economies

Article

Do Women Benefit from Global Production Networks? Evidence from the Indonesian Footwear Industry

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Abstract: Despite the remarkable improvements in key economic and social standards, the Indonesian footwear industry still struggles to ensure decent work, particularly for women workers. In this paper, female workers are divided into production and non-production workers. Women production workers are used as a proxy for occupational segregation based on sex, called non-skilled workers, while women non-production workers are used as a proxy for women's share of work in managerial and administrative work, called skilled workers. This paper examines the close links between decent work (DW) and global production networks (GPNs) in the Indonesian footwear industry. More specifically, this article scrutinizes fair employment treatment for local female employees within the DW framework in the country's footwear industry with the expansion of GPNs based on Indonesian footwear firm-level panel data from 2001 to 2015. Vertical specialization is a proxy for GPNs and is the main independent variable in this paper. The results show that vertical specialization is in line with the fair treatment indicators and has a significant level for female production workers. In addition, the other independent variable, namely the wages of production workers, has a significant level, and the results are inversely proportional to the fair treatment indicator, while the wages of non-production workers show results that are inversely proportional to female production workers but positive for female non-production workers. This shows that an increase in the wages of production workers is less profitable for female production workers than for female non-production workers. Thus, the results show that the expansion of GPNs in the Indonesian footwear sector has essentially led to improved fair employment treatment, especially for women workers.

Keywords: fair employment treatment; decent work; women workers; global production net-works; footwear industry

Citation: Wicaksono, Padang, Yulial Hikmah, and Rieka Evy Mulyanti. 2023. Do Women Benefit from Global Production Networks? Evidence from the Indonesian Footwear Industry. *Economies* 11: 233. https://doi.org/10.3390/economies11090233

Academic Editor: Ines Kersan-Škabić

Received: 13 June 2023
Revised: 30 August 2023
Accepted: 31 August 2023
Published: 13 September 2023

1. Introduction

Despite becoming an increasingly important contributor to the Indonesian economy over the last decade, the footwear industry has surprisingly received little attention from academicians, particularly with regard to social issues such as employment, social protection, workers' rights, and social dialogue. Indonesia was the sixth largest footwear producer and the tenth largest consumer in the world (World Footwear Yearbook 2016). Based on Statistics Indonesia the trend of the Indonesian footwear export value increased between 2002 and 2015. Leading global footwear brands such as Adidas, Nike, and Puma as well as other major regional brands have suppliers in the country employing thousands of workers, especially women (The Conference Board of Canada 2018). This position reflects the country's global reputation for manufacturing footwear products as a fruitful result of engagement in global production networks (GPNs).

Furthermore, the proponents of the GPNs theory mostly suggest that companies involved in GPNs have the opportunity to carry out economic upgrading by producing higher-value goods or services or positioning themselves within the value chains (Kuroiwa and Heng 2008; Hiratsuka and Uchida 2010; Kawakami and Sturgeon 2011). In other

words, the more a given country, sector, industry, or certain company engages in global production networks, the more new job opportunities are created. However, there are growing concerns that the economic benefits achieved by firms do not necessarily reflect an improvement in the social welfare of workers (Salido and Bellhouse 2016). Indeed, economic upgrading is not automatically accompanied by social upgrading (Kaplinsky and Readman 2005; Barrientos et al. 2011; Milberg and Winkler 2011; Rossi 2013).

In contrast to the growing concerns mentioned in the previous paragraph, while it faced increasingly intense competition in meeting commercial demands and maintaining high-quality standards and flexibilities, the Indonesian footwear industry experienced both economic and social upgrading (twin upgrading) between 2000 and 2014 despite severe cost reductions, particularly labor costs (Wicaksono et al. 2019). Yet, the revival of the GPN paradigm creates an opportunity for emerging market economies to advance economic competitiveness through increased access to global markets (Salido and Bellhouse 2016), to create employment, especially for women (Barrientos et al. 2003; Raworth 2004), and to improve living standards (Bernhardt and Milberg 2013). This has a positive impact on the rapid growth of the leather and footwear industries which are labor-intensive industries, where an average of 46 percent of workers are women (UNIDO 2013). Nevertheless, the literature has not particularly clarified the mechanism behind the expansion of GPNs and its economic implications for female workers' conditions of employment, as well as their social welfare.

This paper aims to close this research gap by examining the consequences female workers deal with within a GPN. It focuses on the links between the country's engagement with GPNs and the challenges of how to keep it balanced with social upgrading by using the decent work (DW) framework (as initially introduced in Barrientos et al. 2011; Milberg and Winkler 2011). More specifically, the authors examine the implications of GPN engagement for equal opportunity and treatment in employment (later in this paper, the authors will use the terms "equal opportunity and treatment" and "fair employment treatment" interchangeably). The fair employment treatment indicators used in this article are the segregation of occupations by sex (women production workers) and women's share of employment in managerial and administrative work (women non-production workers) (Anker et al. 2003). The proportion of women is an indicator of "fair employment" because one form of justice is segregation based on gender. Moreover, this article also tries to contribute to the existing literature by scrutinizing GPN engagement at the firm level, emphasizing labor-intensive and low-tech industries, particularly footwear industries.

