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The Impact of Economic Upgrading on Social Upgrading: Evidence from Thailand's Processed Food Value Chain

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ABSTRACT

In the global value chains (GVCs) analysis, controversy over the relationship between economic and social upgrading remains. Many studies argue that economic upgrading (it consists of product, process, functional, and inter-sectoral upgrading) does not always generate social upgrading in developing countries, although they are key exporters of traded processed foods. Neglecting labor issues can be a serious problem for the countries as key global buyers pay more attention to these issues. This study examines the impact of economic upgrading on social upgrading in the Thai processed food sector, using the fixed effect regression. The study's findings show that product upgrading negatively effects social upgrading. This result can explain that the Thai processed food sector tends to become engaged in a 'race to the bottom'. They attempt to reduce their product costs (i.e., lowering wages) to keep competitiveness in global markets. In contrast, the lagged variable of function upgrading is positively significant for social upgrading. The key recommendation of the study is that private firms in the Thai processed food sector need to pay more attention to social upgrading. Particularly, all stakeholders in the sector should collaborate to create policies to support social upgrading in the Thai processed food sector.

Keywords: *Economic and Social Upgrading, Processed Foods, Global Value Chain*

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Background and Significance of the Research Problem

Through the lens of GVC analysis, upgrading is recognized as a key path of development for developing countries in GVCs. Previous research suggested that upgrading can be classified into two broad trajectories: economic and social upgrading (Bernhardt & Pollak, 2016). On the one hand, economic upgrading refers to countries' ability to shift their position in a GVC by producing products of higher quality and increasing output efficiency, thereby shifting to a new functional position in that GVC. On the other hand, social upgrading relates to processes of improvement in entitlements and workers' rights (Bernhardt & Pollak, 2016).

Processed food products have become a rising star as major exporting product of developing countries (Jongwanich, 2009; The Office of Industrial Economics, 2015). Many developing countries, including Thailand and Chile, have become key producers and exporters of processed foods, but upgrading in many production areas is needed. Previous studies have shown that it is not an easy task to find the proper way of upgrading (Marcato & Balter, 2020; Ponte & Ewert, 2009). Policymakers and other stakeholders need to understand the relationship between economic and social upgrading in a productive sector. Some product categories in that sector may experience both economic and social upgrading, but others may not.

Based on the literature in the GVC analysis, controversy over the relationship between economic and social upgrading remains. Several studies argue that economic upgrading may not generate social upgrading in developing countries. For example, excessive working hours and involuntary and often unpaid overtime work are seen in China's mobile phone industry, although the country has become a key producer and exporter of mobile phones globally (Barrientos et al., 2011). In contrast, Rossi (2013) suggests that economic upgrading (i.e., development in product quality and production processes) can bring positive outcomes for workers, especially production skill upgrading and increasing wages. Moreover, empirical studies on the impact of economic upgrading on social upgrading are rare. Most previous research applied qualitative methods, such as interviews or surveys (Ponte & Ewert, 2009; Ponte et al., 2014; Rossi; 2013), which generally lack statistical confidence and inferences. These are significant research gaps in the literature. This study contributes to the literature by examining the impact of economic upgrading on social upgrading. The Thai processed food sector is selected as a case study.

Research Objective

This study aims to empirically examine the impact of economic upgrading on social upgrading in Thailand's processed food sector by product category.

Scope of Research

The study period is between 2002 and 2020 due to data availability. Product categories of Thailand's processed food sector consist of meat products, dairy products, fish products, flour and cereals, vegetables and fruits (fresh or dried), sugar preparations and honey, coffee extracts, instant tea, cocoa-based products, processed vegetable oils, and other edible products and preparations. Data sources for the study are from the National Statistical Office of Thailand, the Bank of Thailand, the Office of Industrial Economics, the UN Comtrade Database, and World Development Indicators.

Research Methodology

1. Literature Review

Humphrey and Schmitz (2002) present four key types of upgrading: product, process, functional, and inter-sectoral upgrading. Product upgrading refers to developing product quality. Process upgrading occurs when countries can transform input factors into outputs more efficiently through the reorganization of relevant production activities. Functional upgrading refers to achieving a new function in a GVC, such as moving from assembly actors to distributors. Inter-sectoral upgrading emerges when countries can leverage some knowledge acquired from a current industry to insert their business into a new industry.

