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How is Economic Structure Transformed?
Evidence: West Kalimantan Province of Indonesia

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Abstract: The Covid-19 pandemic caused a negative contraction in the economic structure. In West Kalimantan province, despite negative growth, the primary and secondary sectors surprisingly showed positive growth in the mining, electricity, and agriculture sectors. Based on this situation, we investigated the possibility of the structural transformation process during the pandemic. We applied Lewis's transformation theory to the analysis of primary, secondary, and tertiary sectors to examine the general trends. We used Static-Dynamic Location Quotient, Klassen typology, and Shift Share analysis, and discovered that the negative contraction in 2020 did not significantly affect each sector. However, the pattern indicates a failure in the transformation process between the tertiary and primary sectors, with the primary sector naturally proving to be the main sector in the economic structure. The critical point of our finding is that the failure of the structural transformation process was potentially caused and locked by the failure of labour shifting. To unlock the interchange of labour to modern industries, the government must address human resource issues, identify definite interchanged sectors, choose key sectors, and ensure each stage is passed thoroughly with all necessary resources.

Keywords: Economic Structure, Transformation Process, Labour, Gross Domestic Regional Product, West Kalimantan.

Introduction

In 2020, the entire globe faced a dangerous and deadly COVID-19 virus. The WHO reported 770,085,713 confirmed cases of the pandemic, including 6,956,173 deaths globally. As the outbreak spread all over the world, the global economy and productivity fell to the lowest level in over six decades. The World Bank noted the pandemic caused negative growth of -3.1 percent in the global economy, worse than the -1.3 percent growth during the global financial crisis in 2009.

In Indonesia, the Covid-19 pandemic negatively impacted many sectors of the economic structure, and sectoral decline led to negative contraction in economic growth. However, in certain sub-sectors, despite the negative contraction, the pandemic also resulted in significant positive growth. Health and insurance, communication, and social services experienced the most growth during the pandemic. Therefore, if these sub-sectors have a large share of sectoral growth, they could potentially change the economic transition.

Several sectors in Indonesia recorded positive growth, as noted by Salim (2020), i.e.,information and communication (10.88 percent), water supply (4.56 percent), health services (3.71 percent), real estate (2.3 percent), and agriculture (2.19 percent). The contribution of the agricultural sector to the national economy was the second-highest (15.46 percent) after the manufacturing industry (19.87 percent).

On the other hand, social restrictions and physical distancing led to reduced working hours, job losses, and changes in the labour market. The International Labour Organization (2021) remarked: "The latest labour force survey data (up to the third quarter of 2020) reveals the contrast between massive job losses in hard-hit sectors (such as accommodation and food services, arts and culture, retail, and construction) and the positive job growth evident in a number of higher skilled services sectors (such as information and communication, and financial and insurance activities). This divergence is likely to increase inequality within countries.

The widespread outbreak also had a reciprocal effect on consumption and production curves. Lockdowns and local restrictions drastically reduced revenues from tourism, transportation, and manufacturing. Many industries cut workhours, leading to salary cuts and a large number of job losses. As production declined significantly to minimum levels, people adjusted their consumption to anticipate uncertain conditions. Panic buying at the start of the pandemic transformed into a new normal consumption pattern focused on primary needs such as food, health, and insurance. People became more selective about how they spent their money. Moreover, in this uncertainty, most investors prioritized safeguarding their cash flow over making new speculations. Whether the government changed their spending priorities to mitigate the pandemic and strengthen the health system while improving social safety nets, the labour market, and industries also urgently needed restructuring. Su et al., (2021) noted that the pandemic significantly increased the unemployment rate in most European economies, marking a rare negative effect of the virus on the European labour market. In addition, the ILO-OECD (2020) confirmed that industrial production had declined on average by around 28 percent in G20 countries in just two months between February and April 2020. Larger declines of between 40 and 60 percent were recorded in India, Indonesia, Italy, and South Africa, while relatively smaller declines occurred in Korea and Russia.

Then, how is the economic structure transformed? Do the changes in consumption, distribution, and production rule how the government constructs and restructures the labour market and industries, or is economic transformation actually occurring as an adjustment to market changes without government intervention?

Yifu & Wang (2021) explain the vast variety and complexity of goods and services in the real economy, describing how all economies have different structures that associate with different stages of economic development. Constantine (2017) argues that economic structure governs

economic activities, technologies, production, and government policies. On the other hand, McGregor & Verspagen (2016) find that labour productivity growth has been the dominant source of gains in GDP per capita in most Asian economies, with observed gains often driven by changes in labour productivity within sectors rather than shifts in employment across sectors. This means that a large labour force in the industry significantly influences growth and economic transition in Asia.

In West Kalimantan, agriculture, fisheries, livestock, and forestry have the highest contribution to GRDP, averaging about 22 to 24 percent since 2010. The second highest is wholesale, retail, restaurants, and hotels, which contribute an average of 17 percent, followed by manufacturing, which contributes between 15 and 17 percent. When grouped by sectoral base, the primary sector accounts for an average of 28 percent, the secondary sector for 17 percent, the tertiary sector for 37 percent, and the quaternary sector surprisingly accounts for 19 percent. A large number of workers are employed in the primary sector, approximately 57 percent, followed by the tertiary sector at 24 percent, the quaternary sector at 14 percent, and the secondary sector at 5 percent. Despite the pandemic causing negative growth for more than half of the sectors in 2020, the curves for the primary, secondary, and tertiary sectors did not fluctuate significantly. The large contributions to GRDP and employment from the primary or agriculture sector specifically indicate its dominance insubsistence, characterized by a huge labour in the industry.