2. Literature Review

2.1. Fair Employment Treatment as One Element of DW

The concept of social improvement introduced in the Decent Work Agenda of the International Labour Organization (ILO) includes employment, standards and rights in the workplace, social protection, and social dialogue (Ghai 2003). The aim is to identify improvements in worker conditions in global chains and networks. This can be achieved in two ways: top-down or bottom-up. The evidence of outcomes for workers suggests that their inclusion in GPNs resulted in the creation of new employment opportunities for disadvantaged groups such as women and unskilled workers, who previously had no access to paid employment (ILO 2015).

Social development can be divided into two components, namely measurable standards and enabling rights (Elliott and Freeman 2003; Barrientos and Smith 2007). Measurable standards include wages, physical benefits (e.g., health and safety, and working hours), job security (e.g., contract type and social security), and gender (e.g., women in management). The rights reinforced include the most important trade union rights, such as freedom of association and collective bargaining, the right to choose a profession, non-discrimination, and the right to vote. Anker et al. (2003) proposed 11 sets of indicators, each of which includes a measured variable. These 11 clusters are job opportunities, unacceptable work, decent income and productive work, satisfactory working hours, stability and

security in the workplace, work–life balance, fair treatment in the workplace, occupational safety, social protection, social dialogue, and workplace relations, the economic and social underpinnings of decent work. Fair treatment in the workplace is an intrinsic human hope and one of the indicators of decent work. Indicators of equal treatment in employment are different between men and women.

The gender-based job gap that develops as a result of gender stereotypes has many implications for women's ability to effectively assimilate into the labor market, especially the formal market (Boserup 1970). Industry segregation by sex has adverse consequences for economic growth and productivity. Therefore, statistical discrimination may contribute to modern hiring practices that divert women to positions with lower skills even though they reach a certain level of human capital (ILO 2013).

The theory of human capital and the existence of discrimination describe the separation of work that assigns women to certain jobs in an industry that requires education, skill development, and other factors that contribute to one's human resource level. The labor market is diversified due to differences in education and training among prospective employees as well as entrepreneurs' production preferences. As a result, certain jobs become more suitable for individuals with different levels of human capital. If differences in human capital occur along gender lines, skill-based work segregation will emerge in line with segregation by sex (Bergmann 1974).

According to neoclassical theory, workers look for the best-paying jobs that consider their abilities, constraints, and preferences. Women are less productive than men and are almost exclusively responsible for domestic work and parenthood. Mincer and Polachek (1974) showed that women plan their lives differently from the way men do because women essentially withdraw from the labor market, at least temporarily. They will naturally decide and consider their responsibilities as they again make work choices and participate in the workforce. Women prefer a relatively high initial salary, relatively low returns for experience, and relatively low penalties for temporary withdrawal from the workforce, including flexible work in time of entry and hours (Anker 1998).

Research in developed countries such as Australia states that women are concentrated in various narrow jobs and industries, while in the United States, it is implied that labor market segregation is still prevalent (ILO 2013). In Indonesia's research on equal opportunity and treatment in employment, there was some progress in the period 1996–2010, as seen in the increasing number of women participating in politics and management as well as the reduced wage differentials among permanent employees. The gender wage gap declined among regular workers. In 2010, women were not adequately represented in the important job categories of legislators, senior officials, and managers (21.2 percent). The share of women in International Standard Classification of Occupation (ISCO-88) Group 11 (legislators and senior officials) and Group 12 (corporate managers) increased from 15.8 percent in 2007 to 20.1 percent in 2010 (ILO 2011).

2.2. Global Production Networks (GPNs)

GPNs consist of leading companies with local suppliers that participate in different value chains of business activity, while global value chains consist of two or more production networks that are compatible with the production process. Therefore, both are complementary concepts (Kuroiwa and Heng 2008). Ernst and Kim (2002) divide the main GPN companies into two types: brand leaders and contract manufacturers. Brand leaders give suppliers autonomy but demand high performance, while contract manufacturers build an independent manufacturing network and make an integrated supply chain available to brand leaders.

The footwear industry is a customer-driven manufacturing chain that produces labor-intensive goods to specifications and designs developed by "factory-less manufacturers" (Coe et al. 2013). The growing competition in the shoe industry is increasingly divided into high-end and low-end ("value") products and brands. Advanced manufacturing consists of enterprises that use better technology and highly skilled workers. Multi-party

participation is more common in these factories. Conversely, production or value added in the lower price segment is dominated by a strong price orientation and often poor working conditions (Hess 2013; Jones 2013).

This article used vertical specialization as a proxy for GPNs, which can be seen in Figure 1. Yi (2003) defines vertical specialization as an increase in linkages between production processes in successive vertical trade chains spanning many countries, with each country specializing in goods at a number of stages in the order of production of goods. Vertical specialization occurs when goods are produced in successive stages, where two or more countries add value to a good's production sequence, at least one country uses the imported inputs in the stage of the production process, and part of the output is exported. Vertical specialization has an importer, a subset of intermediate goods (used to produce exports), and an exporter, including finished and semi-finished products (Hummels et al. 2001). Ideally, vertical specialization is calculated at the level of individual goods and then combined. This article used vertical specialization as a measure of a firm's involvement in GPNs by declaring the contribution of imported inputs to gross output on exports in every footwear firm. The equation of vertical specialization is

$$VS_{ki} = \left(\frac{Imported\ Intermediaries_{ki}}{Gross\ Output_{ki}} \right) Exports_{ki} \quad (1)$$

where the notation k denotes state, i is goods, and

$$VS1_{ki} = \sum_{j=1}^{n} exported\ intermediates_{kji} \left(\frac{exports_{ji}}{gross\ output_{ji}} \right) \quad (2)$$

where j is the country of destination for exports from country k.