Trajectories in economic and social upgrading have increased in importance as a new type of upgrading in the GVC framework. Economic upgrading is defined as the competence of countries to move their position in a GVC by producing products with higher quality, making outputs more efficiently, and shifting to a new functional position in GVCs. In short, economic upgrading consists of product, process, functional, and inter-sectoral upgrading. Social upgrading describes improvements in employee entitlements and rights, including the well-being of employees. Social upgrading encompasses two broad aspects: measurable (e.g., employment and wage) and non-measurable aspects (e.g., non-discrimination and harassment of employers) (Bernhardt & Pollak, 2016).

Previous studies approached social upgrading analysis in the field of GVCs research from two perspectives (Barrientos et al., 2011; Marcato & Balter, 2020; Milberg & Winker, 2011;

Rossi, 2013). The first perspective sees labors as a productive factor. Conventional economic theory views labors as an input of production. Firms attempt to maximize their profit and minimize production costs. This can be seen as a trajectory of the low road when firms attempt to keep competitive based on lowering wages and profit margins, especially found in developing countries. Firms in developing countries are usually trapped in low-value activities and become engaged in a 'race to the bottom'. The second perspective views labors as socially embedded and highlights labors as human beings with capabilities and entitlements.

Based on the literature, concerns about the relationship between economic and social upgrading are growing. Social upgrading can be caused by derived demand effects. In short, the experience in economic upgrading may translate into social upgrading (Feenstra & Sasahara, 2018). However, Barrientos et al. (2011) and Bernhardt and Pollak (2016) claim that the relationship between economic and social upgrading is not necessarily positive, especially in developing countries. Szymczak and Wolszczak-Derlacz (2022) also suggest that participation in GVCs and economic upgrading in GVCs may have different effects on wages and employment. The effects depend on countries' characteristics and positions/tasks of countries in GVCs. Rossi (2013) suggests that product and process upgrading in the Moroccan garment sector can bring skill upgrading for regular workers, but not for irregular workers. The Office of Industrial Economics (2015) states that Thailand has become a key producer and exporter of seafood products in global markets, such as processed shrimp and canned tuna. However, labor exploitation persists in the Thai seafood industry, including child labor and human trafficking. Selwyn (2013) suggests that horticulture sectors in South Africa and Chile can achieve profitable exports, but there are social downgrading situations occurring in the horticulture sector, such as temporary contracts, and low pay.

Although there have been clear definitions of economic and social upgrading, a key challenge is how to numerically measure the upgrading. The exact and definite measurement of upgrading is inconclusive, especially for a specific product category. In addition, Milberg and Winkler (2011) argue that the quantification results can show how much upgrading is occurring in specific sectors of the economy and which productive sectors are experiencing relatively more or less economic and social upgrading.

Previous empirical studies employed relevant proxies (based on data availability) to quantify the upgrading (Bernhardt & Milberg, 2011; Bernhardt & Pollak, 2016). Product upgrading is improving product quality. To quantify product upgrading, product price or export unit price is a common proxy (Tham et al., 2016). Product quality reflects changes in consumer preferences

and, consequently, product prices. This leads to price differences between high- and low-quality products; higher quality means a higher price. However, a higher price may result from increased production costs or inefficient production. Thus, using only product prices to explain product upgrading can lead to misleading interpretations. Kaplinsky and Readman (2005) suggest using market shares combined with product prices to determine product quality. Exporters and producers who cannot achieve a cost-competitive situation often experience a decrease in their market share. In short, both increased product price and market share can explain product upgrading. Moreover, Khandelwal et al. (2013) quantify product quality using elasticities of substitution given the product price and market share. However, Curzi and Pacca (2015) argue that the elasticities of substitution are difficult to calculate from trade data and are of limited use, especially for specific product categories of the food sector.

Baylis et al. (2010) and Jongwanich (2009) state that a decrease in the number of import refusals can explain the process upgrading of food sectors. This is because if countries are required to meet food safety standards, they have to improve their production processes. The number of import refusals should reduce once they meet these standards. However, a vital constraint on using import refusals as a proxy for process upgrading is data availability, especially when focusing on a specific product category.