Several empirical studies of structural transformation research focus particularly on theories related to the overall adjustment in industrial structure according to available resources, the emergence of backward economies, the interlinkage between industrial and service sectors, and the analysis of productivity growth decomposition. Ali et al., (2023) utilize a mechanism for the industrial structure upgrading model to analyze governmental environmental requirements as the main available resources for improving industrial structure. Herrendorf et al., (2014) develop a multi-sector extension of the one-sector growth model to measure economic development and structural transformation through the shares of value added in agriculture, manufacturing, and services. McGregor & Verspagen (2016) decompose income changes into three components: (i) changes in labour productivity within sectors, (ii) shifts in employment across sectors (structural change), and (iii) changes in the intensity of employment participation. They find that gains in labour productivity are often driven by changing labour productivity within sectors rather than by shifts in employment across sectors.

Others identify basic sectors using regression to determine the magnitude of sector growth and its impact on structural transformation, using tools like location quotient, the Fuzzy-Klassen model, and shift-share analysis. Zhou et al., (2023) employ a regression model to assess the impact of deviations in economic structure on economic growth and the interrelationship between employment structure, industrial sectors, and economic growth. Adao et al., (2019) utilize a shift-share regression design to identify changes in regional outcomes depending on observed and unobserved (residual statistics) sector-level shocks through several shift-share terms. Munandar et al., (2017) adapt agglomerative clustering with location quotient to identify potential sectors for regional development. Goschin (2020) combines static-dynamic location quotient, Herfindahl and Krugman statistical tools to identify strengths, weaknesses, potential industries, economic structure, and changes in regional specialization patterns within the context of economic crisis. Munandar & Wardoyo (2015) apply the Fuzzy-Klassen model to analyze development disparities based on the gross

regional domestic product of a region. Isabhandia & Setiartiti (2021) analyze basic sectors using SLQ, DLQ, shift-share analysis, Klassen typology, and SWOT analysis to identify potential strategies for regional economic development.

In this research using West Kalimantan Province data, we aim not only to prove the theory and analyze labour productivity's relationship to growth and economic transition, but also to cross-check and fit the results to conclude how the economic structure is transformed through GRDP variables and labour by sector. This is the principal difference between our analysis and others. To our knowledge, no detailed scientific studies have been reported on the combination of GRDP and labour variables to analyze the possibility of the structural transformation process during the pandemic, and to define the leading, potential, growth, and under developed sectors by GRDP and labour.

Literature Review

A significant amount of labour in agriculture could be a key indicator of the structural transformation process in Indonesia. Thus, if labour remains the main factor in total factor productivity, it seems impossible to transform the economic structure from primary to secondary or tertiary sectors without shifting subsistence labour. In 2020, the labour force in agriculture in Indonesia accounted for almost one-third of the total labour force, or 29.76 percent, contributing 13.34 percent to GDP. In West Kalimantan, agricultural labour accounted for 49.27 percent, contributing 24 percent to GRDP. The gap between labour share and output indicates a serious productivity issue in agriculture. Overall, our hypotheses in this research are: 1) Labor is significant to GRDP in all sectors, but productivity in the primary sector is declining due to excess labour. 2) Both labour and GRDP in the primary sector are the most leading and rapidly growing compared to others, but marginal productivity is decreasing as labour continues to increase. 3) The design of the transformation process from subsistence to modern industry must begin with the transfer of labour from the primary sector.

The dual model of Arthur Lewis (as cited in Schlogl & Sumner, 2020) provides one of the best-known models of economic development in developing countries. Lewis argued that capital accumulation was driven by the sectoral movement of labour, from the traditional or subsistence or non-capitalist sector (with low productivity, low wages, pricing based on average product rather than marginal product, and widespread disguised unemployment) to the modern or capitalist sector (with higher productivity, where wages are determined by productivity in the subsistence sector). Indeed, one exception to this assumption is when the design of structural transformation does not aim to minimize the scale of labour and productivity in subsistence, but rather aims to develop secondary and tertiary sectors with a higher level of skill, competence in labour and technology.

Structural transformation theory introduced by Lewis (1954) is based on the assumption of unlimited labour supply in the subsistence sector. With an excess of labour supply in the subsistence sector, its marginal productivity has declined and if transferred to the capitalist sector, it will not change total labour productivity values but will significantly increase capitalist output.

The models are structured as follows:

Total ProductionAgriculture(TPA)= f(labourA.capitalA.techA);
ΔTPA3 < ΔTPA2 < ΔTPA1

Total Production(TP)= f(labour.capital.tech);
$\theta'1\Delta$labit > $\eta'1\Delta$labit > $\beta'1\Delta$labit; TP=f(labour)

where, TP or total production is a function of labour, capital, and technology, or an average of capital and technology in the subsistence sector. Total production in agriculture has declined when labour productivity declined as a result of excess labour in the subsistence sector, ΔTPA3<ΔTPA2<ΔTPA1. In this situation, labour shifting to the capitalist sector significantly affected total productivity in the capitalist sector and multiplied the coefficient of labour variable changes, $\theta'1\Delta$labit>$\eta'1\Delta$labit>$\beta'1\Delta$labit. Thus, it locked the role of the structural transformation process from agriculture to manufacturing to just the labour variable, TP = f(labour).

However, in fact, the structural transformation process is more complicated than Lewis' dual-sector model because many variables possibly get involved in the shifting process. But Lewis' theory basically constructs the idea of moving away from the stagnation of economic growth, and also addresses the low productivity problem in the agriculture of less developed countries by structural transformation. Indeed, in the case of a large amount of labour in Indonesia, this variable plays the most important role in economic growth and in the movement of its sectors.