VS, measures the imported input content of exported goods, and $VS1$ measures the value of exported goods used as import inputs to produce exports of other countries' goods.

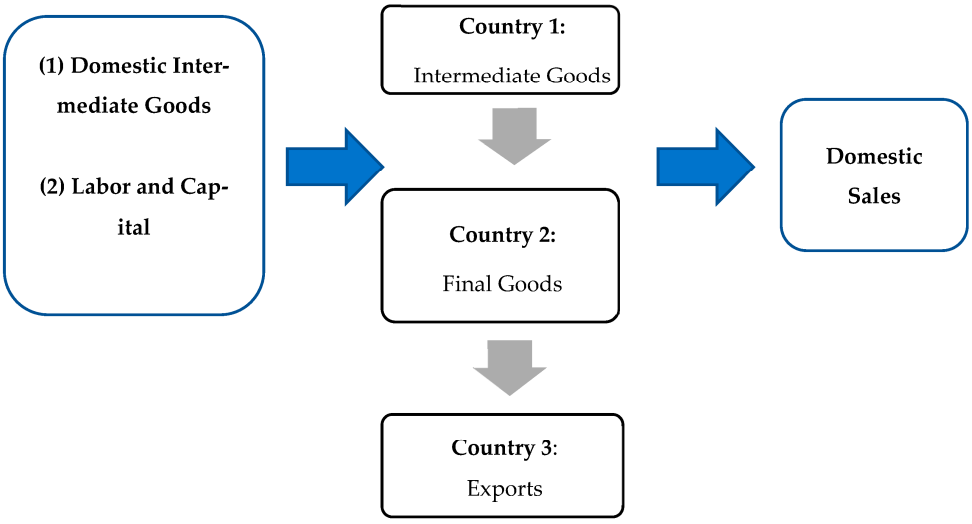

Figure 1. Vertical specialization (Yi 2003).

2.3. Linkage between Fair Employment Treatment and GPNs

Social upgrading is generally defined as changes in the working conditions or rights of workers that improve the quality of their employment (Rossi 2013). This advantage can come in the form of monetary remuneration or in terms of increased welfare. Social enhancement can be described as a social impact felt by workers engaged in production networks (ILO 2015). Social upgrading is generally defined as a change in the quality of work among workers.

Economic upgrading is a process whereby economic actors (firms and workers) move from low-value activities to relatively high-value activities in global supply chains and can be analyzed using country-level data export indicators (Gereffi 1995). Economic upgrading is a multi-faceted and complex process, involving changes in business strategy, production and technology structure, market policy, and organization (Bernhardt and Milberg 2013). Types of economic upgrading include process up-grading, product upgrading, functional upgrading, and chain upgrading. Each of these types of upgrading has different implications for skill and job development (Humphrey and Schmitz 2002).

The difference between the economic and social analyses of work arises from the integration of workers as productive and social subjects in the dynamics of change in GPNs in developing countries. This is to better understand how two-way improvements affect businesses and workers, and how profit-enhancing strategies benefit both businesses and workers. The analysis of twin upgrading measures is complex because it involves different data sets depending on the scope and understanding of these concepts. Three major methodological challenges in this measurement include the level of analysis and comparison of recent studies, the quality of available data, and the conceptualization of social enhancement (Salido and Bellhouse 2016). Milberg and Winkler (2011) provide several indicators to improve twin upgrading at the country, sector/industry, and firm levels.

Work analysis in the context of GPNs considers work as a productive factor form a social perspective. The conventional economic theory treats labor as a factor of production based on the marginal product of labor and the cost of labor in individual firms or in the labor market. The key assumption here is that companies should charge as little as possible to stay competitive. However, this does not fully recognize the role of labor in the context of GPNs where companies are concerned with meeting cost pressures and quality standards (Barrientos and Kritzinger 2004). Workers are seen as social subjects in addition to their role as factors of production and are elevated as human beings with skills and rights (Sen 1999). Outside the workplace, workers' welfare and dependents are influenced by networks and formal and informal social protection strategies supported by the government and society (Barrientos et al. 2011).

Demand for skilled labor in developing countries is increasing drastically due to engagement in GPNs (Kasahara et al. 2016). However, demand for production workers will decrease if there is a mechanization in the production process for most women (Jomo 2009; Joekes 1995). The basic theory of labor demand explains that two variables are considered by the firm for decision-making in employment recruitment, i.e., wages and capital. Wages have a negative correlation with labor demand, as well as capital and other factors of production (Ehrenberg and Smith 2012). GPNs can increase productivity and thus improve overall living standards through factors of production such as capital and labor (IMF 2016). At the firm level, the Cobb–Douglas production function is:

$$Q_{it} = A_{it}\, K_{it}^{\alpha}\, L_{it}^{1-\alpha} \tag{3}$$

where Q represents total output, A represents total factor productivity (TFP), K represents capital input, L represents labor input, i denotes firm, t denotes time, and α denotes factor share coefficients. The conceptual framework of this research is shown in Figure 2.