Functional upgrading occurs when producers and exporters can achieve new functions in GVCs. Export diversification can explain new export functions in GVCs by moving from the export of goods to the export of services. However, export diversification can clarify a situation where a country only changes its export destinations while continuing to export the same products (Jongwanich, 2020). This situation cannot explain functional upgrading since it does not reflect a country achieving new functions in GVCs. In contrast, Pananond (2012) suggests that outward foreign direct investment (OFDI) can be a proxy for functional upgrading. If producers and exporters in a country want to run a business related to product distribution in overseas markets, they often require increasing OFDI in the markets. However, OFDI data are usually reported as aggregated data of a sector, not for a specific product category (Pananond, 2012).

Furthermore, inter-sectoral upgrading is difficult to quantify though its definition is clear. This is because it describes upgrading only from a general perspective; it only suggests that a country can export a new product but does not explain what areas should be developed (Ponte & Ewert, 2009).

Bernhardt and Milberg (2011) proposed economic and social upgrading indices. The economic upgrading index of a specific product is computed from an equally weighted

combination between its market share in global markets and export unit value. By contrast, Bernhardt and Milberg use an equal combination of changes in employment rates and real wages to quantify social upgrading. Equally weighted effects of these indicators are assumed since research cannot provide exact impacts of each indicator on the computation of economic and social upgrading. It is a good start to use equally weighted effects rather than unequally weighted effects for the computation.

The key advantage of using Bernhardt's and Milberg's economic upgrading index is that it requires common international trade data (market share and export unit price) and is easy to quantify multiple product categories. Also, it is easy to make a comparison between economic upgrading indices of countries. The disadvantage of the index is that it cannot specify sub-types of upgrading (i.e., process and functional upgrading). In addition, the formula for economic upgrading's computation is somewhat similar to the concept of product upgrading proposed by Kaplinsky and Readman (2005). In terms of the social upgrading, the key advantage is that it employs common data related to social development: wage and employment variables. The disadvantage is that the index cannot capture other areas of social upgrading (i.e., poverty reduction, non-discrimination of employers).

Marcato and Baltar (2020), Milberg and Winkler (2011), and Tian et al. (2019) also propose alternative measurements for upgrading types of each country or firm, depending on data availability. Productivity growth, export growth, unit value of growth of output, and increased skill intensity of employment can describe economic upgrading at the country-and sectoral levels. Productivity growth, value-added growth, export growth, and business growth ratio (i.e., firm revenue) can be used to explain economic upgrading at the firm level. Wage growth, poverty reduction, and the human development index can explain social upgrading. In terms of social upgrading, poverty reduction, improved political rights, and human development index, the number of workers per job is used as a proxy.

2. Empirical Model

The study develops an empirical model to examine the impact of economic upgrading on social upgrading in Thailand's processed food sector. The dependent variable is the social upgrading index (SUP_{it}). To further confirm the robustness of the estimation, the study also uses employment and real wage variables as the dependent variable. The economic upgrading variables used in the equation (1) consist of product upgrading ($Prod_{it}$ and $Prod_{it-1}$), process upgrading ($Proc_{it}$ and $Proc_{it-1}$), and functional upgrading ($Func_{t}$ and $Func_{t-1}$). Based on the literature and data availability, other control variables are chosen (Basnett &

Sen, 2013; Gereffi & Fernandez-Stark, 2011; Melamed et al., 2011; OECD et al., 2014). They are the manufacturing production index (MPI_{it}) and other macroeconomic variables (e.g., inflation rate (INF_t), human resource development (HD_t), and the 2008 global financial crisis (GF_t)). The study does not take a logarithm on variables used in Eq. (1). This is because several variables contain both positive and negative values.

The study applies the fixed effect regression to estimate empirical models. This is because the data for empirical model is characterized as panel data. Also, the fixed effect regression can control the effect of unobserved variables on other regressors.

$$SUP_{it} = f(Prod_{it}, Prod_{it-1}, Proc_{it}, Proc_{it-1}, Func_t, Func_{t-1,} MPI_{it}, INF_t, HD_t, GF_t, \gamma_j) \quad (1)$$

where: i refers to product category, t refers to time t, and γ_j is fixed effect variables.

