

Article

# Employment Conditions in 17 Economic Sectors in Indonesia: Comparative Study Before and During Covid-19

Ricci Rakhman Pamuji<sup>1</sup>, Chairullah Amin<sup>2</sup>, Aziz Hasyim<sup>3</sup>

1,2,3 Department of Economics, Faculty of Economics and Business, Khairun University, Ternate, Indonesia

\* Correspondence: [ricci.pamuji@gmail.com](mailto:ricci.pamuji@gmail.com)

**Abstract:** The Covid-19 pandemic has impacted and pressured almost all sectors of life. One of the effects is shown by the increase in the Open Unemployment Rate (TPT) in 2020, accompanied by a significant decrease in Gross Domestic Product (GDP) in the same year. Therefore, further research is needed to compare employment conditions before and during Covid-19, in terms of the number of workers, GRDP, and labor productivity. The purpose of this research is to analyze the comparison of employment conditions before and during Covid-19. The analytical methods used are comparing the values of Shift Share, particularly its competitive effect across 17 sectors and 34 provinces, between the periods 2017-2019 and 2020-2022. The results of the study show a significant increase in the percentage of labor growth, particularly in the food and beverage provision sector and professional & business services sector. There is a significant increase in the percentage of GRDP growth, particularly in the Mining & Quarrying sector. There is a significant increase in the percentage of productivity growth, particularly in the Mining & Quarrying sector.

**Keywords:** Shift Share; Employment; GDP; Covid-19

## 1. Introduction

The Covid-19 virus has significantly impacted nearly every aspect of life, with the economic sector being no exception (Iksan Burhanuddin & Nur Abdi, 2020). One major effect has been the rise in unemployment. Data from the second quarter of 2020 indicated that Indonesia's economic growth contracted by 5.32% compared to the same period in 2019 (Putri et al., 2021). According to BPS data (2020), the sectors hardest hit by the pandemic were, in descending order of impact, the accommodation and food/beverage industry, other services, transportation and warehousing, construction, manufacturing, and trade. Conversely, the sectors least affected included water and waste management, electricity and gas, and real estate. This data was derived from an online voluntary survey involving 34,559 business operators.

Covid-19 has also impacted Indonesia's GDP. As shown in Figure 1, there was a decline in 2020, with a gradual recovery observed in 2021-2022. Research by Syarifuddin & Setiawan (2022) explored the link between foreign direct investment and GDP during the pandemic, revealing that Covid-19 significantly influenced foreign investment levels, which in turn affected GDP. Susan et al.'s (2020) study further confirmed the pandemic's impact on GDP, particularly during mid-2020, noting a slowdown in sectors like transportation, agriculture, and mining, while sectors such as services and communication remained relatively unaffected.

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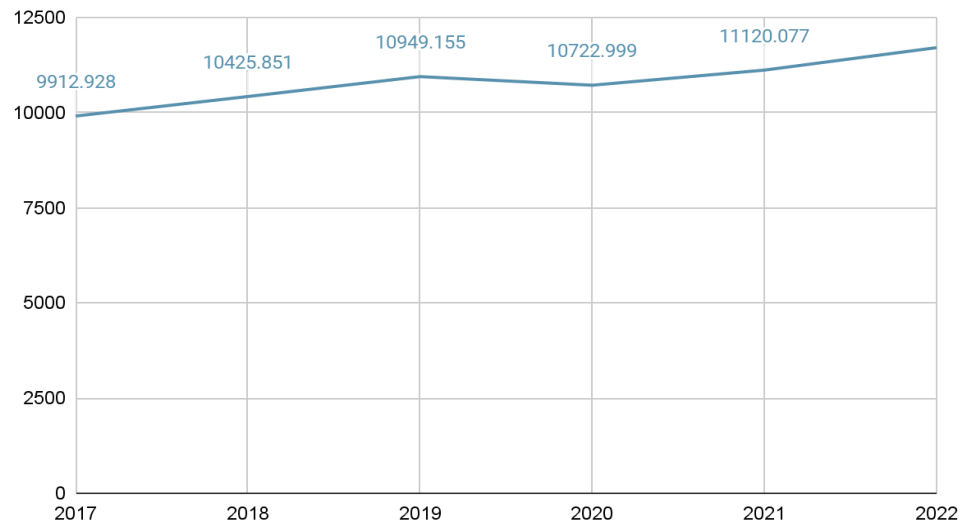


Figure 1. GDP of Indonesia (Trillion Rupiah), 2017-2022. Source: BPS, 2023

In 2020, the pandemic affected each business sector differently, with some experiencing more severe impacts on labor and GDP than others. This variation in impact across sectors highlights the need for research to determine which sectors require greater attention and which are more resilient to the pandemic. The findings from such research could guide the government in prioritizing specific sectors and provinces for economic recovery efforts post-pandemic. Moreover, sectors and provinces that showed resilience could serve as models for others in their recovery plans following the pandemic.

## 2. Materials and Methods

The study utilizes data from Indonesia, maintaining consistency by using the number of provinces as they were before the division of Papua. It covers a 6-year period, split into two segments: before the pandemic (2017-2019) and during the pandemic (2020-2022). The research relies on quantitative data, specifically the number of workers and the Gross Regional Domestic Product (GRDP) across various sectors in 34 provinces from 2017 to 2022.