Figure 2 shows that VS, as a proxy for GPNs, and increases in labor and capital, which are influenced by wages and mechanization, are related to fair treatment in employment, namely gender and skill (managerial and administrative) segregation.

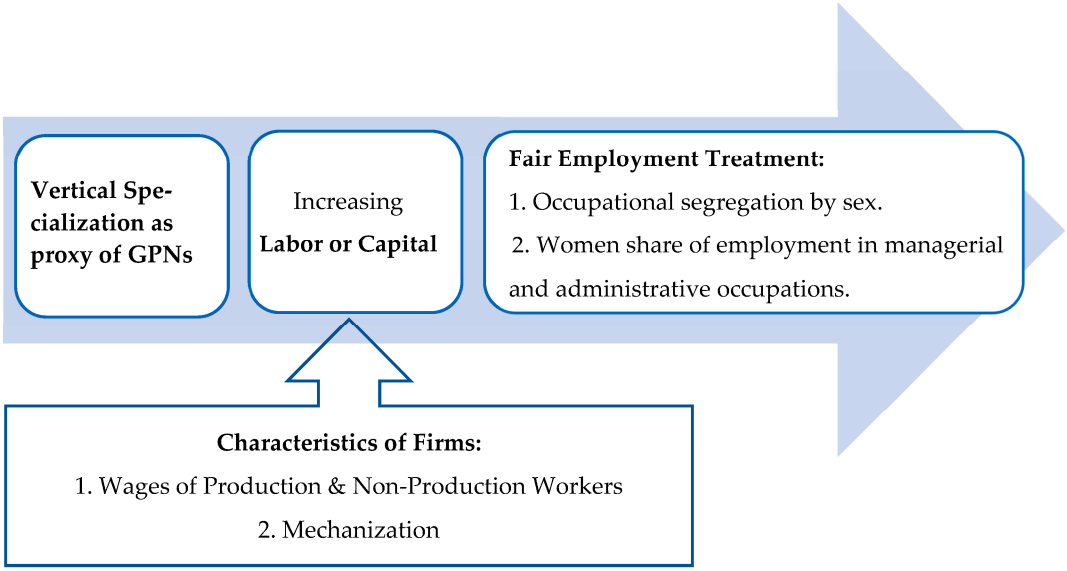

Figure 2. Theoretical framework.

3. Data and Methodology

The focus of this research was on medium- and large-scale footwear industry companies in Indonesia from 2001 to 2015. The data for this study were sourced from the Annual Survey of Large and Medium Manufacturing Statistics conducted by the Central Bureau of Statistics during the same period. The classification of the footwear industry used in this research follows the Footwear Industry Classification of ISIC Rev.4 (Indonesia Standard Industrial Classification) published by the United Nations Statistical Division (UNSD) in 2008. This classification encompasses various economic activities within the footwear industry, including footwear for daily needs (15201), the sports shoe industry (15202), the industrial engineering/shoe industry (15203), and other footwear industries (15209).

This research used company panel data for 15 years along with company response rates, which were unstable on a yearly basis. The survey provided 6503 data points on the Indonesian footwear industry from 2001 to 2015. The Slovin formula is a practical method for determining the size or number of samples, provided that the population is relatively large. This is used to determine the minimum number of samples needed in research by considering the error tolerance limit set by the researcher. The following is Slovin's formula:

$$n = \frac{N}{1 + Ne^2} \tag{4}$$

where n represents the number of samples needed, N represents the population size, and e represents the sampling error tolerance limit. The value of e must be determined by the researcher.

In this research, the researcher used a sampling error tolerance limit of 10%. Based on the Slovin formula, with an error tolerance level of 10%, many data samples are sufficient for analysis. Based on Equation (4), with an error tolerance level of 10%, the number of data samples is at least 99 companies. The samples used in this study were 127 panel companies from a 15-year period, or 1905 units of analysis. Thus, the amount of sample data used in this study is sufficient to make the research results representative.

The dependent variable in this study is fair employment treatment to measure the equal distribution of employment opportunities. Decent employment treatment in this study uses two indicators, namely:

(1) The proportion of female production workers among the total production workers as a proxy for occupational segregation based on sex;

(2) The share of female non-production workers among the total non-production workforce as a proxy for women's share of work in managerial and administrative work.

This study used production workers as a proxy for non-skilled workers and non-production workers as a proxy for skilled workers. The operational definition of each variable is shown in the Table 1.

Table 1. Operational definitions of variables.