On the other side, structural transformation through the labour variable is not as simple as moving the labour from the subsistence to the modern sector. Allen (2016) described performance in the Indonesian labour market as weak, with slow job growth and a highlevel of labour underutilization. Increasing investment in education has expanded the pool of educated workers, but these investments have not translated into substantial gains in labour productivity. Underqualified workers still fill many positions, with skill shortages continuing to be challenges. In the short term, it is almost impossible to transform the economic structure by shifting the labour between the two sectors, and it would also incur an expensive human resources upgrade cost.

Between Lewis' dual-sector model about labour movement driving capital accumulation inter-sector and the reality of low productivity and underqualified workers in Indonesia that seems impossible to shift in a short time, the large number of unskilled labour is one of the critical problems in the labour market. The primary sector is believed to solve the problem because of its large scale of labour input needed, relatively low cost in terms of investment compared to human capital development cost, and solving unemployment problems. Thus, developing the modern sector without shifting the subsistence labour could be a better choice to transform the economic structure. However, it could significantly raise productivity and poverty issues, especially regarding low wage and low productivity matters in Indonesia's labour market. The unskilled and underqualified workers trapped in the labour market would be larger, which means more cost for upgrading human resources, multiplying the time to solve the slow job growth problem and to expand the educated workforce. Also, if the government's new focus on the modern sector is only filled with high-skill and productivity workers that only take a few shares of the labour market, this could increase inequality. An

extra budget is probably required not just to cover the new sector, but also to prevent the increase of inequality and poverty in the primary sector.

Back to the pandemic situation, the government has to tackle multiple problems caused by the outbreak. The primary sector growth slowed down, affecting more than half of the low-skilled workers in the labour market. The rise of inequality and poverty becomes complicated due to the challenges of transforming human resources from low-wage to high-skill workers. Whether the primary is a key sector in the economic structure, it also has low productivity, low-wage labour, and is the most impacted sector by Covid-19. It is almost impossible to shift from primary to secondary or tertiary sector through either variable, by labour or developing a new sector. In a short time, the primary sector is the only way to economic recovery.

On the other hand, boosting key sector productivity is believed to be the most strategic way to achieve economic rebound during the outbreak. Ahumada et al., (2021) remarked that economic recovery through improving key sectors struggling in the pandemic situation and growing related sectors would help restore lost productivity in affected sectors. While in cases where key sectors fail to improve in the pandemic crisis, taking action straight to the problem becomes more urgent. A fast response will control and minimize extra damage from the crisis. The International Monetary Fund (2021) identified three main issues based on how the pandemic is changing multidimensional aspects and how policies should be designed to enhance productivity and inclusiveness, i.e.: 1) Digitalization during the outbreak would boost productivity and probably increase aggregate productivity in a short time. But no longer; weakened balance sheets in the aftermath of the crisis can inhibit some firms from investing in intangible capital, which is particularly sensitive to credit conditions, 2) The crisis can affect the allocation of labour and capital across firms and sectors with ambiguous effects on productivity, 3) A skills gap may present challenges as in-person activities transform to automation processes, reducing in-person interaction. These three situations have direct effects on the subsistence sector, which is poor in digitalization and relies heavily on personal interactions in the working space.

But translating subsistence to modern not always refers to transforming sector productivity, labour, and investment from primary to secondary. Digitalization and industrialization in farming, agriculture, forestry, and fisheries products or in mining, also high-quality control in the whole supply chain system, make modernization through the primary sector more feasible to boost productivity, and transform subsistence to modern rather than growing and transforming to another sector. The World Bank (2020) analyzes two levels of complementary changes of successful sectoral transformations. First, a seismic shift in sector-wide policy orientation that changes the behavior of farmers and other sectoral players. Second, a high level of sectoral reform supported by many lower level subsectoral policies and investments, also considering operationalizing a new concept of agriculture through consolidation, modernization, and industrialization.

Some empirical evidence discovers a deep downturn of economic transition caused by the failure of government, politics, and an unadapted market. Stiglitz (2017) found a few major structural changes that occur very infrequently. Economics change naturally by the changes in the industrial revolution, manufacturing, market, or competitive landscape. But over time, the balance sheet gets restored because of the failure of markets and politics to manage structural transformations. Sen (2016) analyzes government failures in economic

transformation relating to the market failure (function of labour, land, and product), and market failure relating to the coordination of investment, credit market imperfections, and human capital formation as one of the primary causes of the slow pace of structural transformation in several Asian countries. UNDP Regional Bureau for Asia and the Pacific (2024) remarks Indonesia has failed to transition enough workers from low to high productivity sectors, and has still not managed to create a middle-class workforce (p-19).

Methods

The most basic comprehensive tool to find a robust argument between GRDP-GDP is scaling the data evidence to the static and dynamic location quotient. Thus, we used a 10-year time-series database from 2011 to 2020 of GDP, GRDP, and labour. Both GDP and GRDP variables are grouped into nine sectors following nine sectors of labour data categories provided by Badan Pusat Statistik. We combine each partial empirical method and tool, use structural transformation theory, create a general model and chart from GRDP-GDP, and employ statistics of West Kalimantan province and Indonesia, regress the magnitude of labour to GRDP, then compare and fit the analysis with static-dynamic location quotient, Klassen typology, and shift share analysis to get comprehensive and clear results on how each sector of GRDP generates GDP, or vice versa. To get a deep and comprehensive analysis about what sectors lead in economic structure, we also used static-dynamic and shift share analysis on the labour variable (province and national), so it can be compared with GRDP-GDP; still to analyze the possibility of structural transformation processes during and after the pandemic from the evidence.

