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Labor Productivity Growth Comparison Vietnam, China, and South Korea: How productive is Vietnam?

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Abstract

The paper analyzes labor productivity growth for Vietnam by using Divisia Index Decomposition to decompose productivity growth into 3 separate effects: improvement from within sectors or the direct effect, labor reallocation between different sectors or structural change effect, and price change or term of trade effect. The results of Vietnam are compared to that of China and South Korea to determine Vietnam's difference sources of productivity growth relative to the 2 compared economies. We found out Vietnam labor productivity growth relies on both improvement from within sectors and labor reallocation between different sectors while that of China and South Korea are due mainly to improvement from within sectors. Moreover, while China and South Korea shows consistent improvement from within sectors and labor reallocation patterns following the line of development economics, Vietnam's productivity growth is being driven by a small but hyper productivity segment of the employment force working in other industrial sectors with labor reallocation from agriculture mainly into service in earlier periods and to manufacturing in later periods. On the aggregate level, we also found out that although Vietnam experienced drastic decline in agriculture employment shares, the decline is due to expansion of the employment force rather than labor migrating out of agriculture into others more productive sectors.

I. Introduction

Vietnam – a country on the move and in transition, has experienced unprecedented economic growth for the last 30 years. Government reforms since liberalization coupled with beneficial global trends have helped propel Vietnam from being one of the world's poorest nations to a middle-income country in one generation (The World Bank in Vietnam, 2022). After a series of reforms known as Đổi Mới in 1986, the country has posted annual real GDP and real GDP per capita growth rates of 6.4 percent and 5 percent, respectively (World Development Indicator, n.d.). Vietnam has benefited from a program of internal modernization, a transition from its agricultural base toward manufacturing and services, and a demographic dividend powered by its youth population (Breu, Dobbs, Remes, Skilling, & Kim, 2012). These effects, an expanding labor pool, structural shift away from agriculture, and improvement in productivity within the sector, taken together, explained the majority of Vietnam's GDP growth (Breu, Dobbs, Remes, Skilling, & Kim, 2012).

Despite the tremendous progress in economic development from 1991 to present, Vietnam's economic-wide labor productivity growth was moderate and unstable. Labor productivity in absolute terms remains insignificant compared to other Northeast Asia and ASEAN economies (Nguyen, Pham, Bui, & Ohno, 2021). In the Vietnam Productivity Report-2021, the rate of labor productivity growth evolved in 3 distinct stages: high growth (1991-1995), stagnation (1996-2012), and recovery (2013-present). The report shows that labor productivity was highest in secondary industry, specifically manufacturing and construction, followed by the tertiary industry or the service sector, with primary industry, including agriculture, forestry, and fishery, having the lowest labor productivity. It should be noted that the structure of labor productivity with the secondary industry being the most productive and the primary industry being the least productive is consistent with the expected dynamism in a developing country similar to that of Vietnam. Nonetheless, this paper will reexamine Vietnam's labor productivity progress similarity with this expected dynamism for a developing country and compare the productivity

decomposition results of Vietnam with China and South Korea in order to recommend a future potential growth path for the country.

Informed by this background, this paper seeks to identify sectoral contribution and analyze the pattern of labor productivity growth in Vietnam during its development history from 1991 to 2019. Sectoral contributions to economic development from the lens of developing economies have been emphasized from a number of studies: Ocampo, 2005; Marcel & Szirmai, 2000; Üngör, 2017; Mcmillan, 2014; etc. Within the context of our study, we will decompose labor productivity growth of Vietnam into 3 sectoral contributions: within sector effect, labor reallocation between sectors effect or structural change effect, and term of trade effect. The within effect depends on the improvement of technological knowledge and innovation in the production process, facilitated by worker training in knowledge and skills as well as technology transfer or purchase from foreign countries (Molnar, 2015). The structural change effect measures the impact of transfer of workers from low to high productive sectors; in other words, productivity changes due to labor mobility across sectors (Marcel & Szirmai, 2000; Alam, Anós Casero, Khan, & Udomsaph, 2008). Foster-McGregor & Verspagen (2016) pointed out that structural change plays a large role in the growth rate of labor productivity in Asia developing economies, as these economies benefit from movement of labor from lower-than-average productivity sectors to high productivity sectors. However, such a model of economic growth will become less beneficial once labor migration from agriculture to “modern” sectors diminish. Lastly, our analysis encompasses the term of trade effect, which consider the impact of relative change in prices toward labor productivity. For instance, given constant demand and increasing sector’s output overtime, output relative price will decrease, hence depressing labor productivity level measured in terms of output price.

For comparison purposes, the paper analyses the decomposition results for China and South Korea because these countries share some similarities in their geography and economic development path with Vietnam (Bresser-Pereira, Jabbour, & De Paula, 2020). Specifically, Vietnam and South Korea are immediate geographical neighbors of China, and all 3 countries are within the Sinosphere, regions in East

Asia that had been historically influenced by Chinese culture. The most notably similarity between China and South Korea are their recent economic growth, where both countries began in the list of the world poorest and predominantly agrarian before liberalization and rose up to second position (China) and twelfth position (South Korea) in term of nominal GDP among the OECD countries (OECD, National Accounts at a Glance 2015). We believe a comparison of Vietnam with the selected countries would shed some light on the relatively slower growth of labor productivity in Vietnam. The literature surrounding the economic success of South Korea and China shares some consensus among economists, such as the state's central role coordinating and developing industrial policy as means to execute respective national development strategies, the existence of public – or private – business conglomerates connected with the national financial system, export focus growth strategy with increasing value added, highly educated bureaucracies and labor forces, etc (Evans, 2018; Bresser-Pereira, Jabbour, & De Paula, 2020). However, within the concern of our study, the economic structure in term of labor allocation within both China and South Korea during their respective development period are comparable to that of Vietnam and other developing economies, where the pre-development economy's labor resides mainly within primary sector – especially agriculture - and shifts to manufacturing and services during economic growth. Still, Vietnam and other developing countries in Asia have not experienced a labor productivity spurt similar to that of South Korea or China that boost the nation into high income level (Breu, Dobbs, Remes, Skilling, & Kim, 2012; Nguyen, Pham, Bui, & Ohno, 2021).

II. Conceptual Framework

With the objective of analyzing the patterns of labor productivity growth of Vietnam and comparing it to that of China and South Korea by using structural decomposition analysis, this paper is based on the findings of structuralist and new growth theory for economic development. Research has stressed the importance of economic structure to economic growth through labor productivity (Mcmillan, 2014; Ocampo, 2005). Within the context of economic development, during the development path, a country can be placed into one of five categories in term of growth: (i) traditional societies - a subsistence

economy, high levels of agriculture and labor intensive agriculture; (ii) societies with pre-growth conditions - increase capital use in agriculture, development of mining sector, some growth of saving and investment; (iii) societies in "take-off" mode - high level of investment and industrialization, accumulation of savings and investment, decline labor shares in agriculture sector; (iv) societies where wealth generation enables investment in value adding industry – growth becomes self-sustaining, an increasing diversified industry, increase use sophisticated technology; (v) mass-consumption societies that achieved high output level, services sector dominates economic structure (Lin, 2011). Recent economic structuralists also highlight that the optimal industrial structure of an economy will be different at various levels of economic development (Lin, 2011). For Korea, during its industrialization and rapid economic growth process during 1970-1990, Kim & Topel pointed out that because aggregate labor demand expanded rapidly, millions of workers from rural areas had migrated to urban labor markets, tripling the aggregate real wage. Moreover, Kim & Topel showed the emergence of manufacturing as the engine of Korea's economic development and driver of labor productivity growth during the studied period, coinciding with constant improvement in labor skills due to an increased number of high school and college graduates. Korea's labor productivity growth, in particular that of industry sectors, also fueled a transformation of the Korean labor market, creating export opportunities and a huge shift in the sectoral composition of employment (Kim & Topel, 1995). In term of China, from 1978-1995, Fan, Zhang, & Robinson developed a conceptual framework that explicitly incorporates the contribution to aggregate growth of reallocation of resources across sectors and found that 17% of aggregate growth in China during the period is due to structural change – shifting resources from lower to higher productivity sectors, attributed mainly to sectoral labor movement. Hence, Fan, Zhang, & Robinson (2003) results support the idea that during China's early stage of economic development from 1978-1995, the country still had great potential for further efficiency gains through continued structural change. It is also interesting to point out that from 1998-2007, China's manufacturing labor productivity demonstrated strong convergence which was partially driven by technological change, and its economy during this

period benefited from resource allocation and technology diffusion. In the long term, China labor productivity growth must be based on technological progress (He & Walheer, 2020).