MPI is a common proxy for an industry's gross domestic product (GDP) and refers to the output of industrial establishments. Basnett and Sen (2013) and Melamed et al. (2011) reveal that growth in the manufacturing and service sectors has positive impacts on employment. However, Al-Habees and Rumman (2012) suggest that positive economic growth does not stimulate employment. GVC participation is positively related to domestic inflation and wages. In particular, low-wage countries are integrated into GVCs. The GVC integration places downward pressure on domestic inflation, subsequently lower wages. This is because countries need to keep their cost competitiveness in world markets (Andrews et al., 2018; Auer et al., 2017). In terms of the HD variable, previous studies argue that HD helps laborers improve their working skills, leading to SUP (Gereffi & Fernandez-Stark, 2011; OECD et al., 2014). The 2008 global financial crisis is commonly used as a control variable to absorb the time effect during the study period.

For the variable measurement, the study uses the social upgrading index presented by Bernhardt and Milberg (2011), which has been used in many empirical studies, to quantify the social upgrading of specific product categories in Thailand's processed food sector (Bernhardt & Pollak, 2016; Salido & Bellhouse, 2016). The social upgrading index is built from equally-weighted combinations of the employment rate and real wages (see equations (2)). As discussed in Bernhardt and Milberg (2011), equally weighted effects of these indicators are used because there has been no research that provides exact effects of each indicator on the computation.

$$\text{Social upgrading/downgrading} = 0.5*(\%\Delta EMPt) + 0.5*(\%\Delta RWt) \quad (2)$$

%ΔEMPt is the percentage change in employment in a specific industry (such as the meat industry and fruit industry) in Thailand's processed food sector at year t, %ΔRWt is the percentage change in real wages (its unit is 1,000 Thai Baht) (the real wage is adjusted by using the consumer price index (CPI)) in a specific industry at year t. Employment (its unit is 1,000 people), real wage, and CPI data are collected from the National Statistical Office of Thailand and World Development Indicators.

According to Bernhardt and Milberg (2011) and Kaplinsky and Readman (2005), the product upgrading index is built from equally-weighted combinations of the market share and export unit value (see equations (3)). Equally-weighted combination is used due to limited knowledge of the impacts of these indicators on the computation. If the index value is positive, upgrading has occurred; if it is negative, then downgrading has occurred.

$$\text{Product upgrading/downgrading} = 0.5*(\%\Delta MSj,t) + 0.5*(\%\Delta EUVj,t) \quad (3)$$

where %ΔMSj,t is the percentage change in the market share of Thai processed food in a market at year t, %ΔEUVj,t indicates the percentage change in the export unit value of Thai processed food in a market at year t. The export unit value is calculated using export volume[2] divided by export quantities (Salido & Bellhouse, 2016). Data used in Eq. (3) are extracted from the UN Comtrade Database

For the process upgrading, the study uses the labor productivity index of the Thai processed food sector as a proxy variable due to data availability. Milberg and Winkler (2011) and Tian et al. (2019) suggest that if the process upgrading at the sectoral level occurs, labor productivity tends to improve. Each product category's labor productivity data are extracted from the Office of Industrial Economics. For the functional upgrading, the study uses the OFDI of the Thai food sector as a proxy variable. This is because no OFDI data has been published for each specific product category. The OFDI data (its unit is a million U.S. dollars) are extracted from the Bank of Thailand.

In terms of other regressors used in Eq. (1), $MPI_{i,t}$ is collected from The Office of Industrial Economics. The INF_t (annual %) is obtained from World Development Indicators. HD_t is proxied by enrolment in tertiary education (% gross), extracted from World Development Indicators. The GF_t variable is a dummy variable. It equals one if a financial crisis occurs in year t, zero otherwise.

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[2] Export volume is in the real term. It is adjusted by the Thai export price index.

Results

1. Descriptive Statistics

The test for the multicollinearity problem is needed since the equation (1) is in the linear form. Table 1 reports the test's result of the multicollinearity problem and finds that there is no multicollinearity problem in the empirical model. This is because the correlation coefficients shown in Table 1 are not close to 1 or -1 (Gujarati & Porter, 2005). Table 2 summarizes key descriptive of variables used in the equation (1). They consist of a number of observations of each variable, mean, standard deviation, skewness, and kurtosis.