### Shift Share Analysis

This method is utilized to examine the changes in the economic structure of regions or provinces in the context of national economic growth. The Shift Share Analysis comprises three components: national growth, industry mix effect, and differential shift. The national growth component highlights the impact of the national economy on individual provinces. The industry mix effect illustrates how a sector's performance in a province compares to national sectoral growth. The differential shift component indicates the competitiveness of a sector in a province compared to the same sector nationwide. Shift Share Formula:

$$D_{ij} = N_{ij} + M_{ij} + C_{ij}$$

Explanation:

i = Economic sectors under study

j = Regional variables under study

$D_{ij}$  = Change in sector i region j

$N_{ij}$  = National growth impact on sector i region j

$M_{ij}$  = Industry mix effect on sector in region j

$C_{ij}$  = Competitive advantage of sector i in region j

The expanded equation is:

$$D_{ij} = y^*_{ij} - y_{ij}$$

$$N_{ij} = y_{ij} \cdot r_n$$

$$M_{ij} = y_{ij} \cdot (r_{in} - r_n)$$

$$C_{ij} = y_{ij} \cdot (r_{ij} - r_{in})$$

Where:

$y_{ij}$  = Number of labor or GRDP of sector  $i$  in region  $j$

$y^*_{ij}$  = Number of labor or GRDP of sector  $i$  in region  $j$  at the end of analysis period

$r_n$  = National average growth rate of labor or GDP

$r_{in}$  = National average growth rate of labor or GDP for sector  $i$

$r_{ij}$  = National average growth rate of labor or GDP for sector  $i$  region  $j$

Research Variables:

1. Number of workers. This refers to the employed population within the labor force. According to the International Labour Organization (ILO), working involves any economic activity performed to earn or assist in earning income or profit, for at least 1 uninterrupted hour in the past week. This includes unpaid labor that supports a business/economic activity. The research examines the number of workers in 34 provinces in Indonesia across various business sectors.
2. GDP. This represents the total value added by all business units in a country, or the total value of final goods and services produced by all economic units. To observe sectoral shifts in GDP before and during the pandemic, GDP at current prices is used.

### 3. Results

#### Comparative Description of the Growth in the employment, before and during pandemic in 17 Sectors in Indonesia

Figure 2 illustrates the percentage change in worker growth across various sectors. The Agriculture, Forestry, & Fisheries sector saw a 4.07% decline from 2017-2019, followed by a 4.31% rise from 2020-2022. The Mining & Quarrying sector grew by 0.27% from 2017-2019 and surged by 18.28% from 2020-2022. Manufacturing increased by 6.51% from 2017-2019 but declined by 0.29% from 2020-2022. The Electricity, Gas, Steam/Hot Water & Cold Air Provision sector grew by 3.94% from 2017-2019 but fell by 9.99% from 2020-2022. The Water Treatment, Wastewater Treatment, Treatment & Recovery sector rose by 12.44% from 2017-2019 and further increased by 15.30% from 2020-2022. The Construction sector saw a 6.38% increase from 2017-2019 and a 0.89% increase from 2020-2022. The Wholesale & Retail Trade; Repair & Maintenance of Cars & Motorcycles sector grew by 5.19% from 2017-2019 and a 4.14% increase from 2020-2022. The Wholesale & Retail Trade; Repair & Maintenance of Cars & Motorcycles sector grew by 5.19% from 2017-2019 and by 4.14% from 2020-2022. The Wholesale & Retail Trade; Repair & Maintenance of Cars & Motorcycles sector grew by 5.19% from 2017-2019 and by 4.14% from 2020-2022.

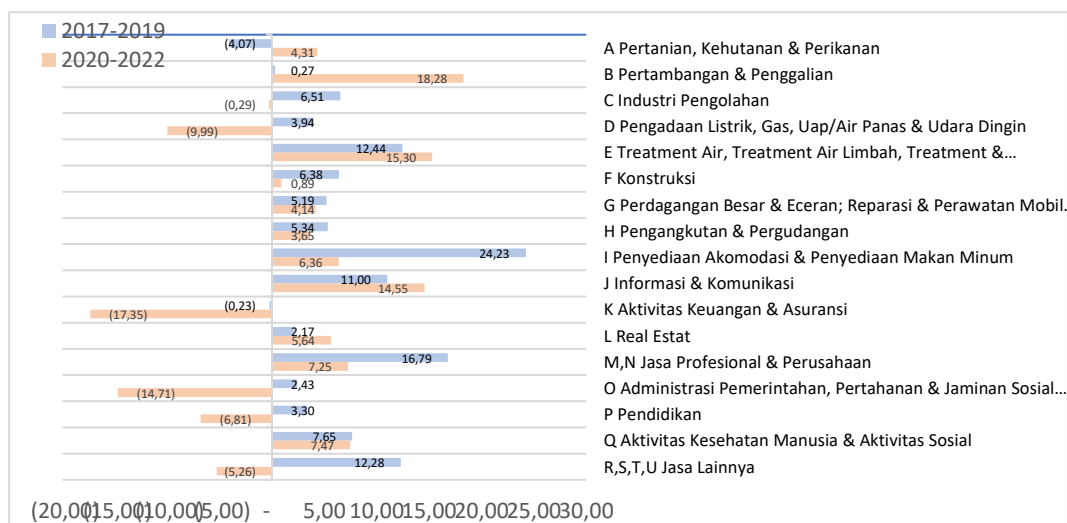


Figure 2. Comparison of employment growth Percentage in 2017-2019 and 2020-2017 by 17 business sectors. Source: BPS (processed data), 2023

The graph indicates that the sectors with increased worker growth rates between the 2017-2019 and 2020-2022 periods are mining and quarrying, agriculture, forestry & fisheries, and water treatment sectors. In contrast, sectors experiencing a decline in worker growth rates include financial and insurance activities, government administration, defense & compulsory social security, and accommodation & food/beverage provision sectors.