The Divisia Index Decomposition

Structural decomposition analysis of developing countries has often been implemented using conventional or/and modified shift-share analysis. However, different from other studies, the paper will use Divisia Index Decomposition to identify and analyze sectoral contributions of labor productivity growth for the Vietnamese economy. We believe that Divisia Index Decomposition is superior compared to shift-share analysis. Based on insights from Herzog & Olsen (1997), since both the conventional and modified shift-share analysis possesses the problem of "weight," that is taking no account of changes in regional industrial structure over the analyzed period, the longer the period of analysis the larger the bias resulting from changes in the weight. Also, the conventional technique's competitive position and industry-mix effects are interwoven, therefore, the formulation of the competitive effect within the conventional shift-share analysis does not measure what it is often described (Herzog & Olsen, 1997).

To comprehend Divisia Index Decomposition, we extensively use the materials and information from Ang, 2004 paper. Index decomposition analysis, of which encompasses Divisia Index Decomposition, was first proposed by energy researchers to study the impact of structural changes and sectoral energy intensity change. Based on several recent studies, index decomposition analysis is now widely accepted as an analytical tool for policy makers with main application areas in energy demand and supply, energy-related gas emissions, material flows and dematerialization, national energy efficiency trend monitoring, and cross-country comparisons. An index decomposition analysis begins with defining a governing function relating the aggregate to be decomposed to several pre-defined factors of interest. By far the most common 2 indices decomposition approaches are Divisia index and Laspeyres index. The Divisia index is a weighted sum of logarithmic growth rate, where the weights are the components shared in total value, given the form of a line integral. We choose to use the Divisia Index as our preferred

decomposition index because it accounts for changes in weights of the decomposition terms by identifying contributions from changes in sectoral terms of trade (Azenui & Rada, 2021). Moreover, the Log Mean Divisia Index (LMDI) used within this paper satisfies the factor reversal test, being a symmetric and additive indicator of relative change (Ang, 2004; Azenui & Rada, 2021), therefore, LMDI is suitable within the scope of the decomposition analysis.

We employed the same mathematical formulation of the Divisia Index Decomposition technique as the one in Azenui & Rada (2021) methods.

III. Description of data and decomposition analysis

1. Real value-added and employment trends

Despite the effects of the Asian Financial Crisis (1997-1998) and Global Financial Crisis (2008-2009), respectively, Vietnam, China, and South Korea showed extraordinary annual average real value-added growth rates of 6.5%, 9.18%, and 4.64%, respectively. Moreover, from graphs 1a, 1b, 1c, service and industry sectors drove the gains in terms of real value-added growth in all three economies between 1991 and 2019. However, the contributions from the industrial sector of Vietnam and South Korea were vastly different. Whereas Vietnam industrial value-added change occurred because of increasing figures in both manufacturing (49.74% of industrial increment) and other industry sectors (33.02% of industrial increment); South Korea industrial sector value-added change occurred mainly due to manufacturing sector (87.37% of industrial increment). Hence, Vietnam's real value added figures relied less in proportion to manufacturing compared to that of South Korea. Also, despite the small size of Vietnam's manufacturing value-added, manufacturing sector employment share increased by 10.48% between 1991 and 2019, a higher increase relative to China's (1.75%) and South Korea (roughly 8.81%). Nevertheless, other industries contributed the most to Vietnam's real value added within the industrial sector compared to China and South Korea where manufacturing dominated. Only after 2017 did Vietnam's manufacturing value-added within industry surpass value-added from other industries. Due to lack of manufacturing real

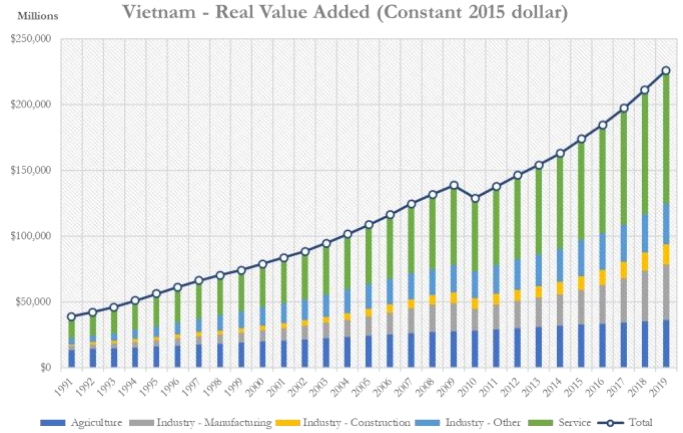
value-added data pre-2004, we are unable to analyze changes in the composition of China's industrial sector during that time frame. The service sector comprised the majority of real value-added shares for all 3 countries. Nonetheless, while Vietnam and China have increased their service sector shares between 1991 and 2019, South Korea service shares still remain the largest out of 3 countries and stable at 60% range throughout the period. Finally, although the 3 countries observed a decreasing trend of agriculture real value-added shares, in 2019, Vietnam economy are still more agrarian compared to that of China and South Korea, with 16% of real value added coming from agriculture comparing to 7.7% that of China and 1.95% that of South Korea.

In terms of employment level and sectoral employment shares, all 3 countries have an increasing total employment figure with Vietnam, China, and South Korea respective average growth rate of 1.89%, 0.55%, and 1.26%. It should be noted that while South Korea's employment temporarily declined during the Asian Financial Crisis and the Global Financial Crisis, Vietnam and China did not experience similar effects. Regarding sectoral employment level and shares from graphs 2a, 2b, 2c, the 3 countries experienced decreased agriculture employment level and shares between 1991 and 2019, with Vietnam showing the most drastic declined. The decline in employment share of Vietnam's agriculture sector was due to the expansion of the economy-wide employment level, rather than agricultural employment level decline. This is different from that of China and South Korea, where agriculture employment share decreased both because of expansion of economy-wide employment level and decreased agricultural employment level. Particularly, Vietnam's agriculture employment level decreased by an average annual growth rate of -0.4%, which is much smaller than China's at -2.46% and South Korea at -2.37%. Interestingly, we observed that from 1996 to 2002, China agriculture employment shares stayed constant at around 50% with little to no volatility. Regarding service, Korea's service sector employment share showed decreasing marginal growth and stabilized at around 70%. The sector was also the largest employer within the Korean economy throughout the studied period. In contrast, services only became the largest provider of employment in China after 2011 and remained the second largest employment

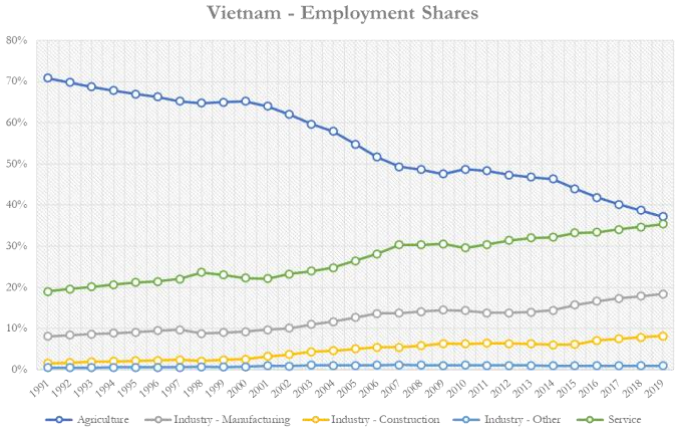
provider in Vietnam throughout the studied period. Nevertheless, all 3 countries had increasing service employment levels and employment share. Regarding manufacturing, while South Korea decreased its manufacturing employment level, Vietnam and China manufacturing employment increased in the studied period. Moreover, Vietnam manufacturing employment growth rate was significantly higher at 4.97%, increasing manufacturing employment from 2.7 million to 10.3 million (63.27% of all industrial increment) comparing with that of China at merely 0.75%, increasing from 122.9 million to 149.5 million (38.27% of industrial increment). Still, although Vietnam had the highest rate of employment growth in manufacturing, the country still had lower manufacturing employment share compared to China or South Korea in all periods. Regarding construction, all 3 countries showed signs of increasing employment levels within the sector with an average annual employment level growth rate of 8.35%, 6.74%, and 0.96% for Vietnam, China, and South Korea respectively. The significant average annual growth in Vietnam and China caused the increasing construction employment share in both countries, whereas in South Korea, due to lower growth rate, construction sector employment share was stable with a slight decrease between 1991 and 2019. Other industry sectors in all countries had an insignificant contribution to both employment level and employment shares.