Table 1 Correlation Coefficients of Regressors Used in Eq. (1)

	$Prod_{it}$	**$Proc_{it}$**	**$Func_t$**	**MPI_{it}**	**INF_t**	**HD_t**	**GF_t**
$Prod_{it}$	1.000						
$Proc_{it}$	0.048	1.000					
$Func_t$	-0.163	0.391	1.000				
MPI_{it}	-0.056	0.306	0.279	1.000			
INF_t	0.057	-0.157	-0.376	-0.106	1.000		
HD_t	-0.014	0.496	0.571	0.357	-0.232	1.000	
GF_t	-0.015	-0.082	-0.136	-0.052	0.034	0.184	1.000

Table 2 Key Descriptive Statistics of Continuous Variables Used in Eq. (1)

Variables	**Key Descriptive Statistics**				
	Obs.	**Mean**	**Std. Dev.**	**Skewness**	**Kurtosis**
SUP_{it}	171	3.615	10.081	0.937	4.791
$Prod_{it}$	189	2.286	14.222	1.914	12.710
$Proc_{it}$	173	93.986	15.129	0.167	7.756
$Func_t$	207	1,025.433	1,207.553	1.365	3.854
MPI_{it}	189	93.742	20.454	-0.078	2.897
INF_t	207	2.080	2.142	0.834	3.565
HD_t	171	44.521	7.146	-0.895	2.939

2. Empirical Results

Table 3 presents empirical results of the impact of economic upgrading on social upgrading in Thailand's processed food industry. The dependent variable of the model (1) is the social upgrading index. The study found that the product upgrading variable has a negative impact on the social upgrading index at the 0.05 significance level. However, other economic upgrading variables have no impact on the social upgrading index. The study presents empirical results of the models (2) and (3) to provide the robustness check. The employment and real wages variables are regressed separately. The findings show that product upgrading has no impact on the employment variable. Meanwhile, both the product upgrading variable and its lagged variable negatively effect real wage at the 0.01 and 0.1 significance levels, respectively. In addition, the lagged variable of functional upgrading has a significant positive impact on real wages.

In terms of control variables, the study finds that the MPI variable is not significant for all models. It also shows that the INF variable is negatively significant for employment and real wages. Meanwhile, other control variables have no significant impacts on the social upgrading index, employment and real wage variables (Table 3).

Table 3 Empirical Results of the Economic Upgrading Impact on Social Upgrading

Regressors	Dependent Variable		
	(1) Social Upgrading Index	(2) Employment	(3) Real Wage
$Prod_{it}$	-0.088**	-0.239	-0.012***
	(0.035)	(0.165)	(0.003)
$Prod_{it-1}$	0.086	-0.030	-0.017*
	(0.065)	(0.220)	(0.008)
$Proc_{it}$	-0.057	0.238	0.001
	(0.105)	(0.364)	(0.008)
$Proc_{it-1}$	-0.050	0.078	0.003
	(0.121)	(0.353)	(0.011)
$Func_{t}$	0.0001	0.005	0.0002
	(0.001)	(0.004)	(0.0001)
$Func_{t-1}$	0.002	0.010	0.001***
	(0.001)	(0.009)	(0.0001)
MPI_{it}	-0.075	0.238	0.004
	(0.066)	(0.523)	(0.009)
INF_{t}	0.138	-4.423*	-0.127***
	(0.385)	(2.204)	(0.031)

Table 3 (Continued)

Regressors	Dependent Variable		
	(1) Social Upgrading Index	**(2) Employment**	**(3) Real Wage**
HD_t	0.312	1.524	-0.019
	(0.385)	(0.913)	(0.023)
GF_t	-1.208	-3.031	-0.253
	(1.866)	(5.775)	(0.206)
Cons	3.407	1.564	7.742***
	(9.656)	(55.648)	(1.160)
Obs.	120	128	128
F-test	26.10***	38.46***	53.52***
Industry fixed effect	Yes	Yes	Yes

Note: 1. *, **, *** indicate statistical significance at 0.1, 0.05, and 0.01 levels, respectively.