Graph 2 highlights several trends that parallel pandemic-era phenomena. The increase in mining sector growth, for instance, was driven by a rise in coal prices in 2021, owing to higher coal demand from China (Haq et al., 2021). This aligns with (Malahayati et al., 2021), who predicted that the recovery in energy prices would spur mining sector growth. Additionally, the Indonesian government aims to maximize coal use for domestic electricity while still exporting more than half of its coal (National Energy Council, 2017).

Other studies have noted similar trends, such as the decline in the electricity and gas supply sector, which also occurred internationally. Mulvaney et al., (2020) noted that the pandemic reduced the economic sector workforce in the US, particularly in high-pollution areas, which were more prone to COVID-19 and thus more likely to shut down (Wilson et al., 2020). The financial and insurance sector experienced the most significant decline. Bank loans have been consistently decreasing since April 2020, by about 2% year-over-year in April 2021, marking the first sustained contraction since the 1998 monetary crisis. The negative impact of COVID-19 on banking activities has been documented in both developed and developing countries (Li et al., 2020; Siregar et al., 2021; Siregar & Choy, 2010). The public sector also faced significant declines, as highlighted by several studies. The shift from office work to remote work affected public sector employment more than the private sector (Melian, 2020; Palumbo, 2020) found a continuous drop in public sector job openings in Germany from March to September 2020. Similarly, the US saw a significant reduction in the public sector workforce, with a slow recovery (Maye et al., 2020)

### **Comparative Description of the Growth in the employment, before and during pandemic in 34 Provinces in Indonesia**

Figure 3 displays the percentage changes in worker growth across various provinces. Aceh experienced a 7.30% increase from 2017-2019, followed by a 1.94% decrease from 2020-2022. North Sumatra saw a significant increase of 12.53% from 2017-2019 and a slight rise of 0.26% from 2020-2022. West Sumatra had a 3.87% increase from 2017-2019 but dropped by 1.94% from 2020-2022. Riau's growth was 4.52% from 2017-2019, then declined by 3.22% from 2020-2022. Jambi decreased by 1.70% from 2017-2019 but increased by 1.86% from 2020-2022. South Sumatra rose by 1.99% from 2017-2019 but fell by 0.27% from 2020-2022. Bengkulu saw a slight decline of 0.05% from 2017-2019 and a further drop of 1.06% from 2020-2022. Lampung increased by 3.83% from 2017-2019 and 9.12% from 2020-2022. Bangka-Belitung saw growth of 1.09% from 2017-2019 and 2.99% from 2020-2022. Riau Islands grew by 1.35% from 2017-2019 but declined by 8.37% from 2020-2022.

Jakarta increased slightly by 0.34% from 2017-2019 but decreased significantly by 8.96% from 2020-2022. West Java saw a 6.03% increase from 2017-2019 and a smaller rise of 0.57% from 2020-2022. Central Java increased by 2.04% from 2017-2019 and by 7.85% from 2020-2022. Yogyakarta grew by 4.43% from 2017-2019 and by 1.12% from 2020-2022. East Java rose by 3.56% from 2017-2019 and by 1.02% from 2020-2022. Banten increased by 2.20% from 2017-2019 but declined by 3.67% from 2020-2022. Bali grew by 3.48% from 2017-2019 but fell by 2.07% from 2020-2022. West Nusa Tenggara saw a slight increase of 0.18% from 2017-2019 and a more significant rise of 4.61% from 2020-2022. East Nusa Tenggara increased by 1.30% from 2017-2019 but decreased by 1.71% from 2020-2022.

The graph indicates that the provinces with increased worker growth rates between the 2017-2019 and 2020-2022 periods are Papua, West Papua, and North Maluku. In contrast, the provinces experiencing a decline in worker growth rates include Southeast Sulawesi, South Kalimantan, and Jakarta.