Overall, in terms of real value added, all 3 countries' real value-added figures in 2019 increased dramatically compared to that of 1991 with significant contributions coming from industrial sectors. Decomposing industrial sector increment with available data shows that Vietnam's industrial real value-added growth occurred because of the increasing figure of other industrial sectors with significant contribution from manufacturing, while that of South Korea occurred mainly from the increasing figure of manufacturing only. Thus, real value-added growth in Vietnam relies less in proportion to manufacturing compared with that of South Korea. Regarding employment, during the studied period, the 3 countries experienced decreasing agriculture employment shares with Vietnam's figures decreased most dramatically. Nonetheless, due to the country's fast rate of employment force growth at 1.89% and agriculture absolute employment figure only slightly decreased between 1991 to 2019, Vietnam

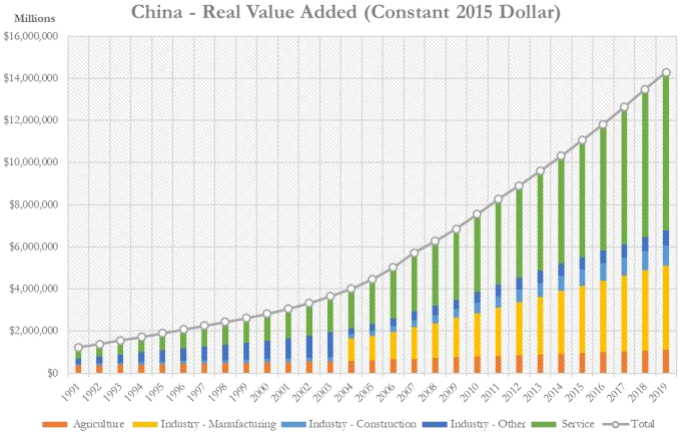
Graph 1a.



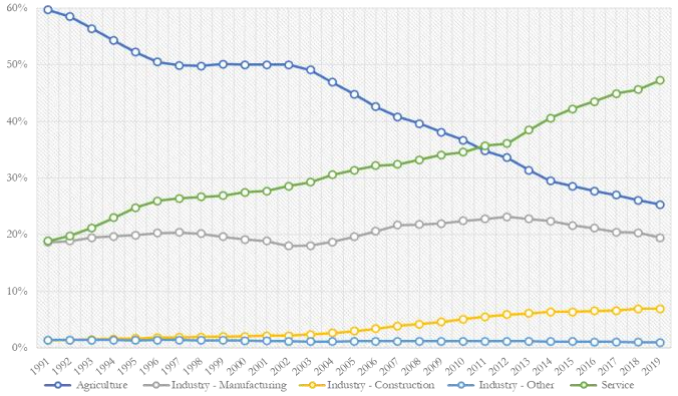
Graph 2a.



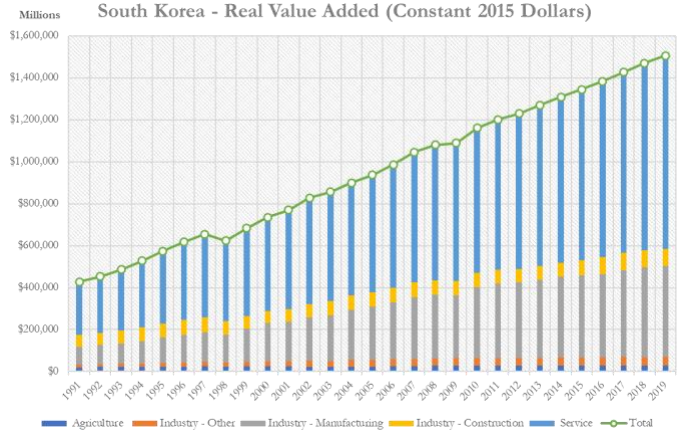
Graph 1b.



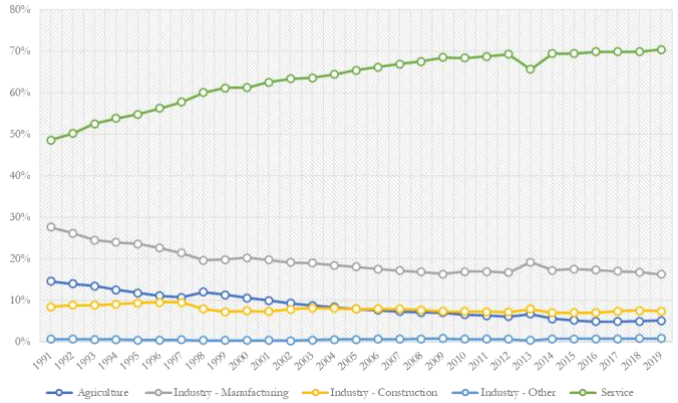
Graph 2b.



Graph 1c.



Graph 2c.



Sources: Author's construction using data from the United Nations and the International Labour Organization

decreasing agriculture employment shares happened due to large increase of the whole economy's employment force, rather than employment significantly reallocated from agriculture to other sectors. The story is different in China and South Korea, where agriculture employment shares decreased due to both the employment force increasing and aggregate employment reallocating from agriculture to other sectors. Also, because of the large differences between agriculture real value added and agriculture employment shares in Vietnam and China relative to that of Korea, the 2 countries can still be categorized as developing, while South Korea is already developed. More specifically, from real value added and employment shares figures, Vietnam's economy is still more agrarian compared to that of China and South Korea with 16% of Vietnam's real value added coming from agriculture, employing roughly 37.2% of the whole economy. More interestingly, while Vietnam's other industrial sectors contributed the majority of industrial real value added, manufacturing was the largest employer and had the biggest employment increase between 1991 and 2019. This result indicated that Vietnam's industrial real-value added is being driven by a small hyper productive segment of the labor force working within other industrial sectors. Whereas in South Korea and China (with available data periods), industrial real value added is being driven by a large proportion of the labor force with increasing productivity.

1. Labor Productivity Decomposition Results

Using Divisia Index Decomposition, we decomposed annual labor productivity growth from 1991 to 2019 into the sum of three aggregate components: The direct effect, the labor reallocation or structural change effect, and the terms of trade effect. These effects are in turn further decomposed into its sectoral contributions, including service, manufacturing, construction, other industry, and agriculture. In the case of China, due to lack of manufacturing data pre-2004, sectoral contributions are decomposed into service, industry, and agriculture from 1991 to 2019, and into service, manufacturing, construction, other industry, and agriculture from 2004 to 2019. The decomposition graphs included manufacturing, construction, and other industry will be presented as graphs A1, A2, A3 in the Appendix.

Before the decomposition, we start off with understanding what each effect represents. The direct effect measures gain in aggregate output per worker due to increases in productivity from within sectors. The direct effects are the result of capital gains and technology, and therefore should closely follow the trends in aggregate productivity growth. The structural change, or labor reallocation effect measures the impacts of change in employment shares to aggregate labor productivity as labor migrates between sectors with different productivity levels. It follows that a positive sectorial structural change effect indicates labor moving into that sector, while a negative sectorial structural change effect indicates labor leaving that sector. In addition, since the Divisia Index is the sum of logarithmic growth rates weighted by average of sectors' value-added share (Ang, 2004), we consider the impact of price change relative to the economy to sectoral output share using the term of trade effect. A positive term of trade effect means an increase in the sector's output price relative to the economy leading to an increase in aggregate productivity change, while a negative term of trade effect means a decrease in the sector's relative output price leading to a decrease in aggregate productivity change. Total term of trade contribution to productivity growth should be minor since by definition the term of trade across sectors should be close to zero (Diewert, 2010).

We begin by analyzing the decomposition results for Vietnam.