2. Numbers in parentheses are corrected standard errors.

Discussion

Based on the empirical results, the negative impact of product upgrading on the social upgrading index and real wage corresponds with the discussion in Barrientos et al. (2011), Marcato and Balter (2020) and Selwyn (2013). Firms in developing countries tend to become engaged in a 'race to the bottom'. They attempt to reduce their product cost (i.e., lowering wages) to keep competitiveness in global markets. In particular, most firms in Thailand's processed food industry are small and medium-sized. Labor exploitation and other relevant problems (e.g., human trafficking and child labor) to maintain firms' competition can still be found (Barrientos et al., 2011; Bernhardt & Pollak, 2016).

The positive impact of functional upgrading on real wages can be explained by an increase in investment of large Thai companies in Thailand's processed food industry. As discussed in Rossi (2013) and Tian et al. (2019), functional upgrading requires higher skilled laborers, which in turn implies large investment in training and the payment of higher wages.

For other control variables, the MPI variable is not significant. This finding corresponds with the study by Al-Habees and Rumman (2012). That is, economic growth does not guarantee an increase in the employment rate and wages. The INF variable is negatively significant for employment and real wages. This could be the result of the long-run relationship between employment and inflation, as discussed in Vermeulen (2017). When countries participate in GVCs, downward pressure is placed on domestic inflation, resulting in lower wages for local

laborers. This is true for advanced economies due to the threat of using foreign suppliers (outsourcing) (Andrews et al., 2018; Auer et al., 2017).

Suggestions

Based on the study's findings, some pertinent conclusions can be drawn. Private firms in Thailand's processed food sector need to pay more attention to social upgrading. This is because most global buyers are concerned about labor problems, especially in developing countries. Suppose developing countries fail to comply with labor standards proposed by global buyers or neglect labor problems. In that case, they risk losing their market share in world markets (The Office of Industrial Economics, 2015). Thus, private firms need to improve both measurable (i.e., employment, wage, working hours) and non-measurable (i.e., employees' rights and fairness of employers) aspects of social upgrading. Private firms should integrate action plans for social and economic upgrading. In particular, employers and employees in Thailand's processed food sector should participate and work together to create policies related to social upgrading (Hamilton-Hart & Stringer, 2016).

References

Al-Habees, M. A., & Rumman, M. A. (2012). The relationship between unemployment and economic growth in Jordan and some Arab countries. *World Applied Sciences Journal, 18*(5), 673-680.

Andrews, D., Gal, P., & Witheridge, W. (2018). *A genie in a bottle? Globalization, competition and inflation* (No. 1462). OECD Economics Department Working Papers. Retrieved from https://www.oecd-ilibrary.org/economics/a-genie-in-a-bottle_deda7e54-en

Auer, R., Borio, C., & Filardo, A. (2017). *The globalization of inflation: The growing importance of global value chains* (No. 602). BIS Working Paper. Retrieved from https://www.bis.org/publ/work602.htm

Barrientos, S., Gereffi, G., & Rossi, A. (2011). Economic and social upgrading in global production networks: A new paradigm for a changing world. *International Labour Review, 150*(3-4), 319-340.

Basnett, Y., & Sen, R. (2013). *What do empirical studies say about economic growth and job creation in developing countries*. EPS PEAKS Research Paper. Retrieved from https://www.gov.uk/research-for-development-outputs/what-do-empirical-studies-say-about-economic-growth-and-job-creation-in-developing-countries

Baylis, K., Nogueira, L., & Pace, K. (2010). Food import refusals: Evidence from the European Union. *American Journal of Agricultural Economics, 93*(2), 566-572.

Bernhardt, T., & Milberg, W. (2011). *Economic and social upgrading in global value chain: Analysis of horticulture, apparel, tourism and mobile telephones* (No. 6). Capturing the Gains Working Paper. Retrieved from www.capturingthegains.org/publications/workingpapers/wp_201106.htm

Bernhardt, T., & Pollak, R. (2016). Economic and social upgrading dynamics in global manufacturing value chains: A comparative analysis. *Environment and Planning A: Economy and Space, 48*(7), 1220–1243.

Curzi, D., & Pacca, L. (2015). Price, quality and trade costs in the food sector. *Food Policy, 55*, 147-158.

Feenstra, R. C., & Sasahara, A. (2018). The 'China Shock,' exports and U.S. employment: A global input–output analysis. *Review of International Economics, 26*(5), 1053–1083.