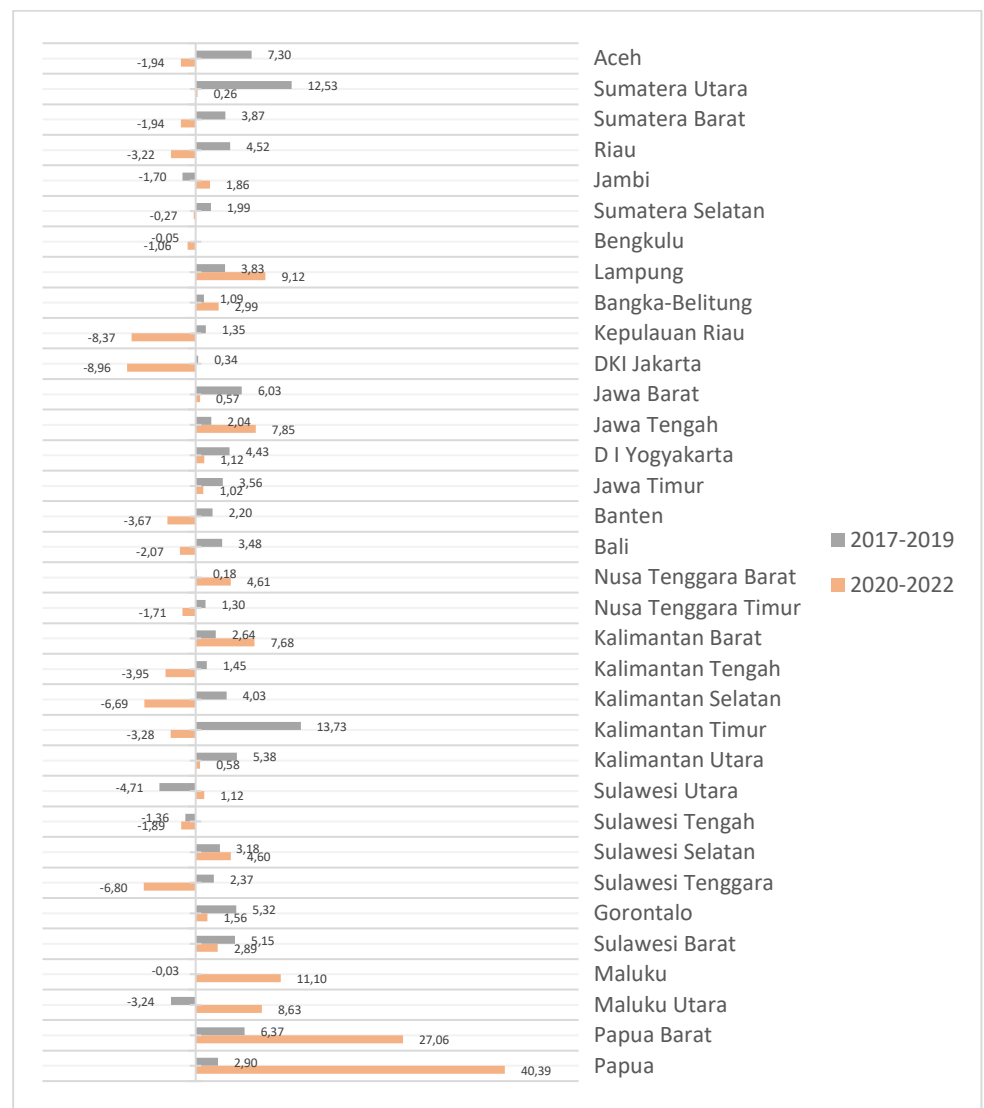


Figure 3. Comparison of employment growth Percentage in 2017-2019 and 2020-2021 by 34 provinces. Source: BPS (processed data), 2023.

#### 4. Discussion

##### Shift Share Results in terms of Employment, before and during pandemic

The table below shows that the sector with the most significant increase in competitive advantage from 2017-2019 to 2020-2022 in Indonesia is the Manufacturing Industry, with 23 provinces experiencing an increase in this sector. This is followed by the Human Health & Social Activities sector, which saw an increase in 22 provinces, and the Wholesale & Retail Trade; Repair & Maintenance of Motor Vehicles & Motorcycles, and Transportation & Warehousing sectors, both of which increased in 20 provinces.

Conversely, the sectors that experienced the most significant decline in competitive advantage across provinces from 2017-2019 to 2020-2022 were the Professional & Business Services sector and the Water Treatment, Wastewater Treatment, Treatment & Recovery sector, each declining in 23 provinces. The Agriculture sector also saw a decline in 22 provinces.

From a provincial perspective, West Papua had the most sectors with an increased competitive advantage, with 14 out of 17 sectors showing improvement. This is followed by West Kalimantan, where 13 out of 17 sectors saw an increase in competitive advantage. On the other hand, Aceh experienced the most significant decline in sectoral competitive

advantage, with 13 sectors declining, followed by Riau Islands and Jakarta, each with 12 sectors experiencing a decline.

Several studies have examined the phenomena depicted in the graph above. Regarding labor force growth, Papua demonstrated resilience during the pandemic, being one of the few provinces to see economic growth in the first half of 2020 (Tulus Rahayu et al., 2021). Support for micro, small, and medium enterprises also played a role in maintaining and even boosting employment in the region (Dewi et al., 2021). Conversely, the graph shows a decline in provinces with high population densities, like Jakarta and the Riau Islands. As Shima et al. (2020) reported, metropolitan areas experienced the highest infection and mortality rates during the COVID-19 pandemic. Additionally, other factors, such as the incomplete support for budget refocusing policies in Southeast Sulawesi, also contributed to these trends (Kadir, 2021).

The table below shows that the sector with the most significant increase in competitive advantage in Indonesia from 2017-2019 to 2020-2022 is the Manufacturing Industry, with 23 provinces experiencing an increase in competitive advantage in this sector. This is followed by an increase in the Human Health & Social Work Activities sector in 22 provinces, and the Wholesale & Retail Trade; Repair & Maintenance of Motor Vehicles & Motorcycles, and Transportation & Warehousing sectors, which increased in 20 provinces. Conversely, the sectors with the most significant decline in competitive advantage across provinces from 2017-2019 to 2020-2022 are the Professional & Business Services sector and the Water Treatment, Wastewater Treatment, and Recovery Treatment sector, each occurring in 23 provinces. These sectors are followed by the agriculture sector, which saw a decline in 22 provinces.