Variable	Description	Category	Symbol
(1)	(2)	(3)	(4)
Dependent Variables			
Women production workers	The ratio of women production workers to total production workers.	Numeric	WPW
Women non-production workers	The ratio of women non-production workers to total production workers.	Numeric	WNPW
Main Explanatory Variables			
Vertical specialization	The ratio of imported inputs to gross output on exports adjusted to the constant price of the year 2012.	Numeric	VS
Control Variables			
The wage for production workers	The wage that production workers will receive in the Indonesian footwear industry adjusted to the constant price of the year 2012.	Numeric	WAGEPROD
The wage for non-production workers	The wage that non-production workers will receive in the Indonesian footwear industry adjusted to the constant price of the year 2012.	Numeric	WAGENONPROD
Fixed Capital	The value of fixed asset exports adjusted to the constant price of the year 2012. This variable is used to observe the mechanization that occurred in the Indonesian footwear industry.	Numeric	CAPITAL

The main explanatory variable is the firm's involvement in GPNs, represented by vertical specialization. Vertical specialization occurs when goods are produced in successive stages, where two or more countries add value at different stages and at least one country uses imports in the production stage. The resulting output includes exports, comprising intermediate goods (used in the production of goods for export) and finished or semi-finished goods (Hummels et al. 2001). Ideally, vertical specialization is calculated at the level of individual goods and combined. This article used vertical specialization to measure a firm's involvement in GPNs by declaring the contribution of imported inputs to gross output on exports in every footwear firm. The ratio between imported inputs and exported outputs measures vertical specialization. The greater the value of a company's vertical specialization, the greater the company's involvement in the global footwear production network.

The dependent variable also depends on firm characteristics, including wages for production and non-production workers and high capital (mechanization). Sánchez-Páramo and Schady (2003) argue that participation in GPNs can increase the demand for skilled labor in developing countries. In addition, imports can also increase capital goods. On the other hand, exports are fundamental to changes in the labor market, especially the increas-

ing demand for highly-skilled labor. Exports require increased output quality, operational services, and labor (Brambilla et al. 2014).

This study used the fixed effect method with panel data from footwear companies from 2001 to 2015. This is due to the fact that this study aims to identify differences between companies and between years. Although there are differences in each company, each intercept does not change with time (time-invariant). The fixed effect method can show how much the characteristics of each company come from other variables that are not included in the estimation model (the omitted variable). This characteristic can be seen in the different intercept levels for each company. In addition, when using the fixed effect method, it is not always assumed that the error component is not correlated with the independent variables, which may be difficult to fulfil (Nachrowi and Usman 2006). Two regression models are formed using the fixed effect method derived from the Cobb–Douglas production function and other firm characteristics as controls, namely the inferential models for the share of female production workers and the share of female non-production workers.

The inferential model for the share of female production workers (WPW) is as follows:

$$WPW_{it} = \beta_{01} + \beta_{11} VS_{it} + \beta_{21}\, WAGEPROD_{it} + \beta_{31}\, WAGENONPROD_{it} + \beta_{41} CAPITAL_{it} + (\mu_{1it} + \varepsilon_{1it}). \quad (5)$$

The inferential model for women non-production workers (WNPW) is as follows:

$$WNPW_{it} = \beta_{02} + \beta_{12} VS_{it} + \beta_{22}\, WAGEPROD_{it} + \beta_{32}\, WAGENONPROD_{it} + \beta_{42} CAPITAL_{it} + (\mu_{2it} + \varepsilon_{2it}) \quad (6)$$

where:

i = 1, 2, . . ., N (firm).
t = 1, 2, . . ., N (period).
WPW_{it} = The share of women production workers among the total production workers in firm i in period t (model 1).
$WNPW_{it}$ = The share of women non-production workers among the total production workers in firm i in period t (model 2).
β_{01}, β_{02} = Intercept (model 1 and model 2).
VS_{it} = Vertical specialization of firm i in period t.
$WAGEPROD_{it}$ = Wage of production workers in firm i in period t.
$WAGENONPROD_{it}$ = Wage of non-production workers in firm i firm in period t.
$CAPITAL_{it}$ = Fixed capital of firm i in period t

The objective of this research is to determine the impact of vertical specialization on the proportion of female production workers among the total production work-force and the proportion of female non-production workers. By analyzing the β11 and β12 coefficients, this study aimed to determine the direction and significance of the relationship, as hypothesized in the previous section. In the inferential models where the dependent variables are the share of female production workers and the share of female non-production workers, vertical specialization is expected to be positive (β11 and β12 > 0) and significant. This means that increasing company involvement in GPNs is expected to increase the share of female production workers and non-production workers.

4. Results and Discussion

4.1. Descriptive Analysis

Indonesia's linkages to GPNs can also be seen in the ownership structure data. Collective investment is the main ownership structure of footwear manufacturers, as shown in Table 2 below. Since the early 2000s, with the elimination of strict local content policies, the global linkages of the Indonesian production network have strengthened significantly. There has been a notable rise in foreign investment with complete foreign ownership, and numerous domestic companies have transitioned their ownership structure to co-investment.

Table 2. Footwear industry ownership structure by number of establishments.

Ownership	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Domestic Firm	329	319	303	286	297	525	488	431	407	394	401	401	399	409	429
Foreign Investment	11	15	25	20	16	25	31	28	31	35	32	34	31	33	44
Joint Investment	24	22	22	21	14	19	16	14	14	18	18	19	18	19	16
Total	364	356	350	327	327	569	535	473	452	447	451	454	448	461	489

Source: Annual Survey of Large and Medium Industries BPS, author's calculation.