Using graph 3a, from 1991 to 2019, Vietnam's total labor productivity growth rate was stable at around 3% to 8%, with a temporary decrease of -9.5% during the Global Financial Crisis. We observe that total productivity change is mainly due to productivity improvement from within sectors (the direct effect) and reallocation of labor to relatively higher productivity sectors (structural change effect) with minimal contribution from price change (term of trade effect). Moreover, from the graph, we can divide labor productivity growth in Vietnam into 3 periods: 1991 – 1997, 1997 – 2014, 2014 – 2019. We observed that from 1991 – 1997 and 2014 – 2019, productivity growth is mainly due to the Direct Effect with consistent contribution from structural change effect. During these 2 periods, we also noticed total labor productivity grew larger than 5% annually compared to less than 5% rate between 1997 to 2014. From 1997 to 2014, interestingly, we saw 2 distinct subperiods. From 2000 to 2007, structural change effect dominated,

indicating large labor reallocation between relatively lower to relatively higher productive sectors. However, from 2007 to 2014, there was little to no meaningful labor reallocation across sectors. It should be noted that from 2009 – 2010, Vietnam productivity was heavily influenced by the Global Financial Crisis; nevertheless, the Crisis seems to affect only productivity change from within sectors with minimal effects to structure of the economy.

From graph 3b, the total direct effect for Vietnam is consistently positive throughout the period with outliers during the Asian Financial Crisis (1997 - 1998) and the Global Financial Crisis (2008 – 2009). We can divide sectoral productivity change contribution through the direct effect by 3 periods: 1991 – 1997, 1997 – 2010, 2010 – 2019. Productivity change through Direct Effects grew more than 4% annually between 1991 – 1997 and 2010 – 2019, higher compared to that between 1997 – 2010 at less than 4%. We should also note that the agriculture sector's Direct Effect had consistently contributed positively to productivity growth. Moreover, between 1991 – 1997 and 2010 – 2019, all sectors of the economy indicated consistent positive Direct Effects. Interestingly, service sector direct effect contribution was the largest between 1991 – 1997, however, industrial sector direct effect contribution, or the sum of manufacturing, construction, and other industry, was the largest between 2010 – 2019. From 1997 to 2010, there was a volatile contribution from the service and other industrial sectors. Most importantly however, we noticed little to no Direct Effect from all economic sectors apart from agriculture between 2000 – 2006. Overall, although Vietnam's total productivity growth through Direct Effect has consistently remained positive, there is not a dominant sector driving direct effect contribution within its economy.

Regarding Structural Change Effect contribution in graph 3c, we noticed that the agriculture sector had contributed negatively through Structural Change Effect for most periods, indicating consistent decreasing agriculture employment relative to the rest of the economy. Combining with consistent positive agriculture direct effect and increasing agriculture real value-added data, the results indicate Vietnam maintained or improved its food security despite decreasing agriculture employment shares. We

can also divide the sectorial structural change effect by 4 periods: 1991 – 1997, 1997 – 2007, 2007 – 2014, 2014 – 2019. Between 1991 – 1997 and 2014 – 2019, structural change effect contributed roughly 2% and 1% to 1.5% of total productivity growth respectively. Moreover, we noticed during these periods, all economics sectors possessed positive structural change contributions apart from the agriculture sector. Therefore, we conclude that between 1991 – 1997 and 2014 – 2019, Vietnam had a stable reallocation of labor out of agriculture into other sectors with higher-than-average productivity. Nonetheless, it should be noted that while labor seems to migrate out of agriculture to the service sector between 1991 – 1997, labor migrated out of agriculture at a faster rate to the manufacturing sector between 2014 – 2019. From 1997 to 2007, initially we observed the volatile back and forth labor movement between service and industry sectors during the aftermath of the Asian Financial Crisis (1997 – 1998). It is worth highlighting that Vietnam export and import got a massive hit due to the crisis, which explained the employment migration out of manufacturing during the period. Afterward, from 2000 to 2007, there seems to be deep reallocation of labor due to large contributions to productivity growth from Structural Change Effect. We observed a large negative structural change effect value from the agriculture sector relative to other periods, indicating increasing labor reallocation to other more productive sectors of the economy, particularly manufacturing and service. We also observed large structural change contributions from other industrial industries. However, the high level of structural change contribution is due to the sector's initial high productivity level, not necessarily indicating labor movement into other industrial sectors. Lastly, from 2007 – 2014, there is little to no labor reallocation between agriculture to other sectors of the economy, causing minimal contribution from Structural Change Effect to the economy productivity growth. We also should stress that labor migrated out of other industrial sectors throughout these periods, and out of manufacturing between 2010 to 2011 to the service sector.

Graph 3d shows the total term of trade effect in Vietnam contributes insignificantly to productivity growth compared to other 2 effects. However, decomposing total terms of trade into its sectoral contribution, the service sector has consistently contributed negatively to productivity growth with

noticeable exceptions only from 1991 to 1994, 2012 to 2013 and 2014 to 2016. Moreover, from 2004 to 2008, we saw large negative contributions relative to other periods varying from -0.4% to -1%. Thus, service sector experience decreased in price, most noticeable from 2004 to 2008, relative to the whole economy. Regarding the agriculture sector, we observed a large price decrease relative to the economy in 1991 to 1994 and price growth from 2007 to 2008 and 2009 to 2011. During other periods, agriculture price changes were similar to the economy. Within industrial sectors, we noticed manufacturing relative prices decreased throughout 2002 to 2014, however grew similar to the rest of the economy in other periods. It should be noted that in 1991 to 1992 and 1996 to 1997 periods, manufacturing had large price increases compared to the whole economy. Between 1991 to 1996, construction had a large term of trade contribution to productivity growth, nonetheless, throughout the rest of the studied period, construction terms of trade effect were negligible. Interestingly, other industrial sectors consistently increased their price relative to the economy, hence, positively contributed to productivity throughout most of the studied period. Overall, Vietnam had a large sectorial term of trade contribution compared to total term of trade effect. From 1991 to 1996 and 2007 to 2013, the country had volatile price changes in all sectors compared with little to no sectoral contribution from other periods. Also, other industrial sectors in Vietnam had increased their price relative to the whole economy throughout the studied period.

We continue by decomposing the results of China.

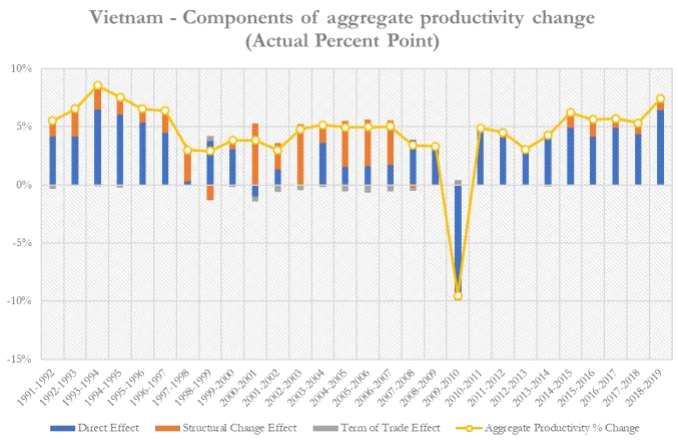
China's labor productivity growth has remained between the impressive range of 6% - 14% annually. Decomposing China's aggregate productivity growth by using graph 4a, we observed that direct effect dominates China's productivity growth throughout the studied period. Contributions from the Structural change effect consistently increased between 1991 - 1996 and after 2002 from 1.4% to 3.3%. However, from 1997 to 2002, we noticed an absence of positive structural change in labor productivity contribution. This coincides with a stagnant employment share in China's agricultural sector, indicating no labor reallocation between agriculture and the rest of the economy during the period. Lastly, although the terms

of trade effect show a negative contribution to productivity growth from 1991 to 1996, overall, terms of trade effect contribute insignificantly to productivity change.

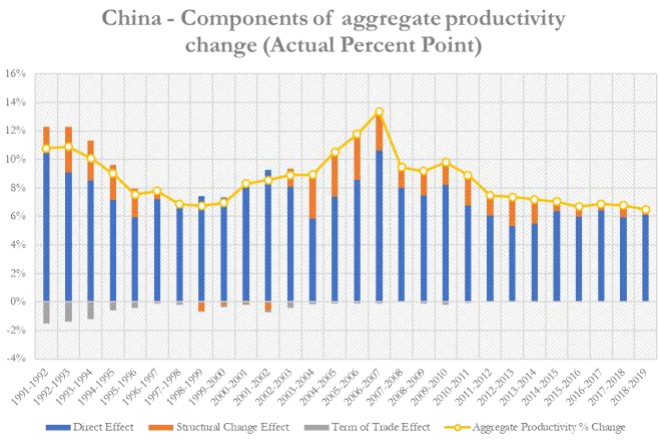
From graph 4b, we observed that China's direct effect contribution is dominated by the industry sector, followed by service and agriculture sectors. We noticed that total direct effect contribution had a decreasing trend, varying from 5.8% to 10.6% between 1991 and 2012, and decreasing to 5.3% to 6.4% range in the period afterward. Industry dominated productivity growth from the direct effect between 2004 and 2010, there was also a large service contribution from 2004 to 2008. Regarding industry, the sector had a high but decreasing annual contribution to productivity growth from 1991 to 2003 from 7.2% to 4.9%. From 2003 onward, industry sector contribution decreased down to and stabled at around 2.6% to 4.1% productivity growth range. Contributions to the direct effect from the agricultural sector are small throughout the studied period. But from 1996 to 2003, agriculture's direct effect decreased and stagnated at around 0.23% to 0.7% annually. The lower productivity contribution during this period was partly due to constant agriculture employment share, thus, limiting the decreasing trend of agriculture employment leading to slower productivity growth rate in the agriculture sector due to direct effect. Given manufacturing data after 2004, we decomposed industry into manufacturing, construction, and other industries from 2004 to 2019. Throughout this period, manufacturing dominated contributions from industry with consistently minimal contribution from construction and other industries.