Table 1. Table of changes in sectors with competitive advantage in the number of workers before and during the pandemic

Provinsi	Sectors with competitive advantage in terms of number of workers before the pandemic	Sectors with competitive advantage in terms of number of workers during the pandemic
Aceh	A, C, D, E, K, M,N, O	C, F, J, L
Sumatera Utara	A, C, D, G, H, I, K, L, M,N, O, P, Q	C, E, G, I, J, P, Q, R,S,T,U
Sumatera Barat	C, D, H, I, J, K, L, O, P	B, D, G, H, I, J, P, R,S,T,U
Riau	A, B, C, D, F, J, K, M,N, Q	C, D, G, K, L, Q
Jambi	C, D, E, G, I, J, M,N, P, R,S,T,U	B, C, F, G, H, I, K, O, P, Q
Sumatera Selatan	A, B, D, E, G, H, J, R,S,T,U	B, C, D, G, I, K, L, O, P, Q, R,S,T,U
Bengkulu	C, E, F, G, J, K, M,N, P, Q	C, E, F, G, H, J, M,N, O, R,S,T,U
Lampung	A, B, C, E, F, I, K, L, M,N, P, Q	C, E, F, G, H, I, J, K, O, P, Q, R,S,T,U
Bangka- Belitung	B, I, K, P, R,S,T,U	B, D, H, I, J, K, L, O, P, Q, R,S,T,U
Kepulauan Riau	A, B, C, D, F, J, P	C, H, I, L, M,N
DKI Jakarta	C, F, O	D, F, K, L, O
Jawa Barat	E, F, G, H, I, Q, R,S,T,U	A, B, D, E, F, G, M,N



Jawa Tengah	B, D, J, M,N, P, Q	A, B, D, E, F, H, I, J, K, L, O, R,S,T,U
D I Yogyakarta	A, B, D, H, I, J, P	A, G, H, I, J, L, M,N, P, Q, R,S,T,U
Jawa Timur	C, E, F, I, J, L, M,N, R,S,T,U	A, D, G, H, I, L
Banten	B, D, E, F, G, H, J, P, Q	A, B, E, I, M,N, Q
Bali	A, B, D, E, H, J, K, M,N	A, G, J, K, O, P, Q
Nusa Tenggara Barat	C, I, K, O, P, Q, R,S,T,U	A, C, D, E, F, G, I, J, K, Q
Nusa Tenggara Timur	A, C, G, I, O, P, Q	B, C, D, G, H, I, J, L, M,N, O, R,S,T,U
Kalimantan Barat	E, G, I, K, M,N, O, Q	A, B, C, F, H, J, K, L, M,N, O, P, Q, R,S,T,U
Kalimantan Tengah	B, C, D, G, K, M,N, P, Q, R,S,T,U	B, C, H, I, K, Q, R,S,T,U
Kalimantan Selatan	B, C, E, F, G, I, O, Q	C, D, F, H, K, Q, R,S,T,U
Kalimantan Timur	A, B, C, E, F, H, J, L, M,N, Q, R,S,T,U	C, D, F, H, J, K, L, O, P, Q
Kalimantan Utara	A, B, C, D, E, F, L, P	C, D, F, I, J, K, M,N, O, P, Q
Sulawesi Utara	B, C, H, K, M,N, O, P, Q	C, F, L, O, P
Sulawesi Tengah	C, D, E, F, G, K, O, Q	C, D, G, H, J, M,N, R,S,T,U
Sulawesi Selatan	A, C, G, J, K, L, M,N, O, R,S,T,U	A, D, E, H, I, K, L, P, R,S,T,U
Sulawesi Tenggara	A, B, I, J, K, L, P, Q, R,S,T,U	B, D, F, H, K, L, P, Q
Gorontalo	A, B, I, K, M,N, O, Q	A, C, F, J, O, P, Q
Sulawesi Barat	A, G, J, K, M,N, P	B, C, F, J, K, M,N, P, Q, R,S,T,U
Maluku	C, E, J, O	B, C, F, G, H, I, J, K, O, P, Q, R,S,T,U
Maluku Utara	B, E, K, O, P, Q	B, C, D, E, F, G, I, K, P, Q, R,S,T,U
Papua Barat	B, C, D, E, F, G, H, I, J, K, L, O, Q, R,S,T,U	A, C, D, F, G, H, I, J, K, M,N, O, P, Q, R,S,T,U
Papua	A, C, D, F, K, O, P, Q	A, C, G, H, I, J, K, L, Q

#### Sector Descriptions:

A : Agriculture, Forestry & Fisheries; B : Mining & Quarrying; C : Manufacturing Industry; D : Provision of Electricity, Gas, Steam/Hot Water & Cold Air; E : Water Treatment, Wastewater Treatment, Treatment & Recovery; F : Construction; G : Wholesale & Retail Trade; Repair & Maintenance of Motor Vehicles & Motorcycles; H : Transportation & Warehousing; I : Accommodation & Food and Beverage Provision; J : Information & Communication; K : Financial Activities & Insurance; L : Real Estate; M,N : Professional & Business Services; O : Government Administration, Defense & Compulsory Social Security; P : Education; Q : Human Health & Social Activities; R,S,T,U : Other Services

From a provincial perspective, the province with the highest increase in competitive advantage across the most sectors is West Papua, which experienced an increase in

competitive advantage in 14 out of 17 sectors. This is followed by West Kalimantan, which saw an increase in competitive advantage in 13 out of 17 sectors. On the other hand, the province with the most significant decrease in competitive advantage across sectors is Aceh, with 13 sectors experiencing a decline in competitive advantage, followed by Riau Islands and DKI Jakarta, each with 12 sectors experiencing a decline.

Research has examined how the industrial sector managed to grow during the pandemic. Amir (2013) highlighted that the manufacturing sector drives economic growth and equality through trickle-down effects. Factors such as domestic and foreign investment, workforce size, inflation, poverty levels, and taxes have contributed to the sector's resilience during the pandemic (Julianisa et al., 2022).