Gereffi, G., & Fernandez-Stark, K. (2011). *Global value chain analysis: A Primer*. North Carolina, the Unite States: Duke University.

Gujarati, D. N., & Porter, D. C. (2005). *Basic Econometrics* (5th ed.). New York, the U.S: McGraw-Hill/Irwin.

Hamilton-Hart, N. & Stringer, C. (2016). Upgrading and exploitation in the fishing industry: Contributions of value chain analysis. *Marine Policy, 63*, 166–171.

Humphrey, J., & Schmitz, H. (2002). How does insertion in global value chains affect upgrading in industrial clusters? *Regional Studies, 36*(9), 1017-1027.

Jongwanich, J. (2009). Impact of food safety standards on processed food exports from developing countries. *Food Policy, 34*(5), 447-457.

Jongwanich, J. (2020). Export diversification, margins and economic growth at industrial level: Evidence from Thailand. *The World Economy, 43*, 2674–2722.

Kaplinsky, R., & Readman, J. (2005). Globalization and upgrading: What can (and cannot) be learnt from international trade statistics in the wood furniture sector? *Industrial and Corporate Change, 14*(4), 679-703.

Khandelwal, A., Schott, P. K. & Wei, S. J. (2013). Trade liberalization and embedded institutional reform: Evidence from Chinese exporters. *American Economic Review, 103*(6), 2169–2195.

Marcato, M., & Balter, C. T. (2020). Economic upgrading in global value chains: Concepts and measures. *Revista Brasileira de Inovação*, 19(e020002),1-25.

Melamed, C., Hartwig, R., & Grant, U. (2011). *Jobs, growth and poverty: What do we know, what don't we know, what should we know?* The Overseas Development Institute Background Note. Retrieved from https://cdn.odi.org/media/documents/7121.pdf

Milberg, W., & Winkler, D. (2011). Economic and social upgrading in global production networks: Problems of theory and measurement. *International Labour Review, 150*(3-4), 341-365.

OECD, WTO & World Bank Group. (2014). *Global value chains: Challenges, opportunities, and implications for policy* [Report]. The G20 Trade Ministers Meeting, Sydney, Australia.

Pananond, P. (2012). Moving along the value chain: Emerging Thai multinationals in globally integrated industries. *Asian Business & Management, 12*(1), 85-114.

Ponte, S., & Ewert, J. (2009). Which way is "up" in upgrading? Trajectories of change in the value chain for South African wine. *World Development, 37*(10), 1637-1650.

Ponte, S., Kelling, I., Jespersen, K. S., & Kruijssen, F. (2014). The blue revolution in Asia: Upgrading and governance in aquaculture value chains. *World Development, 64*, 52-64.

Rossi, A. (2013). Does economic upgrading lead to social upgrading in global production networks? Evidence from Morocco. *World Development, 46*, 223–233.

Salido, J., & Bellhouse, T. (2016). *Economic and social upgrading: Definitions, connections and exploring means of measurement*. Mexico: Economic Commission for Latin America and the Caribbean.

Selwyn, B. (2013). Social upgrading and labour in global production networks: A critique and an alternative conception. *Competition and change, 17*(1), 75–90.

Szymczak, S., & Wolszczak-Derlacz, J. (2022). Global value chains and labour markets–simultaneous analysis of wages and employment. *Economic Systems Research, 34*(1), 69-96.

Tham, S. Y., Kam, A. J. Y., & Aziz, N. I. A. (2016). Moving up the value chain in ICT: ASEAN trade with China. *Journal of Contemporary Asia, 46*(4), 680-699.

The Office of Industrial Economics. (2015). *Project examining the effects of global and supply chain (GSC) free trade agreements (FTAs) on Thai manufacturing* (Final report). Bangkok: The Office of Industrial Economics.

Tian, K., Dietzenbacher, E., & Jong-A-Pin, R. (2019). Measuring industrial upgrading: applying factor analysis in a global value chain framework. *Economic Systems Research, 31*(4), 642-664.

Vermeulen, J. C. (2017). Inflation and unemployment in South Africa: Is the Phillips curve still dead? *Southern African Business Review, 21*(1), 20-54.

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