We started the critical point of this issue by 1) grouping each sector of GRDP and labour into the primary, secondary, and tertiary sectors, 2) comparing the contribution of these 3 groups of GRDP and labour variables, then figure them on the chart and trendlines below (Figure 1).

Figure 1.**Contribution of Primary, Secondary, Tertiary Sectors of GRDP and Labour of West Kalimantan Province (%)**
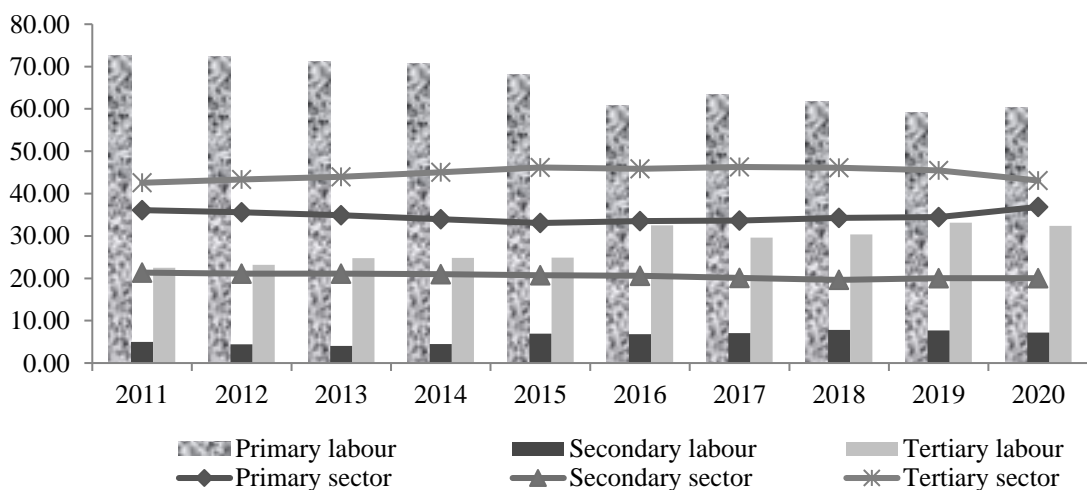
Source : data processed of Badan Pusat Statistik (Statistics Indonesia)

Based on the time series of data evidence, the movement of both GRDP and labour in the secondary sector relatively showed a stable trendline. The space between the GRDP trendline

and labour bar indicates productivity rates in the sector. The secondary sector reached maximum productivity growth in 2013, and constantly decreased until 2020. A unique structural transformation case is shown by the primary and tertiary sectors. The structural shifting of these two main sectors resembles simultaneous interchange cases and is almost linear. During 2011 to 2015, the primary sector decreased while the tertiary increased, but from 2016 to 2020 their values reverted to the coordinates of 2011. The labour variable in the primary sector, on the other hand, showed a significant growth in productivity. Tertiary labour increased but the contribution of the tertiary sector declined. Therefore, from the 2011-2020 period, we assume that structural transformation has failed and the primary sector has naturally proved to be the main industry in the economic structure of West Kalimantan Province.

According to Figure 1, we assume that the large number of labour does not follow the movement of production scale in the shifting process from primary to tertiary. So, the conclusion of this research is to rescale the composition of labour and GRDP by sub-sectors, and to identify and analyze the linearization of the transformation process in both instruments.

To estimate relationships between labours (x) and GRDPs (Y) we use regression analysis formula:

$$Y_{primary;secondary;tertiary} = \alpha + \beta x_{primary;secondary;tertiary} \tag{1}$$

To identify competitive mixtures of industries with labour and GRDP variables, we used and compared both variables from province to national numbers using: 1) shift-share analysis, 2) static-dynamic location quotient, and 3) Klassen typology. The traditional form of the shift-share analysis was developed by Daniel Creamer in the early 1940s, and was later formalized by Edgar S. Dunn in 1960 (Chunyun & Yang, 2008). The method was then extended to the Esteban-Marquillas Model (Esteban-Marquillas, 1972), dynamic model shift-share analysis by Barff & Knight (1988), and the latest Arcelus Model (Arcelus, 1984). The classic models are structured as follows:

$$E_{tij} - E_{t-1ij} = \Delta E_{ij} = NE_{ij} + IM_{ij} + CE_{ij} \tag{2}$$

$$NE_{ij} = E_{ij} (eoo) \tag{3}$$

$$IM_{ij} = E_{ij} (eio - eoo) \tag{4}$$

$$CE_{ij} = E_{ij} (eoj - eio) \tag{5}$$

where E_{tij} is employment (income) in the i sector on j region at time t, NE_{ij} is a national growth effect, IM_{ij} is an industrial mix effect, CE_{ij} is a competitive effect, e_{ij} is an employment growth (income) in industry i region j relative to a base year, e_{io} is a national employment growth (income) for industry i, e_{oj} is a total employment growth (income) for region j, and e_{oo} is a national employment growth (income).