However, the relationship between GPNs varies at the sub-industry level. The ownership structure trend has been moving towards complete foreign ownership among significant footwear manufacturers due to the characteristics of the leading brands in the industry. Meanwhile, co-investment is the preferred form of ownership for footwear component manufacturers. This is because multinational companies can access local resources and comply with Indonesian local content policies; local companies can become original equipment manufacturers, which significantly benefits the profitability of foreign and local companies (Wicaksono and Priyadi 2016).

The number of companies was relatively stable over the fifteen years studied if we only look at companies using the GPN framework rather than non-GPN companies. The number of non-GPN companies tended to increase from 2001 to 2015, but a decline tended to occur in the number of GPN companies. This may be due to GPN-related footwear manufacturers being overwhelmed by large companies with well-known brands with significant capital, meaning that companies with relatively moderate capital can face the footwear market, which tends to be dynamic and follows fashion.

The significant increase in the number of non-GPN companies in 2006, as shown in Figure 3, marked the revival of the local footwear industry after a downturn in the production sector due to many unilateral contract terminations by foreign parties and investors, and layoffs.

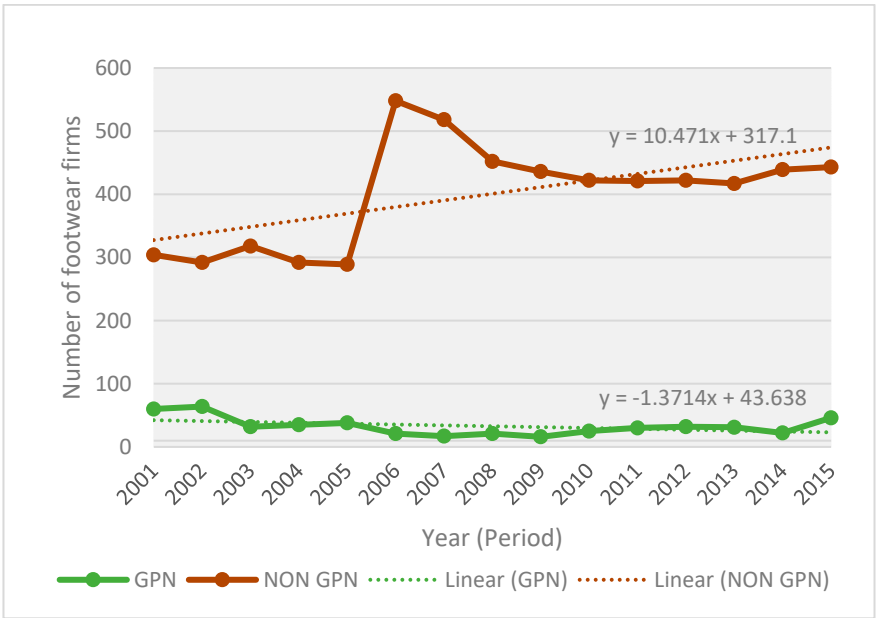

Figure 3. Number of Indonesian footwear firms using the GPN or non-GPN framework, 2001–2015. Source: Annual Survey of Large and Medium Industries BPS, author's calculation.

Economic improvement, represented by an improvement in a country's export performance, occurs in the Indonesian footwear industry, as shown in Figure 4. Despite the volatility, the export trend is increasing as the export market for Indonesian footwear products is internationally competitive (Bernhardt and Milberg 2013). The value of Indonesia's

footwear exports in 2012 increased significantly, as shown in Figure 4. Despite the global crisis in 2008, Indonesia's overseas footwear market share, especially for countries in the Americas and Europe, has not significantly decreased. This is because the export market share is increasing, particularly among countries in the Middle East, especially the United Arab Emirates, so the value of Indonesia's footwear exports tends to increase. Indonesian shoe products are superior to Vietnamese and Thai products because they show better workmanship and more careful stitching (Wicaksono et al. 2019).

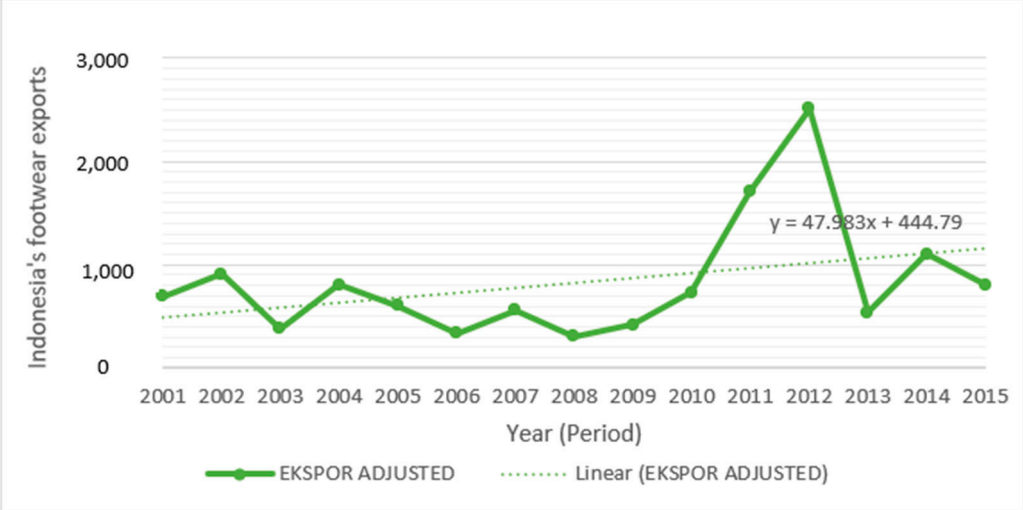

Figure 4. Indonesian footwear export adjusted with the inflation rate, 2001–2015. Source: Annual Survey of Large and Medium Industries BPS, author's calculation.