Using graph 4c, we observed that agriculture has consistently contributed negatively to structural change effect, varying at 0% to -1% of productivity growth. Therefore, agriculture employment has been decreasing relative to the rest of the economy and reallocated to other sectors throughout the period. Similar to Vietnam, with positive agriculture direct effect and increasing agriculture real value added, China had maintained or improved its food security during the period. Structural change effect can be divided into 2 periods: 1991 – 2012, 2012 – 2019. In the first period, we observed large productivity growth contributions from structural change effect, especially from service and industry sectors. Thus,

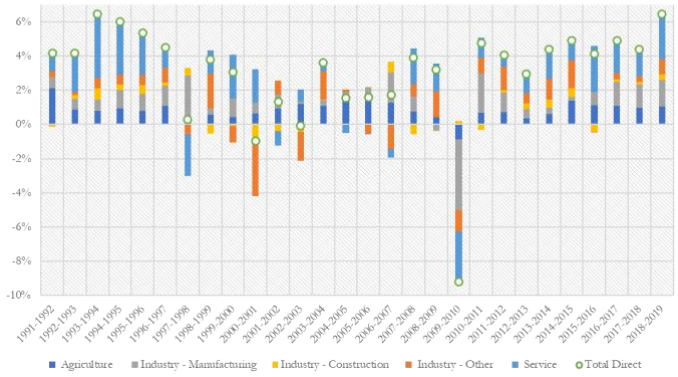
Graph 3a.



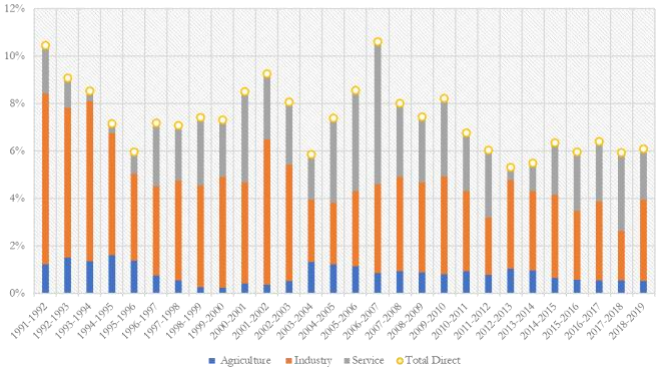
Graph 4a.



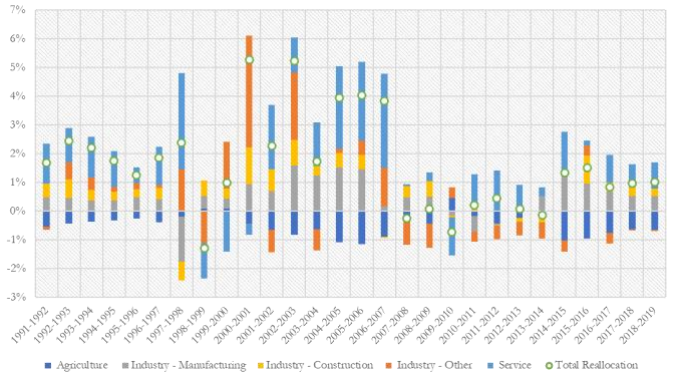
Graph 3b.



Graph 4b.

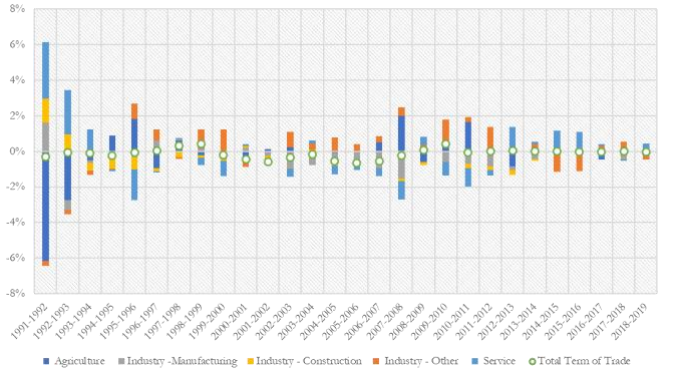


Graph 3c.

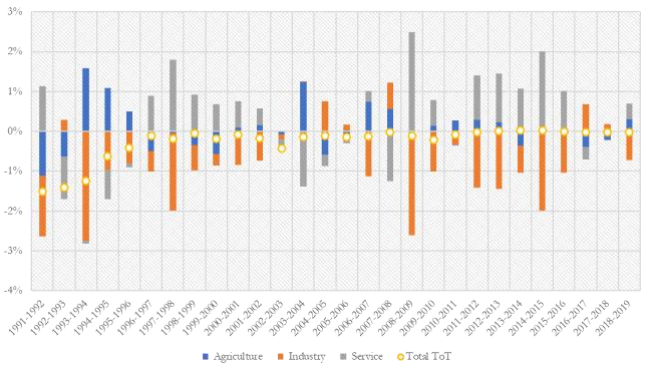


Graph 4c.

Graph 3d.



Graph 4d.



Sources: Author's construction using data from the United Nations and the International Labour Organization

aggregate productivity of the economy increased in this period due to labor moving mainly to the industry and service sector. Interestingly, from 1996 to 2003, we noticed agriculture negative contribution disappeared and a decreased total contribution from structural change effect. Therefore, during this period, labor was stopped from moving from agriculture to other sectors of the economy. Also, we saw a negative total structural change effect with large negative industrial and positive service contributions, indicating the economy labor is moving from industry sector with high productivity to service sector with lower relative productivity. In the second period from 2012 to 2019, total contribution from structural change effect decreased and stabilized at 0.6% - 0.8% annual productivity growth with service being the only positively contributed at 0.8% to 3%. Both industry and agriculture constitute a negative contribution to productivity growth. Thus, aggregate economy-wide productivity increased due to labor moving from both industry and agriculture sectors to service sector during this period. Decomposing industry to manufacturing, construction, and other industries, firstly, it is clear that labor is constantly moving into the construction sector, contributing around 0.1% to 0.5% of annual productivity growth between 2004 to 2012. During this period, manufacturing contribution decreased from around 2% of productivity growth from 2004 to 2007 to approximately 0.5% from 2004 to 2012. Secondly, from 2012 to 2019, we saw that most employment leaving industry came from the manufacturing sector, depressing productivity growth by -0.5% to -1.2% annually.