To get comparative based analysis of sectoral classification, we applied the location quotient (LQ). The LQ therefore is the relation of the industry employment share regarding the overall employment in the analyzed subregion to the industry employment share regarding

the overall employment in the nation. The LQ for a subregion i by Isserman (Strotebeck, 2010) can be shown as follows:

$$LQi = \frac{\frac{Ei,r}{Er}}{\frac{Ei,n}{En}} \quad (6)$$

where, Ei,r is an industry employment i in subregion r, Er is an overall employment, Ei,n is an industry employment i in region n, and En is an overall employment. With notation gij and Gi the models of dynamic and static location quotient structured as follows (Yuwono, 2000):

$$DLQij = \frac{(1+gij)t \,/\, (1+gj)t}{(1+Gi)t \,/\, (1+G)t} \quad (7)$$

$$SLQij = \frac{\frac{Vij}{Vi}}{\frac{Vin}{Vn}} \quad (8)$$

where, Gi and gij are an average of sectoral growth i in a region and subregion j. Vij is a sub industry i in subregion j, and Vi is an overall industry. Vin is a sub industry i in region n, and Vn is an overall industry. The sectoral classification based comparative analysis of DLQ and SLQ shown as follows (Widodo, 2006):

Table 1. **The Sectoral Classification Based Comparative Analysis**

Lead and still potential to grow sector SLQi > 1 ; DLQi > 1	Potential to lead sector SLQi < 1 ; DLQi > 1
Lead but not potential to grow sector SLQi > 1 ; DLQi < 1	Relatively underdeveloped and not potential to grow sector SLQi < 1 ; DLQi < 1

The third step provided an analysis of industries classification based on the growth and sectoral shares of subregion compared to region by Klassen typology. Klassen classify the level of development into advanced and rapidly growing sector, depressed growth sector, potential or can still growing sector, and relatively underdeveloped sector quadrants (Munandar & Wardoyo, 2015). The comparative analysis used an average sectoral contribution i in a region and sub region j (cij, Ci), and an average of sectoral growth i in a region and subregion j (gij,Gi), and the quadrants shown as follows:

Table 2. **Klassen Typology Matrix**

Advance and rapidly growing sector $c_{ij} \geq C_i$; $g_{ij} \geq G_i$	Potential or can still growing sector $c_{ij} \leq C_i$; $g_{ij} \geq G_i$
Depressed growth sector $c_{ij} \geq C_i$; $g_{ij} \leq G_i$	Relatively underdeveloped sector $c_{ij} \leq C_i$; $g_{ij} \leq G_i$

Results and Discussion

Based on Lewis's theory (Lewis, 1954), we simulated the transformation process through the coefficient values of labour toward GRDP, and the estimated regression results are summarized in Table 3 and the formulas below.

Table 3. **Estimated Regression Results**

Explanatory variables	Coefficients	T value	R^2
$L_{Primary}$	-0,59	-2,203	0,35
$L_{Secondary}$	0,778	3,716	0,6
$L_{Tertiary}$	0,899	6,155	0,8

Source: author calculations

$$GRDP_{Primary,Secondary,Tertiary} = f(lab_{pst}, cap_{pst}, tech_{pst}); GRDP_{P,S,T} = (lab_{pst})$$

$$GRDP_{P,S,T} = \alpha + \beta lab_{pst} + \beta cap_{pst} + \beta tech_{pst} + \varepsilon = (lab_{pst})$$

$$GRDP_{Primary} = -0,59 lab_{Primary}$$

$$GRDP_{Secondary} = 0,778 lab_{Secondary}$$

$$GRDP_{Tertiary} = 0,899 lab_{Tertiary}$$

The estimated results indicate that our hypothesis fits with Lewis's theory (Lewis, 1954), where the labour of the primary sector coefficient had a negative and significant impact on GRDP, but was positive and more significant in the secondary and tertiary sectors. We find that the negative coefficient of the primary sector indicates an excessed labour and low productivity in subsistence. The proportions of the variance in GRDP explained by labour variables are 35% in the primary, 60% in the secondary, and 80% in the tertiary. This means that the labour variable in the tertiary sector had the highest impact on GRDP, followed by the secondary sector, and then the primary sector. Thus, it definitely fits with the assumption of Lewis's theory that the coefficient of labour variable changes multiplied in the transformation process $\theta'1\Delta labit > \eta'1\Delta labit > \beta'1\Delta labit$.

On that condition, when the subsistence sector is in low productivity caused by the excessed of labour supply, transferring its labour to the secondary or tertiary sectors is not only expected to transfer and grow the productivity but also to revitalise productivity in the subsistence. Helble et al., (2019) find evidence of a major reallocation of labour directly from agriculture to services, and it contributed most to overall labour productivity growth in developing Asia. Bustos et al., (2018) provide empirical evidence of the labour transfer mechanism's effect. New technologies in agriculture can foster this sector to release unskilled

workers to another sector, which encourages comparative advantage in low-skill industries. In the short run, there are some improvements in agriculture productivity and generated specialization in less-innovative industries, but it also has negative effects on productivity in the long run. Thus, freeing labour from subsistence to manufacturing seems like transferring and unsolved productivity problems of unskilled workers, but it also potentially generates primary growth if it is chosen as a key sector.

In West Kalimantan Province, based on statistical data for 2020, economic growth declined to -1.82%. Despite the negative sentiment in several sectors, some positive contributions were also derived from the growth of mining and quarrying (21.23%), electricity, gas, and water (8.62%), and agriculture, forestry, livestock, and fisheries (1.19%).

In comparison to national growth, GRDP (Gross Regional Domestic Product)'s negative contraction in West Kalimantan at -1.82% was lower than Indonesia's GDP (Gross Domestic Product), which declined by -2.07%. The composition of each sector in GRDP generally showed that all primary sectors shared an average positive growth of 11.21%, with 3 sectors: agriculture, information and communication, financial and insurance activities, showing positive growth compared to GDP (Figure 2).