### GDP and GDRP

Figure 4 shows the percentage growth of GDP in various sectors between the periods of 2017-2019 and 2020-2022. The Agriculture, Forestry & Fisheries sector saw a growth of 12.57% during 2017-2019, which increased to 14.81% during 2020-2022. The Mining & Quarrying sector experienced a significant jump from 11.69% to 140.89%. The Manufacturing Industry grew by 13.87% in the first period and by 17.07% in the second period. The Provision of Electricity, Gas, Steam/Hot Water & Cold Air sector saw a slight decrease in growth from 14.03% to 13.87%.



Figure 4. Comparison of GDP growth Percentage in 2017-2019 and 2020-2017 by 17 business sectors. Source: BPS (processed data), 2023

Water Treatment, Wastewater Treatment, Treatment & Recovery grew by 13.75% in 2017-2019 and by 10.89% in 2020-2022. The Construction sector's growth decreased from 20.65% to 15.75%. Wholesale & Retail Trade; Repair & Maintenance of Motor Vehicles & Motorcycles grew from 16.47% to 26.21%. Transportation & Warehousing saw an increase from 19.90% to 42.63%. Accommodation & Food and Beverage Provision grew from 13.74% to 19.76%. The Information & Communication sector's growth decreased from 21.96% to 16.78%.

Based on the graph, sectors with increased GDP growth rates between the two periods include Mining & Quarrying, Transportation & Warehousing, and Wholesale & Retail Trade; Repair & Maintenance of Motor Vehicles & Motorcycles. Conversely, sectors that experienced a decrease in GDP growth rates were Education, Professional & Business Services, and Government Administration, Defense & Compulsory Social Security.

Various phenomena illustrated in graph 4 align with trends observed during the pandemic. The mining sector's GDP growth was primarily driven by a surge in coal mining performance (Kusmayadi et al., 2022). This trend was also seen in countries like the United States, where the manufacturing industry grew during the pandemic due to increased production efficiency and higher export demand (Fisher et al., 2022). Studies have also



examined the growth in the transportation sector, noting that investment significantly boosted its output (Kostiuk et al., 2021). This growth was fueled by the substantial rise in online shopping habits during the pandemic (Saputra et al., 2021), which attracted more investor interest in developing this sector.