Although China's total term of trade effect contributed negatively between 1991 to 1996 and stabilized at -0.1% range for the rest of the periods, the sectorial term of trade fluctuated at -1% to 1% annual productivity growth contribution. Specifically, from graph 4d, service terms of trade effect contributed positively from 1996 to 2002 and after 2008, hence, increasing service price relative to the whole economy contributed to aggregate productivity growth during these periods. However, it should be noted that in 1992 to 1995, 2003 to 2004, and 2007 to 2008, we observed service price growth decrease relative to the economy. In contrast, the industry's term of trade effect is consistently negative between 1991 and 2019 varying from -0.3% to -2.5% of productivity change. Thus, the industry price level increased slower than that of the whole country during the period. From 2004 to 2019, within the industry sector, price

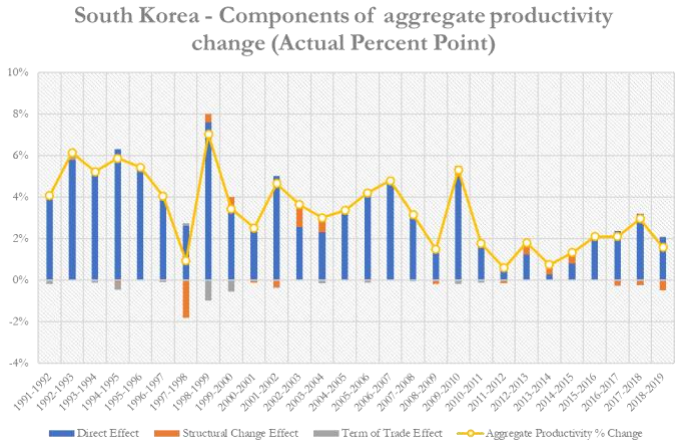
decrement is mainly due to that of the manufacturing sector, comprising the majority of industrial terms of trade effect. Agriculture sector price level showed stable price change contribution to productivity growth at around -0.5% to 0.5% with exceptions of large price increases between 1993 to 1996 and 2003 to 2004. Overall, while service prices had consistently increased and contributed positively to aggregate productivity change, industry prices decreased relative to the whole economy and contributed negatively to productivity. Within the industrial sector, manufacturing comprises the majority of terms of trade effect from available data. Agriculture sector terms of trade contribution fluctuates insignificantly with exception of positive contribution in some periods.

Lastly, we decomposed the results for South Korea.

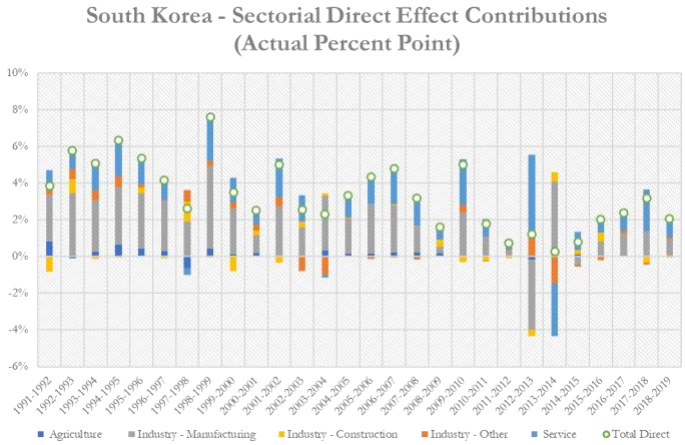
From graph 5a, South Korea labor productivity has grown consistently with a decreasing trend between 1991 and 2019. From 1991 to 1996, the country's productivity growth varied around 4% to 6% annually. The rate of growth decreased to the range of 3% to 4.5% from 1997 to 2010. It should be noted that during the Asian Financial Crisis (1997 – 1998), annual productivity growth temporarily collapsed to 0.9%. From 2010 – 2019, productivity growth reached a minimum of 0.6% in the aftermath of the Global Financial Crisis or 2011 – 2012 period and climbed to 3% in 2017 – 2018 period. We also observed the majority of productivity growth is due to that of Direct Effect with minimal contribution from Structural Change Effect and Term of Trade Effect. Nonetheless, there is a considerable negative contribution of Structural Change Effect during the Asian Financial Crisis (1997 – 1998) at -1.8%, indicating labor reallocated to less productive sectors of the economy.

Using graph 5b, we observed that Direct Effect contribution made up the vast majority of productivity growth in Korea varying from 0.2% to 7.6% annually. Henceforth, similar to total labor productivity growth, South Korea Direct Effect remained stable with decreasing periods. From 1991 to 1996, Direct Effect contributed around 4% to 6% of annual productivity growth. Then, Direct Effect productivity growth contribution decreased to 2.2% to 5% range during 1996 to 2010 period.

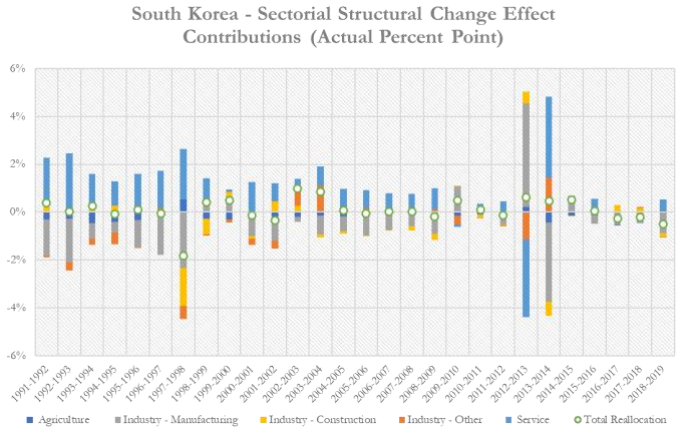
Graph 5a.



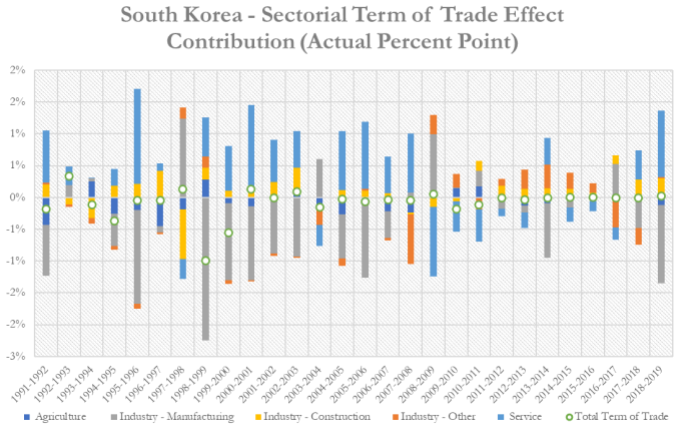
Graph 5b.



Graph 5c.



Graph 5d.



Sources: Author's construction using data from the United Nations and the International Labour Organization

Nonetheless, Direct Effect temporary decrease compared to the previous period at 2.6% in 1997 – 1998 period, or the Asian Financial Crisis, and continued to recover productivity growth at 7.6% in the period right after. From 2010 to 2019, productivity growth due to Direct Effect felt down to 0.28% annually in 2012 to 2014 periods during the aftermath of the Global Financial Crisis, then climbed to 3.2% in 2017 – 2018 period. We also noticed that throughout the studied period, the manufacturing sector constitutes the largest contributor to Direct Effect, followed by the service sector. Other sectors including agriculture, construction, and other industries; registered minimal Direct Effect contribution from 1991 to 1996, then turned barely visible or negatively contributed on the graph afterward. It should be noted that during the Global Financial Crisis aftermath between 2012 to 2014, manufacturing and service sectors suffered extreme volatile contributions from Direct Effect, ranging from -3.8% to 4.5% annual productivity growth.

Regarding Structural Change Effect from graph 5c, although total contribution from Structural Change to productivity growth in Korea varies only from -0.3% to 0.9% annually. However, the sectorial Structural Change contribution showed a highly contrasting contribution. We noticed throughout all of the studied period, while manufacturing's Structural Change Effect contributed negatively around -0.2% to -2%, service's Structural Change Effect contributed positively around 0% to 2.2% to productivity change. Therefore, labor had been reallocated from the manufacturing sector to other sectors of the economy, especially the service sector. Nevertheless, since the negative impact of the manufacturing sector canceled out the positive impacts of the service sector for most periods, total Structural Change contribution remained around 0%. Hence, although aggregate productivity did not change due to labor reallocation, Korea employment had generally shifted from manufacturing sector to service sector. It should also be noted that there existed volatile productivity growth contributions from Structural Change during the Asian Financial Crisis and the aftermath of the Global Financial Crisis.

From graph 5d, South Korea's total term of trade effect contribution to productivity growth is negligible from 2002 to 2019, but shows some volatility between 1991 to 2000. In terms of sectoral term of trade effect, service sector price level consistently rose faster compared to that of the whole economy, hence, contributed positively to productivity growth from 1991 to 2008 and after 2017. However, the sector term of trade effect turned negative between 2008 and 2017, or service price growth was slower than that of the economy, hence, dragging down productivity change. Within the industrial sector, manufacturing made up the bulk of industry in terms of trade effect and the sector price growth consistently contributed negatively to productivity growth. Also, Interestingly, there seems to be a lack of manufacturing price change relative to the economy between 2008 and 2017. Agriculture sector term of trade effect stabilized around -0.2% to 0.2% productivity contribution throughout the studied period with larger volatility in the beginning periods. All in all, similar to China, for most of the studied period, the service sector consistently increased its price level while the industry sector's price level decreased relative to the economy. Thus, while service price change contributed positively to productivity growth, the industry

sector contributed negatively to productivity growth. Agriculture sector terms of trade contribution are insignificant compared to the other 2 sectors. It should be noted that between 2009 to 2017, the results indicated the disappearance of price change of service and manufacturing.