Figure 2. **Sectors Contribution in GDP and GRDP of West Kalimantan Province during COVID19 Pandemic in 2020 (%)**
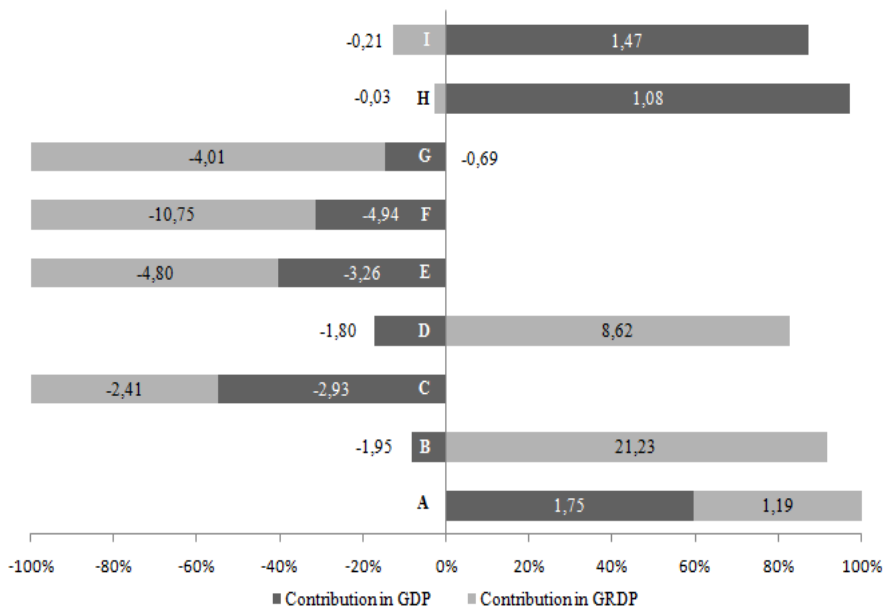
Note :A= Agriculture, forestry, livestock, and fisheries, B= Mining and quarrying, C= Manufacturing, D= Electricity, gas, and water, E= Construction, F= Wholesale trade, retail, restaurants and hotels, G= Transportation, warehousing, and communication, H= Financing, insurance, real estate, and business services, I= Community, social, and personal services
Source : Badan Pusat Statistik and Badan Pusat Statistik Kalimantan Barat (Statistics Indonesia)

Based on sectors' contributions in Figure 2, the improved key sector during the outbreak in West Kalimantan was in the primary, and GDP was driven by agriculture and tertiary sectors. Then how does economic transition in the region relate to the national?

During the Covid-19 pandemic, primary sectors drove GRDP growth of West Kalimantan Province, but national GDP was dominated by tertiaries. This comparison between the two stages of the structural position can define many wide-ranging assumptions such as positive growth possibly indicating a strong and stable sector that differs by region; the non-linear structural transformation process; or the competitive sector in GRDP not automatically integrated with the national sector in GDP, nor its level in economic structures.

Secondly, we grouped sectors into nine sub-sectors as shown in Figure 2, then combined competitive mixtures of industries to analyze the impact on labour and GRDP using our general descriptive data evidence shown in Figure 1 to investigate how each sector's growth and sectoral transformation have operated. The results are summarized as follows:

Table 4.**Klassen Typology, Comparatives Analysis, and Competitives Mixtured of Industries of Labour Variable**

Sectors	Gi	Gij	Ci	Cij	SLQ	DLQ	Neij	Imij	CEij	ΔEij	ΔEij /ΣEij
A	-0,749	-0,253	32,11	54,36	1,695	1,006	20.888	(30.388)	8.566	(934)	-0,93
B	1,121	10,784	1,21	2,82	2,311	1,096	987	(43)	9.047	9.990	9,94
C	2,536	5,067	14,02	4,97	0,358	1,025	2.029	699	4.787	7.515	7,48
D	14,160	21,550	0,47	0,33	0,705	1,066	134	844	1.019	1.996	1,99
E	4,014	4,649	6,42	5,63	0,879	1,007	2.374	1.878	2.757	7.009	6,97
F	3,998	6,106	23,50	15,71	0,671	1,021	6.255	7.974	10.630	24.860	24,73
G	1,632	4,066	4,78	2,69	0,564	1,025	1.081	223	1.917	3.221	3,20
H	8,746	23,516	2,82	1,87	0,671	1,137	847	2.059	22.964	25.870	25,73
I	1,882	5,367	14,66	11,62	0,792	1,035	4.829	636	15.537	21.002	20,89
Σ	1,746	1,667	100,00	100,00	-	-	39.424	(16.118)	77.224	100.530	100,00

Source: author calculations

Table 5.**Comparatives Analysis of Labour Quadrant**

	DLQi> 1; gij> Gi	DLQi< 1; gij< Gi
SLQi> 1; Cij> Ci	A,B	-
SLQi< 1; Cij< Ci	C,D,E,F,G,H,I	-

Source: author calculations

Table 6.**Klassen Typology, Comparatives Analysis, and Competitives Mixtured of Industries of GRDP Variable**

Sectors	Gi	Gij	Ci	Cij	SLQ	DLQ	Neij	Imij	CEij	ΔEij	ΔEij/ΣEij
A	0,037	0,042	13,41	23,45	1,750	1,003	116.104	(17.198)	15.059	113.965	21,62
B	0,010	0,076	8,90	4,75	0,544	1,064	22.702	(18.170)	43.051	47.583	9,03
C	0,039	0,039	22,09	16,51	0,746	0,999	82.226	(11.545)	2.035	72.716	13,79
D	0,042	0,060	1,17	0,24	0,206	1,015	1.166	(0,086)	0,640	1.167	0,33
E	0,056	0,057	10,09	10,63	1,053	1,000	53.029	12.796	(2.747)	63.078	11,97
F	0,042	0,037	16,95	17,18	1,012	0,994	86.473	(6.910)	(8.957)	70.606	13,39
G	0,077	0,071	8,98	8,66	0,963	0,993	42.717	31.430	(7.221)	66.926	12,7
H	0,062	0,053	8,79	6,99	0,792	0,99	34.681	13.771	(8.078)	40.374	7,66
I	0,053	0,037	9,62	11,60	1,2	0,984	57.589	12.606	(20.035)	50.160	9,52
Σ	0,045	0,046	100,00	100,00	-	-	496.687	16.780	13.108	526.575	100,00