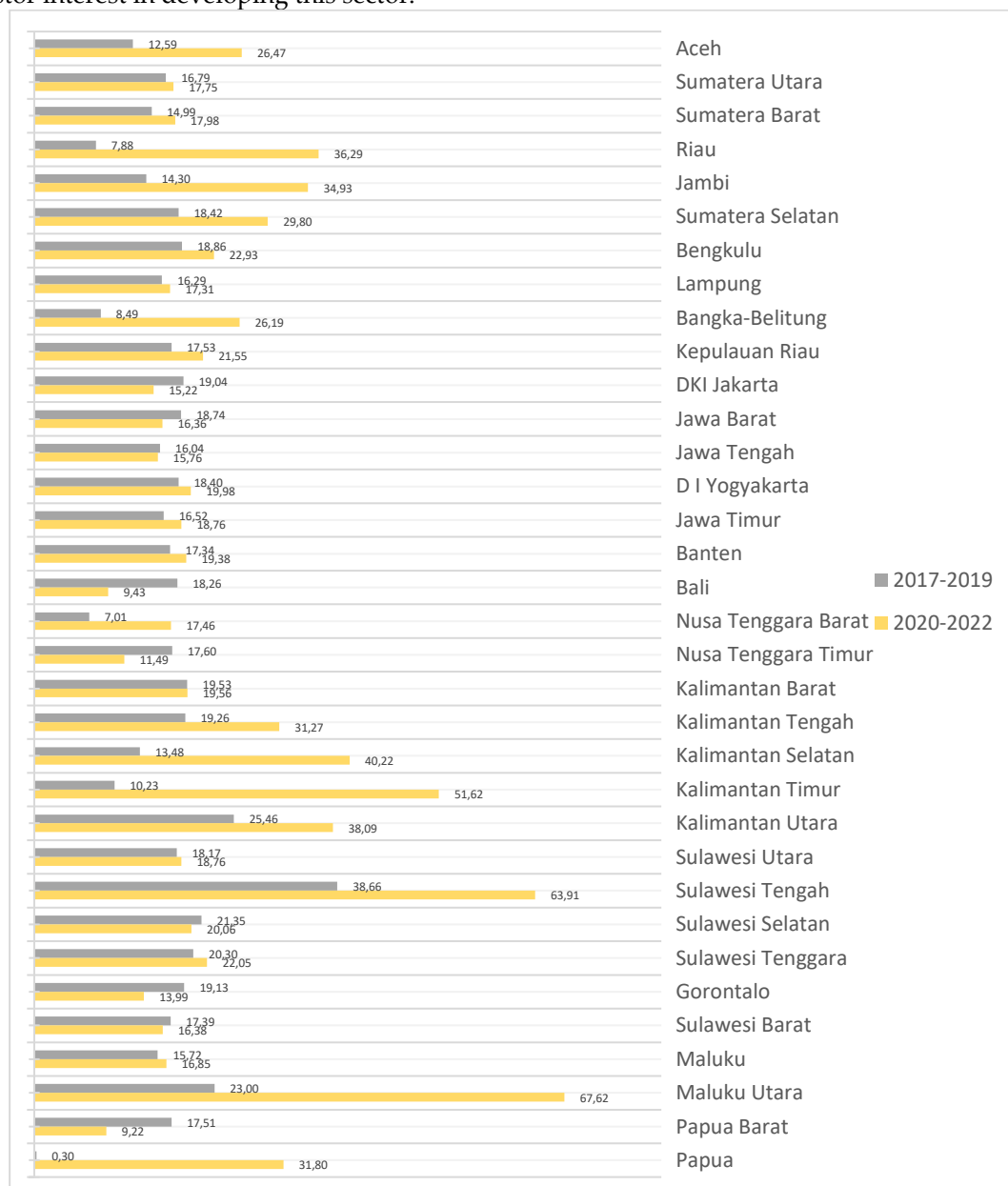


Figure 5. Comparison of GDP growth Percentage in 2017-2019 and 2020-2022 by 34 provinces. Source: BPS (processed data), 2023

Figure 5 shows that the percentage of GDP growth in Aceh province in the 2017-2019 period increased by 12.59%, while in the 2020-2022 period it increased by 26.47%. North Sumatra Province in the 2017-2019 period increased by 16.79%, while in the 2020-2022 period it increased by 17.75%. West Sumatra Province in the 2017-2019 period increased by 14.99%, while in the 2020-2022 period it increased by 17.98%. Riau Province in the 2017-2019 period increased by 7.88% while in the 2020-2022 period it increased by 36.29%. Jambi Province in the 2017-2019 period increased by 14.30%, while in the 2020-2022 period it increased by 34.93%. South Sumatra Province in the 2017-2019 period increased by 18.42%, while in the 2020-2022 period it increased by 29.80%. Bengkulu Province in the 2017-2019 period increased by 18.86%, while in the 2020-2022 period it increased by 22.93%. Lampung Province in the 2017-2019 period increased by 16.29%, while in the 2020-2022 period it increased by 17.31%. Bangka-Belitung Province in the 2017-2019 period increased

by 8.49%, while in the 2020-2022 period it increased by 26.19%. Riau Islands Province in the 2017-2019 period increased by 17.53%, while in the 2020-2022 period it increased by 21.55%.

Based on the graph above, changes in the percentage rate of GDP growth that increased between the 2017-2019 and 2020-2022 periods were in North Maluku Province, Central Sulawesi Province and East Kalimantan Province. Meanwhile, a decrease in the percentage rate of GDP growth occurred in East Nusa Tenggara Province, West Papua Province and Bali Province.

Several studies have also analyzed the results shown in the graph above. For instance, Ferdinan and Armelly (2024) note that East Kalimantan's GDRP growth is driven by labor force participation rates and the human development index. In contrast, North Maluku and Central Sulawesi, which host large nickel mines (IWIP and IMIP), see an increase in Non-Tax State Revenue (PNBP) and GDP due to these companies. However, Wardhani and Djamhari (2024) highlight the need for further investigation into the effects on poverty and the environment in these regions.

The table below shows that the sector that has experienced the greatest increase in competitive advantage (as seen by GRDP) from 2017-2019 to 2020-2022 in Indonesia is the Real Estate sector, where there are 26 Provinces that have experienced an increase in competitive advantage in this sector. This was followed by an increase in the Financial & Insurance Activities sector in 25 Provinces, followed by an increase in the Construction and Government Administration, Defense & Mandatory Social Security sectors in 23 Provinces. On the other hand, the sector that experienced the greatest decline in competitive advantage in each province from 2017-2019 to 2020-2022 occurred in the Mining & Quarrying sector in almost all provinces, namely 30 provinces. This sector is followed by the Wholesale & Retail Trade sector; Car & Motorbike Repair & Maintenance and Transportation & Warehousing which experienced a decline in 27 Provinces.

Table 2. Table of changes in sectors with competitive advantage in GDRP before and during the pandemic

<b>Provinsi</b>	<b>Sectors with competitive advantage in terms of GDRP before the pandemic</b>	<b>Sectors with competitive advantage in terms of number of GDRP during the pandemic</b>
Aceh	B, D, E, I, K, L, O, P	A, B, C, E, H, I, J, L, M,N, O, P, Q, R,S,T,U
Sumatera Utara	B, D, F, G, I, J, L, O, P, Q	A, J, K, L, P
Sumatera Barat	B, F, G, I, J, L, O, P, Q	E, F, I, J, K, L, O, P, Q, R,S,T,U
Riau	D, G, Q	A, C, D, E, F, G, I, J, K, L, M,N, O, P, Q, R,S,T,U
Jambi	B, D, E, F, G, I, L, O, P, Q	A, C, D, E, F, G, K, L, M,N, P
Sumatera Selatan	B, C, D, E, G, H, I, J, L, M,N	I, L, O, P
Bengkulu	A, B, C, D, E, F, G, H, I, J, L, O, Q	A, B, D, J, K, M,N, O, P, Q, R,S,T,U
Lampung	B, C, D, G, I, L, P	E, F, G, L, M,N, O, P, R,S,T,U
Bangka- Belitung	D, F, I, J, K, L, O, P, Q	A, C, E, G, H, I, J, K, L, M,N, O, P, Q, R,S,T,U
Kepulauan Riau	C, F, G, I, J, O	C, D, F, G, H, I, J, M,N, P, R,S,T,U
DKI Jakarta	D, G, H, I, J, K, M,N, O	C, I, P, Q