2. Vietnam decomposition results compared to China and South Korea

While all 3 countries experienced incredible productivity growth between 1991 and 2019, the results indicate Vietnam's sources of productivity growth are different compared to that of China and South Korea. During the studied period, we found out that while China and South Korea's results indicated the 2 country's labor productivity growth is caused mainly by productivity improvement from within sectors or the direct effect, Vietnam's total labor productivity growth is caused by a combination of productivity improvement from within sectors or the direct effect, and labor reallocated to relatively higher productivity sectors or the structural change effect. More specifically, we observed that productivity growth in Vietnam is caused mainly by the direct effect between 1991 to 1997 and 2007 to 2019 and by structural change effect between 1997 to 2007. It should be noted that while the direct effect dominated productivity growth contribution from 2007 to 2014, it is of lower intensity compared to other periods.

Regarding sectoral contribution, similar to China and South Korea, we observed that Vietnam has a small and consistent positive direct effect contribution from the agriculture sector. Also, since the country's agriculture sector experienced consistent negative structural change effect for most periods, thus, Vietnam maintained or improved its food security despite agricultural labor moving into other economic sectors. Moreover, although labor in Vietnam mainly migrates out of agriculture to other economic sectors, agriculture employment seems to migrate into the service sector between 1991 to 1997 and migrates at a larger rate into industrial sectors, specifically manufacturing sector, between 2014 to 2019. From 1997 to 2007, excluding the Asian Financial Crisis, agriculture employment emigration seems to intensify relative to other periods, thus boosting the total contribution from labor reallocation effect. Also, we noticed that during 2007 to 2014, due to lack of agriculture labor emigration, labor moved from manufacturing and other industry sectors to service sectors. Overall, labor reallocation in Vietnam seems to be volatile with

no dominant trends. In comparison, China and South Korea labor movement shows consistent patterns of labor first moving into manufacturing sectors from agriculture sectors then moving from manufacturing and agriculture to service sectors. The labor trends in China and South Korea are compatible with the development path of an economy where countries first tend to focus on labor intensive manufacturing then transition forward to capital intensive manufacturing. Overall, this indicated that while China and South Korea have transition into a more capital-intensive manufacturing sectors, Vietnam have just started capitalizing labor-intensive manufacturing for growth.

More importantly, we observed that the productivity improvement from within sectors in Vietnam also does not have a consistent pattern. While service dominated the direct effect in the early periods from 1991 to 1997, industrial sectors, especially manufacturing, dominated later periods between 2010 to 2019. Other periods from 1997 to 2010, we saw that there was a reduction in direct effect contribution from industrial and service sectors with agriculture direct effect dominated this period. This is partly explained by deep employment reallocation from agriculture to other sectors between 1997 to 2007, Due to a large decrease of employment in agriculture and increase of employment in industrial and service sectors, the phenomenon leads to depressed direct effect contribution of manufacturing and service and increase that of agriculture sector. All in all, in terms of productivity improvement from within sectors, Vietnam has no noticeable overall trends happening within its economy, comparing that with China or South Korea where manufacturing vastly dominated direct effect contribution to productivity growth.

Lastly, from the term of trade effect results, we noticed that all 3 countries have agriculture prices that grow relatively similar to that of each country's respective economy. However, the relative prices trends of service and manufacturing sectors of Vietnam are different compared to that of China and South Korea. In China and South Korea, the 2 countries generally observed an increase in prices of service and a decrease in prices of manufacturing relative to the whole economy. This happened due to the 2 countries' manufacturing sectors increasing supplied outputs which drove down the general economy price, hence, decreased the relative price of manufacturing products and increased the relative price of service

products. In Vietnam, while service relative prices decreased, manufacturing prices grew similar to that of the whole economy for most periods. Henceforth, manufacturing supplied output in Vietnam does not drive down the whole economy's general price.

IV, Conclusion and potential development path.

1. Conclusion

In this paper, we have decomposed labor productivity for Vietnam and compared it with that of China and South Korea. Our main findings included:

- Firstly, on the aggregate level, the paper shows that although Vietnam is experiencing decreasing agriculture employment shares, this decrease is due to large increase of the whole economy's employment force, rather than employment significantly reallocated from agriculture to other more productive sectors. Vietnam's economy is also more agrarian compared to that of China and South Korea with 16% of Vietnam's real value added coming from agriculture, employing roughly 37.2% of the whole economy.
- Secondly, because of the large differences between agriculture real value-added and agriculture employment shares in Vietnam and China relative to that of Korea, Vietnam can still be categorized as a developing country.
- Thirdly, although being one of the main contributors of real value-added growth, Vietnam's industrial real value added is being driven by a small hyper productive segment of the labor force working within other industrial sectors. Whereas in South Korea and China (with available data periods), industrial real-value added is being driven by a large proportion of the labor force with increasing productivity working in the manufacturing sector.
- Fourthly, between 1991 to 2019, the country's labor productivity growth is caused by a combination of productivity improvement from within sectors and labor reallocation from relatively lower to relatively higher productivity sectors. While the productivity improvement

effect dominated from 1991 to 1997 and from 2007 to 2019, the labor reallocation effect dominated from 1997 to 2007. However, in China and South Korea, productivity improvement from within sectors dominated throughout 1991 to 2019. Henceforth, compared to China and South Korea, Vietnam's productivity relies more heavily on labor reallocated from relatively lower to relatively higher productivity sectors, especially from agriculture to other sectors in the economy.

- Fifthly, in terms of sectoral contribution, China and South Korea's productivity growth both relies heavily on manufacturing sector contribution, there is no dominant sector within the Vietnam economy that consistently drives productivity between 1991 to 2019. More specifically, while service sector total contribution dominated productivity growth in earlier periods from 1991 to 1997, manufacturing and other industrial sectors total contribution dominated later periods from 2010 to 2019 with little to no contributions apart from that of agriculture during 1997 to 2010. Also, Vietnam's manufacturing supplied output is not enough to drive down the whole economy's general price.

2. Potential development path.

Productivity is a key concept in economic growth and competitiveness. To quote Paul Krugman: "Productivity isn't everything, but in the long run it is almost everything." (Krugman, 1994). Therefore, for Vietnam to achieve high economic development similar to that of other East Asian economies, Vietnam needs to experience a period of rapid and sustainable productivity increase that enables an economic take-off into high income.

Up until now, labor reallocation between broad sectors effect, especially from agriculture to manufacturing, and growth effects from an expanding, youthful manufacturing workforce have caused overall productivity of Vietnamese labor force to exceed that of average growth for Asian economies (Breu, Dobbs, Remes, Skilling, & Kim, 2012; McCaig & Pavcnik, 2013). Nonetheless, for sustainable and rapid productivity improvement to happen, Vietnam needs to refocus its effort on improving labor

productivity growth from within sectors and continue its contemporary trends of labor migrating into relatively higher productivity sectors.

Also, as much literature has pointed out that manufacturing is the engine of economic growth, and manufacturing have positive impacts on the overall economy through different channels, including opportunities to accumulate capital, increasing returns to scale, strong backward and forward linkages with other sectors, bolstered diffusion of knowledge and promotion of technological change, amongst others (Marcel & Szirmai, 2000; Cantore, Clara, Lavopa, & Soare, 2017; Mcmillan, 2014; Ocampo, 2005; Samaniego & Sun, 2016; etc). Hence, In order to experience a rapid productivity take-off similar to that of "catch-up" economies in Asia, Vietnam should concentrate its efforts on improving labor productivity of manufacturing sectors. However, from 1996 to 2012, labor productivity within Vietnam's manufacturing has been weak and dormant. The country's performance is partly explained by increasing reliance on heavy capital investment with declining capital efficiency within manufacturing sectors; and by the disturbance of the Asian Financial Crisis (1997-1998) and the Global Financial Crisis (2008-2009). The weak growth in labor productivity is further attributed to the decreasing growth effect of labor reallocation from agriculture to manufacturing as labor migration is not enough to satisfy industrial demand (Nguyen, Pham, Bui, & Ohno, 2021). It should be noted that labor reallocation within Vietnam's manufacturing sectors, where labor tends to move from sectors with increasing labor productivity growth to sectors with decreasing labor productivity growth, combine with increasing ratio of unskilled to skilled workers also explain the stagnant of labor productivity in manufacturing (Breu, Dobbs, Remes, Skilling, & Kim, 2012; Nguyen, Pham, Bui, & Ohno, 2021).