Source: author calculations

Table 7.**Comparatives Analysis of GRDP Quadrant**

	DLQi> 1; gij> Gi	DLQi< 1; gij< Gi
SLQi> 1; **Cij> Ci**	A,E	F,I
SLQi< 1; **Cij< Ci**	B,D; B,C,D	C,G,H; G,H

Source: author calculations

Both the comparative analysis using sector growth and growth-contribution mix (Klassen typology) of labour variables (tables 4 and 5) show the same results, where A and B are leading and have potential for growth (advanced and rapidly growing sectors), and C, D, E, F, G, H, I are potential to lead sectors. This is consistent with the labour chart in Figure 1, which shows a high proportion of labour in the primary sector, less in the tertiary sector, and low in the secondary sector. Based on the comparative analysis that uses growth and contribution of sub-regions compared to the region, it's obvious that analyzing only one variable (the labour variable) will lead to distinctive results solely in its comparative position in all sectors. Thus, it could be biased and not entirely determine the effectiveness and productivity of that sector, but it just sizes up the variable in each sector. On the other hand, we used estimated regression results to test Lewis's (Lewis, 1954) transformation theory TP=f(lab) and Isserman's (Strotebeck, 2010) location quotient model to find answers to the questions: Does the comparative analysis of labour quadrants also mean sector improvement? Is it relevant to the structural transformation process?

According to Table 3, the negative coefficient of labour to GRDP in the primary sector describes labour overload, but a positively significant contribution impacts the secondary and tertiary sectors, indicating high productivity and the potential to increase sector capacity through the labour variable. Based on Table 4, the average increase in performance ΔEij (number of workers) is 100.530, generated by labour (ΔEij/Σeij) in sector H = 25.73%, F =

24.73%, I = 20.89%, and B = 9.94%. However, the average performance of labour in sector A has decreased -0.93%. Labour's competitive effect CEij (province to national) is shown in sectors H, I, F, B, A, where a positive industrial mix (Imij) of labour is seen in sectors F, H, E, D, C, I, G, and a negative industrial mix in A, B. National labour growth has a positive effect on province labour growth across all sectors, with a total number (ΣNeij) from 2011 to 2019 of 39,424 workers. Therefore, labour in the primary sector is in the advance and rapidly growing quadrant (Table 5), but it also has a negative impact on output (coefficient of LPrimary in Table 3) and on the industrial mix (column Imij in Table 4). Despite the comparative quadrants (Table 5), sectors A and B do not show a linear improvement in productivity of labour in the primary sector, as shown in Table 3, but labour in sectors C, D, E, F, G, H, I yields the same results in both Isserman (Strotebeck, 2010) and Lewis (1954) theories.

The final result of labour analysis is significant in line with Lewis theory, where on one hand,the excess of labour supply in subsistence causes its marginal productivity to decline and will not affect the total output if it is transferred to the capitalist sector. On the other hand, despite indications of low productivity and excessive supply when regressed against GRDP, comparative analysis shows that labour in the primary sector itself is also leading and potentially growing in terms of labour supply. Thus, if the over-capacity of labour in the primary sector is not tackled adequately by the government, we predict that unskilled workers in subsistence will continue to grow, dominating the labour market, leading to declining productivity in the primary sector, increased costs and time to educate workers, and rising inequality and deep poverty in the long run.

In another aspect shown by Table 7, sector C in the comparative analysis of GRDP has a different quadrant, where it is in the potential to grow quadrant based on the growth-based method (Cij<Ci; gij>Gi), and relatively underdeveloped quadrant based on the growth-contribution method (SLQi<1; DLQi<1). Others are shown in the same quadrant in both comparative analyses, with A and E leading and still having potential to grow (advance and rapidly growing); F and I leading but in a depressed growth sector; B and D having potential to lead and can still grow; and G and H being relatively underdeveloped and not potential to grow. When compared with the trendlines of GRDP in Figure 2, the tertiary sector (E, F, G are in tertiary sectors, while H and I are in the quarterly sector and do not contribute significantly to GRDP) had the highest contribution to GRDP compared to the primary sector (A, B), but each trendline indicates a pattern of simultaneous interchange. Returning to our analysis in Figure 1, if the structural transformation has failed and the primary sector is naturally proven as the main industry, the tertiary sector as a substitute will simultaneously decrease while the primary sector increases. In the year 2020, the GRDP of the primary sector scaled up and approached that of the tertiary sector, with both coordinates almost reaching the same as those in 2011.

A competitive mix of GRDP variables (Table 6) shows an average increase in GRDP performance (ΣΔEij) of 526 trillion rupiahs, generated by sectors A = 21.62%, C = 13.79%, F = 13.39%, G = 12.7%, and E = 11.97%. Competitive effect (Ceij) is shown by sectors B, A, C, D, where it has decreased in sectors I, F, H, G, E. Positive industrial mix (column Imij on Table 6) is observed in sectors G, H, E, I, and negative industrial mix in D, B, A, C, F. GDP growth has a positive effect on GRDP in all sectors (ΣNeij is 496 trillion). Indeed, quantitative evidence of competitive mix results shows that the subsistence sector still

contributes to West Kalimantan GRDP in comparison with the failure of the structural transformation process shown in Figure 1.