The increase in wages for production and non-production workers in the footwear industry in Indonesia in the 2001–2015 period, as shown in Figure 5 below, tends to increase. Real wages indicate how much workers benefit from the value created in their sector and indicate the bargaining power of labor (Bernhardt and Milberg 2013). Marginal productivity theory assumes that markets are perfectly competitive, leaving aside technological processes and risks in the economy; wages consist of a competitive labor market in which the demand for and supply of labor is the determining factor. Moreover, the company is assumed to always maximize profits. Wages will shift if there is a shift in the demand or supply curve for labor (Borjas 2016).

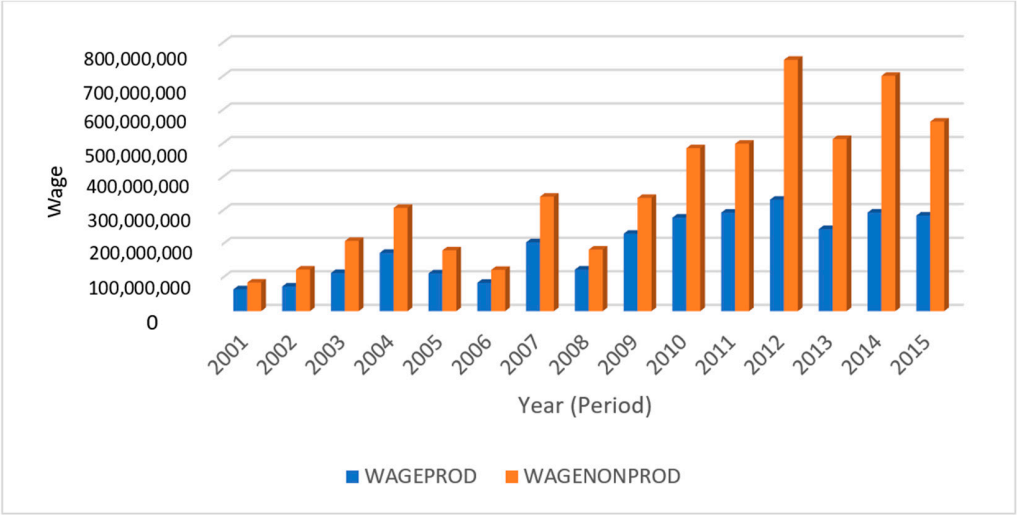

Figure 5. Wages of production workers and non-production workers in the Indonesian footwear industry, 2001–2015. Source: Annual Survey of Large and Medium Industries BPS, author's calculation.

4.2. Inferential Analysis

Before further analysis, it is essential to verify whether the model utilized adheres to the classical assumptions to ensure that the assessment outcomes satisfy the criteria of the Best Linear Unbiased Estimator (BLUE). The multicollinearity test was carried out by looking at the correlation values between the four independent variables in this study. The correlation results show that all correlation values between the independent variables do not exceed 0.8 (Table 3). This means no severe multicollinearity problem exists among the available independent variables.

Table 3. Correlation between independent variables in the model.

Variable	Vertical Specialization	Wage for Production Workers	Wage for Non-Production Workers	Fixed Capital
(1)	(2)	(3)	(4)	(5)
Vertical Specialization	1.0000			
Wage for Production Workers	0.0872	1.0000		
Wage for Non-Production Workers	0.0925	0.5773	1.0000	
Fixed Capital	0.0947	0.0738	0.0599	1.0000

Source: Annual Survey of Large and Medium Industries BPS, author's calculation.

Since the model was analyzed using the fixed effect method, the autocorrelation test was not conducted as this method does not assume a correlation-free model. However, a Wald test was employed to identify any heteroscedasticity issues. The test yielded a value lower than the predetermined α value (0.05), indicating the presence of heteroscedasticity in the error variance. To address this, a robust command can be added to the regression model to rectify the standard errors (Cameron and Trivedi 2009).

Based on the regression results shown in Table 4, using vertical specialization as the primary independent variable in this study is in line with the indicators of fair treatment and has a significant level for female production workers. However, other explanatory independent variables, such as the wages of production workers, have a significant level, and the results are inverse to the indicators of fair treatment. The wages of non-production workers have inverse results for female production workers but positive (in line) results for female non-production workers. In addition, capital is in line with the fair treatment indicators and has a less significant level for female non-production workers.

Table 4. Inferential analysis.