Hence, the Vietnamese government should concentrate on improving its infrastructure connecting rural areas, where labor is still abundant, to urban and manufacturing hubs, where there is a lack of cheap labor. I suggest the government should focus its effort on increasing investments of transportation infrastructure, especially from the mountainous regions to the northern and southern economics "cores" of Ha Noi and

Ho Chi Minh cities, as well as widening the country high speed internet coverage for agriculture labor to capitalize and get access to opportunities in manufacturing and other more productive sectors.

More importantly, the country should capitalize on its current advantages of being a cheap and abundant source of labor on the global market and start shifting to a more capital-intensive manufacturing production to avoid the middle-income trap. I suggest focusing heavily on studying the experiences of other “late-industrializers” like China or South Korea and implements similar economics incentives for the Vietnamese economy.

Moving forward, during analysis for the paper, there is evidence that Vietnam is experiencing signs of premature industrialization, where an economy fully industrialize and shifting its focus into service sectors before average income reached the level of earlier industrialized economies. Thus, there is a need to determine the validity of premature industrialization happening in Vietnam and to what extends of premature industrialization that Vietnam has experienced. Hence, I propose doing similar decomposition in this paper and that of Azenui & Rada (2021) by decomposing the whole economy productivity with emphasis on sectorial service sectors for Vietnam.

Bibliography

Alam, A., Anós Casero, P., Khan, F., & Udomsaph, C. (2008). Unleashing Prosperity : Productivity Growth in Eastern Europe and the Former Soviet Union. *World Bank*. Retrieved from http://hdl.handle.net/10986/6588

Ang, B. (2004). Decomposition analysis for policy making in energy: which is the preferred method? *Energy Policy, 32*, 1131-1139.

Azenui, N. B., & Rada, C. (2021, March). Labor productivity growth in sub-Sahara African LDCs: sectoral contributions and macroeconomic fators. *Structural Change and Economic Dynamics, 56*, 10-26. doi:https://doi.org/10.1016/j.strueco.2020.07.005

Bresser-Pereira, L. C., Jabbour, E., & De Paula, L. F. (2020, Jun). South Korea's and China's catching-up: a new-developmentalist analysis. *Brazilian Journal of Political Economy, 40*. doi:https://doi.org/10.1590/0101-31572020-3102

Breu, M., Dobbs, R., Remes, J., Skilling, D., & Kim, J. (2012). *Sustaining Vietnam's growth: The productivity challenge.* McKinsey Global Institute.

Cantore, N., Clara, M., Lavopa, A., & Soare, C. (2017). Manufacturing as an engine of growth: Which is the best fuel? *Structural Chang and Economic Dynamics, 42*, 56-66.

CFI. (n.d.). *New Growth Theory (NGT)*. Retrieved from CFI: https://corporatefinanceinstitute.com/resources/knowledge/economics/new-growth-theory-ngt/

Chenery, H. B. (1975, May). The Structuralist Approach to Development Policy. *The American Economics Review, 65*(2), 310-316. Retrieved from https://www.jstor.org/stable/1818870

Diewert, W. (2010). On The Tang and Wang Decomposition of Labour Productivity Growth into Sectorial Effects. (W. Diewert, B. Balk, D. Fixler, K. Fox, & A. Nakamura, Eds.) *Price and Productivity Measurement, 6 - Index Number Theory*, 67-76.

Evans, P. (2018). CHAPTER THREE. The State as Problem and Solution: Prédation, Embedded Autonomy, and Structural Change. In P. Evans, *The Politics of Economic Adjustment: International Constraints, Distributive Conflicts and the State* (pp. 139-181). Princeton: Princeton University Press. doi:https://doi.org/10.1515/9780691188034-007

Fan, S., Zhang, X., & Robinson, S. (2003). Structural Change and Economic Growth in China. *Review of Development Economics, 7*(3), 360-377. doi:https://doi.org/10.1111/1467-9361.00196

Foster-McGregor, M., & Verspagen, B. (2016). The role of structural transformation in the potential of Asian economic growth. *Asian Development Bank Economics Working Paper Series*(467). doi:https://dx.doi.org/10.2139/ssrn.2811523

Gabardo, F. A., Pereima, J. B., & Einloft, P. (2017). The incorporation of structural change into growth theory: A historical appraisal. *EconomiA, 18*(3), 392-410. doi:https://doi.org/10.1016/j.econ.2017.05.003

He, M., & Walheer, B. (2020). Technology intensity and ownership in the Chinese manufacturing industry: A labor productivity decomposition approach. *National Accounting Review, 2*(2), 110-137.

Herzog, H. W., & Olsen, R. J. (1997). *Shift-Share Analysis Revisited: The Allocation Effect and the Stability of Regional Structure.* Oak Ridge, Tennessee 37830: Regional and Urban Studies Section Energy Division Oak Ridge National Laboratory.

Kim, D.-I., & Topel, R. H. (1995, January). Labor Markets and Economic Growth: Lessons from Korea's Industrialization, 1970-1990. In R. B. Freeman, & L. F. Katz (Ed.), *Differences and Changes in Wage Structures* (pp. 227-264). University of Chicago Press. Retrieved from https://www.nber.org/books-and-chapters/differences-and-changes-wage-structures/labor-markets-and-economic-growth-lessons-koreas-industrialization-1970-1990

Krugman, P. (1994). *The Age of Diminishing Expectations.*

Lin, J. Y. (2011, July 08). New Structural Economics: A Framework for Rethinking Development. *The World Bank Research Observer, 26*(2), 193-221. doi:https://doi.org/10.1093/wbro/lkr007

Marcel, T. P., & Szirmai, A. (2000). Productivity growth in Asian manufacturing: the structural bonus hypothesis examined. *Structural Change and Economic Dynamics*, 371-392.

McCaig, B., & Pavcnik, N. (2013). MOVING OUT OF AGRICULTURE: STRUCTURAL CHANGE IN VIETNAM. *National Bureau of Economic Research Working Paper Series*.

Mcmillan, M. (2014). Globalization, Structural Change, and Productivity Growth, with an update on Africa. *World Development, 63*, 11-32.

Molnar, M. &. (2015). Recent Trends in Productivity in China: Shift-share Analysis of Labor Productivity Growth and the Evolution of the Productivity Gap. *OECD Economics Department Working Papers, 1221*.

Nelson, R. (1997). How New is New Growth Theory? *Challenge, 40*(5), 29-58.

Nguyen, T. D., Pham, H. T., Bui, T. T., & Ohno, K. (2021). *Viet Nam Productivity Report - Identifying Growth Challenges and Exploring a Way Forward.* Vietnam Institute for Economic and Policy Research; National Institute for Policy Research.

Ocampo, J. (2005). The quest for dynamic efficiency: structural dynamics and economic growth in developing countries. *Beyond reforms: Structural dynamics and macroeconomic vulnerability*, 3-43.

OECD. (n.d.). Retrieved from Defining and Measuring Productivity: https://www.oecd.org/sdd/productivity-stats/40526851.pdf

OECD. (n.d.). *National Accounts at a Glance 2015.* doi:https://doi.org/10.1787/na_glance-2015-en

Samaniego, R. M., & Sun, J. Y. (2016). Productivity and structural transformation. *Review of Economic Dynamics, 21*, 266-285.

The World Bank in Vietnam. (2022, April 14). Retrieved from THE WORLD BANK IBRD-IDA: https://www.worldbank.org/en/country/vietnam/overview#1

Üngör, M. (2017). Productivity growth and labor reallocation: Latin America versus East Asia. *Review of Economic Dynamics, 24*, 25-42. doi:https://doi.org/10.1016/j.red.2016.12.004

Vietnam, World Bank trengthen Partnership to Meet Goal of High-Income Economy by 2045. (2022). Retrieved from THE WORLD BANK: https://www.worldbank.org/en/news/press-release/2022/03/25/vietnam-world-bank-strengthen-partnership-to-meet-goal-of-high-income-economy-by-2045

World Development Indicator. (n.d.). Retrieved from The World Bank:

https://databank.worldbank.org/source/world-development-indicators