These findings are in line with Islam (2017), who discovers the "Lewis turning point" in Southeast and East Asian economics, where manufacturing industries have not acted as the engine of growth and employment, and the growth of the service sector has not been associated with healthy growth in employment. Our finding is also relevant to Islam (2019) for the analysis of theoretical explanations for structural transformation in economies that postulated the process of development involves a transfer of labour from the traditional to the modern sector, where structural transformation of an economy along conventional paths, i.e., a shift from agriculture to manufacturing followed by services, would depend critically on the sectoral pattern of growth that unfolds in an economy. Awaliyyah et al., (2020) identify the largest labour of the agriculture sector as an important determinant of structural transformation in Asian developing countries. Our research differs from that of Marouaoni et al., (2022), who highlight the importance of countercyclical fiscal policies and undervalued currencies in enhancing structural change.

Conclusion

Economic structural transformation ideally is conducted through sectoral transformation within regions. OECD (2019) notes that regions undergoing industrial transition have comparatively strong potential to seize the opportunities offered by current digitalisation and automation to revive economic growth and productivity. However, a lack of skilled labour may prevent new investment in the modern sector. Krawchenko & Gordon (2021) review comparative transitions between national and regional initiatives and find that industrial transition policies exist in 74 regions, identified by their having sub-regions that have experienced significant industrial shifts in the past two decades. This study also identifies only three countries — Canada, Spain, and New Zealand — that have clearly defined transition mechanisms with simultaneous interlinked policies from national to regional initiatives with specific policies.

Comprehensive research and analysis of structural transformation process based on the theory of structural change which basically use growth and development theories. In case large number of unskilled workers in primary sector such as Indonesia especially in West Kalimantan province, generating economic structure transformation from subsistence to modern comes more complicated when primary playing role as key sector, but also contribute to low productivity and rapidly increasing low-wage unskilled labour supply in labour market.

When the pandemic hit in 2020, the contraction of several sectors in the economic structure did not significantly affect the pattern of labour in primary, secondary, and tertiary sectors. However, the trendlines from the year 2011 to 2020 indicate the failure of the structural transformation process from labour in primary to tertiary. According to the result of the analysis, 1) regression analysis confirms that labour in primary, secondary, and tertiary sectors is significant to GRDP, 2) both comparative and competitive mixture analyses of labour and GRDP variables show that the subsistence sector has led, is in advance, and is rapidly growing. However, when labour in subsistence is compared with its contribution to GRDP, it obviously indicates poor productivity in the subsistence sector; also, 3) a negative coefficient only on labour of primary to GRDP indicates that every increase in labour in

subsistence reduces its marginal productivity, which means that labour of primary must transfer to other sectors.

As the overload of unskilled workers contributes to low productivity in the primary sector, this low productivity will constantly occur even if they transfer to another sector. Despite the low productivity problem, the labour overload, and also rapidly growing in primary, it has to shift and switch with capital and technology to revitalize primary as a key sector; TP = f(labour.capital.tech). But transferring a large number of unskilled labour also means defining the right sector within low-skilled categories, and this kind of industry is just limited to the secondary sector. In fact, as shown in Figure 1, the growth of primary and tertiary constantly moves in a simultaneous interchanged trendline, but not to the secondary. Thus, it is almost impossible to transfer an overload of unskilled workers from primary to tertiary. Low productivity and labour excess in subsistence push economic structure rules to the classical economics model: Lewis theory that locked the interchange process only on the labour variable TP= f(lab). Indeed, the failure of structural transformation between primary and tertiary in West Kalimantan province indicates that the transformation process was not followed by labour shifting. Despite the short-term potential sector has grown and scaled up by investment, but a large number of labour in primary, and also without the labour interchange process in between, in the long term, the subsistence sector will naturally return and the transformation process will fail. Thus, explained in Figure 2, that even during the pandemic, GRDP of West Kalimantan is still driven by the primary sector.

When the economic structure drive by main resources on subsistence, but the push of global economy and the direction of development moves to manufacturing and services as industry 4.0, the structure will failed by the mismatch between its resources, economic stage, and the direction of development.

In case of low productivity, unskilled workers and excess labour that grow fast are locked in the primary sector as in West Kalimantan Province, the government has to quickly transfer workers to the secondary sector. Thus, in the short run, this not only stops the increasing labour supply in subsistence, but also revitalizes the primary sector from its low productivity. In the long run, the transfer of unskilled labour potentially encourages a comparative advantage in low-skilled industries of the secondary sector, fosters modernization through technology in the primary sector, and potentially reduces aggregate inequality and poverty from the subsistence sector.

In the condition of huge unskilled labour and low productivity in the primary, but on another side, this sector also plays a key sector and contributes to more than half of GDP or GRDP, policy makers and the government as decision-makers have a hard homework to discharge or downturn secondary to low-skilled industries by transferring workers from primary, probably the most effective way to boost production of primary and grow aggregate productivity in the short run.

As focusing on key sectors is believed to lead strategies toleverage and achieve growth targets, The Advisory Council on Economic Growth of Canada (2018) recommends a focused approach that removes barriers in a few sectors with strong endowments, untapped potential, and significant global growth prospects. They identified a set of cross-cutting strategic imperatives: defining factors that have to be accomplished to achieve growth targets. In the long term, we identified unskilled workers and a huge number of workers in

agriculture as barriers to growth and productivity. Transferring labour to another sector and upgrading the agriculture sector with innovation and technology will boost productivity. This set of cross-cutting strategic imperatives aims not only to rebound productivity in primary sectors but also to transform the economic structure to secondary and tertiary sectors. In order to change transformation rules from the "traditional models" that trap or unlock the interchange of labour to modern industry, the government must address human resource issues, identify definite interchanged sectors, choose key sectors, and ensure each stage is passed thoroughly with all necessary resources.

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