also invest in absorptive capacity through human-capital formation. Such policy efforts can help to ensure that imported intermediates translate into social upgrading rather than low-skill job displacement. In developed countries, where backward GVC integration raises the high-skilled labor share, policies that promote the diffusion of productivity pay-offs to the unskilled would be essential to avoid income polarization.

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**Tables:**

Table 1: Mean Values

Variables	Full Sample		Developing Countries		Developed Countries	
	Obs.	Mean	Obs.	Mean	Obs.	Mean
Total Labor Share (%)	9010	51.347	4610	46.130	4400	56.814
Low-Skilled Labor Share (%)	9010	3.266	4610	2.970	4400	3.575
Medium-Skilled Labor Share (%)	9010	30.386	4610	28.664	4400	32.191
High-Skilled Labor Share (%)	9010	17.695	4610	14.496	4400	21.047
log(VA/L)	9010	3.630	4610	2.872	4400	4.424
log(K/L)	9010	1.709	4610	1.014	4400	2.437
BP (%)	9010	9.380	4610	9.584	4400	9.166
FP (%)	9010	8.884	4610	9.058	4400	8.702

Table 2: Total Labor Share and Manufacturing GVCs

	Full Sample		Developing Countries		Developed Countries	
	(1)	(2)	(3)	(4)	(5)	(6)
log(VA/L)	2.772** (1.197)	2.770** (1.199)	3.339* (1.929)	3.279* (1.929)	2.350*** (0.891)	2.395*** (0.896)
log(K/L)	-6.294*** (0.914)	-6.286*** (0.911)	-6.836*** (1.203)	-6.709*** (1.185)	-5.560*** (0.775)	-5.578*** (0.776)
BP	-0.054 (0.034)		-0.101 (0.063)		-0.018 (0.022)	
FP		0.120** (0.050)		0.207*** (0.080)		0.003 (0.035)
Observations	9,010	9,010	4,610	4,610	4,400	4,400
R-squared	0.038	0.040	0.027	0.032	0.054	0.054
Kleibergen–Paap Wald F-statistics	25549	28852	20791	18492	8823	11011

Notes: Country-clustered robust standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Time dummies are included in all specifications but not reported. Following Owusu (2025), we employ distance-weighted GVCs as instruments. The Kleibergen–Paap Wald F-statistics consistently exceed the Stock–Yogo benchmarks, validating instrument strength across all specifications.

Table 3: Low-Skilled Labor Share and Manufacturing GVCs

	Full Sample		Developing Countries		Developed Countries	
	(1)	(2)	(3)	(4)	(5)	(6)
log(VA/L)	0.088 (0.096)	0.101 (0.096)	-0.083 (0.132)	-0.081 (0.133)	0.997*** (0.106)	1.040*** (0.106)
log(K/L)	-0.730*** (0.072)	-0.727*** (0.072)	-0.658*** (0.088)	-0.641*** (0.087)	-0.840*** (0.087)	-0.872*** (0.088)
BP	-0.020*** (0.003)		-0.015*** (0.005)		-0.024*** (0.004)	
FP		0.017*** (0.004)		0.015*** (0.006)		0.015*** (0.005)
Observations	9,010	9,010	4,610	4,610	4,400	4,400
R-squared	0.074	0.073	0.072	0.074	0.047	0.039

Notes: Country-clustered robust standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Time dummies are included in all specifications but not reported. Following Owusu (2025), we employ distance-weighted GVCs as instruments. The Kleibergen–Paap Wald F-statistics consistently exceed the Stock–Yogo benchmarks, validating instrument strength across all specifications.

Table 4: Medium-Skilled Labor Share and Manufacturing GVCs

	Full Sample		Developing Countries		Developed Countries	
	(1)	(2)	(3)	(4)	(5)	(6)
log(VA/L)	0.868 (0.755)	0.877 (0.757)	0.889 (1.272)	0.873 (1.275)	0.539 (0.492)	0.599 (0.483)
log(K/L)	-2.550*** (0.549)	-2.543*** (0.547)	-3.554*** (0.736)	-3.469*** (0.724)	-1.335*** (0.420)	-1.405*** (0.424)
BP	-0.045** (0.023)		-0.071* (0.042)		-0.046*** (0.014)	
FP		0.077** (0.032)		0.108** (0.051)		0.043* (0.024)
Observations	9,010	9,010	4,610	4,610	4,400	4,400
R-squared	0.018	0.020	0.024	0.027	0.011	0.009

Notes: Country-clustered robust standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Time dummies are included in all specifications but not reported. Following Owusu (2025), we employ distance-weighted GVCs as instruments. The Kleibergen–Paap Wald F-statistics consistently exceed the Stock–Yogo benchmarks, validating instrument strength across all specifications.

Table 5: High-Skilled Labor Share and GVCs

	Full Sample		Developing Countries		Developed Countries	
	(1)	(2)	(3)	(4)	(5)	(6)
log(VA/L)	1.816*** (0.419)	1.792*** (0.418)	2.532*** (0.581)	2.486*** (0.578)	0.814 (0.544)	0.756 (0.546)
log(K/L)	-3.013*** (0.356)	-3.016*** (0.355)	-2.624*** (0.446)	-2.599*** (0.442)	-3.385*** (0.451)	-3.302*** (0.445)
BP	0.011 (0.012)		-0.016 (0.019)		0.052*** (0.012)	
FP		0.026 (0.018)		0.083*** (0.026)		0.055 (0.087)
Observations	9,010	9,010	4,610	4,610	4,400	4,400
R-squared	0.049	0.050	0.030	0.038	0.068	0.064

Notes: Country-clustered robust standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Time dummies are included in all specifications but not reported. Following Owusu (2025), we employ distance-weighted GVCs as instruments. The Kleibergen–Paap Wald F-statistics consistently exceed the Stock–Yogo benchmarks, validating instrument strength across all specifications.

## Appendix:

### A1. Country List

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Australia*	Indonesia	Spain*
Austria*	Ireland*	Sweden*
Belgium*	Italy*	Switzerland*
Brazil	Japan*	Taiwan*
Bulgaria	Korea (Republic of)	Turkey
Canada*	Latvia	United States*
China	Lithuania	
Croatia	Luxembourg*	
Cyprus	Malta	
Czechia	Mexico	
Denmark*	Netherlands*	
Estonia	Norway*	
Finland*	Poland	
France*	Portugal	
Germany*	Romania	
Great Britain*	Russia	
Greece	Slovakia	
Hungary	Slovenia	
India	South Africa	

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Notes: Asterisk (\*) represents the developed countries in our sample.

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