Variables (Notation Slope)	Model 1 (Women Production Workers)	Model 2 (Women Non-Production Workers
Vertical Specialization (β_{11} and β_{12})	8.39 exp-11 * (4.94 exp-11)	1.43 exp-11 (5.02 exp-11)
Wage of Production Workers (β_{21} and β_{22})	−5.32 exp-9 * (2.73 exp-9)	−5.62 exp-9 ** (2.80 exp-9)
Wage of Non-Production Workers (β_{31} and β_{32})	−1.04 exp-10 (4.24 exp-10)	6.76 exp-10 (6.06 exp-10)
Capital (β_{41} and β_{42})	1.17 exp-13 (1.33 exp-13)	2.84 exp-13 * (1.52 exp-13)
Constant (β_{01} and β_{02})	53.10418 ***	47.57749 ***
Number of observations	1905	1905
Number of groups	127	127
R^2	0.0502	0.0000

Source: Annual Survey of Large and Medium Industries BPS, author's calculation. Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; standard error in parentheses.

Vertical specialization is an important factor driving the difference in the proportion of women working in manufacturing and the proportion of women working in non-production among firms in the Indonesian footwear industry. A company's participation in the global footwear industry network can be translated into benefits for production workers through fair labor treatment where the proportion of female manufacturing workers is greater than the share of non-production personnel. Increasing the value of vertical specialization by INR 1 million will increase the proportion of female productive workers by 8.39 exp-11% and the proportion of non-productive female workers by 1.43 exp-11%, assuming other variables remain constant (all other things being equal). In this case, increased vertical specialization is more beneficial for production workers than non-manufacturing workers.

Based on Table 4, the effect of the wages of production workers shows inverse and significant results for both. This means that if the wages of production workers are increased, the share of female production workers and female non-production workers will be lower, with 5.32 exp-9 and 5.62 exp-9, assuming other variables are constant (ceteris paribus). In this case, the increase in the wages of production workers is more profitable for female production workers than for female non-production workers. The effect of non-production worker wages shows inverse results for female production workers, but in-line results for female non-production workers; both are not significant. This means that if the wages of non-production workers increase, the share of female production workers will be lower, with 1.04 exp-10, and the percentage of female non-production workers will be higher, with 6.76 exp-10, assuming other variables are constant (ceteris paribus). In this case, the wage increase for non-production workers is more profitable for female non-production workers than for female production workers.

The effect of an increase in production labor wages shows results that are inversely proportional and significant, assuming other variables remain constant (ceteris paribus). In other words, an increase in the wages of production workers does not necessarily increase the production share of women at companies in the footwear industry. This could be due to the tendency for footwear companies in Indonesia to employ more male than female production workers. Meanwhile, for women non-production workers who are considered to have high skills, this can cause women to prefer to delay entering the labor market until they find a wage that matches the desired reservation wage. This certainly requires further research.

Anker (1998) states that about half of all workers in the world are in sex-dominated occupations where at least 80 percent of workers are of the same sex, so the worldwide labor market is highly segmented by sex. Labor market rigidity re-duces employment opportunities, especially for women, and undermines economic efficiency. In "A Pollution Theory of Discrimination", Goldin (2002) also states that increased feminization in work, i.e., the extent to which women are in decision-making (authority) positions, such as managers and administrative workers, has a negative impact on wage levels at work. This is because the distribution of women and men at different levels of responsibility is an important measure of equal treatment at work (Anker et al. 2003). Women tend to have lower indicators of decent work than men. In addition, women also tend to have lower scores for high-performing employment indicators and higher employment rates for low-performing employment indicators. This aligns with research showing that women entering the labor market often use "unfavorable terms" (Ahikire et al. 2015).

5. Conclusions

This research examines how integrating the GPN framework impacts fair employment indicators in the footwear industry in Indonesia. The descriptive analysis shows that foreign investment in full foreign ownership has increased, and many domestic companies have changed their ownership structure to co-investment. The number of non-GPN companies tended to increase from 2001 to 2015, but the number of GPN companies tended to decrease. The country's export performance increased in the Indonesian footwear industry from

2001 to 2015. The wages of both production and non-production workers in the footwear industry in Indonesia also tended to increase.

The result of the inferential analysis with panel data regression shows that vertical specialization is a factor causing (significant) differences in the distribution of female production labor and the division of female non-production labor among companies in the Indonesian footwear industry. Increases in vertical specialization, wages of non-production workers, and mechanization benefit women non-production workers more than women production workers. Therefore, better education and employment opportunities are needed for women to increase their opportunities to enter the labor market with higher skills.

The involvement of the Indonesian footwear industry in GPNs during the 2001–2015 period was sufficient to demonstrate fair labor treatment. This sector-level re-search only analyzes existing conditions based on sectoral aggregate data on medium and large companies. Therefore, a more detailed investigation using company-level data is needed to assess the impact of individual companies' involvement in global production networks focusing on other decent work indicators.

Author Contributions: Conceptualization and supervision, P.W.; methodology, review, editing, and validation, Y.H.; formal analysis and writing—original draft preparation, R.E.M. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by the Universitas Indonesia research grant.

Informed Consent Statement: Written informed consent has been obtained from the patients to publish this paper.

Data Availability Statement: Data used from International Labour Organization (ilo.org accessed on 11 February 2020), Statistics of Indonesia or Badan Pusat Statistik (bps.go.id accessed on 20 February 2020).

Conflicts of Interest: The authors declare no conflict of interest.

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