Jawa Barat	A, C, E, F, G, I, L, M,N, P, Q	C, D, E, F, K, L, M,N, P, Q
Jawa Tengah	B, C, D, G, H, I, J, L, M,N, P	F, H, I, K, L, P, R,S,T,U
D I Yogyakarta	B, C, D, E, F, G, I, K, L, P	A, E, F, I, J, K, L, M,N, P, Q, R,S,T,U
Jawa Timur	B, C, G, I, L, O	C, D, E, I, K, P, R,S,T,U
Banten	F, G, I, L, O, P, Q	D, E, F, H, K, L, O
Bali	A, C, F, G, H, I, L, O, P	K, O, P
Nusa Tenggara Barat	D, F, G, P, Q	D, E, F, I, K, L, O, P
Nusa Tenggara Timur	A, C, D, G, I, O, P	A, D, E, F, I, L
Kalimantan Barat	A, B, C, D, E, G, H, I, J, L, O, Q	A, C, E, F, I, K, M,N, P, Q
Kalimantan Tengah	A, B, D, E, F, G, H, I, J, L, O, P, Q	A, C, D, E, F, J, K, L, M,N, O, P, Q
Kalimantan Selatan	D, E, G, H, I, L, O, P	B, C, D, E, F, J, L, M,N, O, P, Q
Kalimantan Timur	D, F, G, I, P, Q	A, C, E, F, J, K, O, P, Q
Kalimantan Utara	A, B, C, D, E, F, G, H, I, J, K, L, O, P, Q	A, D, E, G, I, J, K, L, M,N, O, P, R,S,T,U
Sulawesi Utara	A, B, D, F, G, H, L, M,N, P, Q, R,S,T,U	A, C, D, F, I, O, P, Q
Sulawesi Tengah	B, C, D, F, G, H, I, J, O, P, Q	A, C, D, E, F, G, H, I, K, L, O, P, Q
Sulawesi Selatan	B, C, D, F, G, H, I, J, L, M,N, O, P, Q, R,S,T,U	A, C, D, E, F, H, I, L, M,N, O, P, Q, R,S,T,U
Sulawesi Tenggara	A, B, C, F, G, I, P, Q	A, C, D, F, K, L, M,N, O, P
Gorontalo	A, B, C, D, E, G, I, L, P, Q	C, F, K, M,N, O, P
Sulawesi Barat	A, B, C, E, I, J, O, P	A, C, F, I, K, L, P
Maluku	A, B, G, I, K, O	C, D, E, J, K, L, O, P, Q
Maluku Utara	A, B, C, F, G, I, O, Q	B, C, D, E, F, J, K, L, M,N, O, P
Papua Barat	A, B, C, D, E, G, H, I, J, K, L, O	D, I, K, L, O, P
Papua	D, F, G, H, I, L, O	D, E, F, K, L

#### Sector Descriptions:

A : Agriculture, Forestry & Fisheries; B : Mining & Quarrying; C : Manufacturing Industry; D : Provision of Electricity, Gas, Steam/Hot Water & Cold Air; E : Water Treatment, Wastewater Treatment, Treatment & Recovery; F : Construction; G : Wholesale & Retail Trade; Repair & Maintenance of Motor Vehicles & Motorcycles; H : Transportation & Warehousing; I : Accommodation & Food and Beverage Provision; J : Information & Communication; K : Financial Activities & Insurance; L : Real Estate; M,N : Professional & Business Services; O : Government Administration, Defense & Compulsory Social Security; P : Education; Q : Human Health & Social Activities; R,S,T,U : Other Services

From a provincial perspective, the province that has increased competitive advantage in the most sectors is Riau Province which has experienced increased competitive advantage in 15 of the 17 existing sectors. This was followed by the province of Bangka Belitung, where 14 of the 17 sectors saw an increase in competitive advantage. On the other hand, the province with the largest number of declines in competitive

advantage sectors was Bali Province with 14 sectors experiencing a decline in competitive advantage, followed by South Sumatra and DKI Jakarta with 13 sectors experiencing a decline in competitive advantage.

### 5. Conclusion

The conclusions that can be given are in accordance with the results of the analysis and discussion, namely:

1. In terms of labor: There has been a significant increase in the percentage growth of the workforce, especially in the food and beverage supply sector and professional & corporate services, as well as in the Maluku, North Maluku, Papua and West Papua regions. The Industrial & Processing sector and the West Papua region have the most significant growth in competitive advantage. There was a significant decline in the percentage growth of the workforce, especially in the Financial & Insurance Activities sector, as well as the DKI Jakarta area. The Professional & Corporate Services sector and the Water Treatment, Wastewater Treatment, Treatment & Recovery sectors as well as the Aceh region had the most significant decrease in competitive advantage.
2. In terms of GDP/GRDP: There has been a significant increase in the percentage of GRDP growth, especially in the Mining & Quarrying sector and the North Maluku region. The Real Estate sector and the Riau region have the most significant growth in competitive advantage. There has been a significant decline in the percentage growth of the workforce, especially in the education sector, as well as in the West Papua region. The Mining & Quarrying sector and the Bali region had the most significant decline in competitive advantage.

#### Suggestions

Based on the conclusions obtained, this research provides the following suggestions:

1. From the workforce side: For the central government, it is necessary to focus on creating jobs in sectors that are starting to be abandoned by the workforce, such as the Financial & Insurance Activities sector. For regional governments, especially provinces that have a large decline in competitive advantage, it is necessary to attract workers to the region. This can be done by developing infrastructure in relevant sectors, incentives and subsidies to companies, as well as cooperation between regions to equalize the workforce, from regions with high competitive advantages to regions that need to improve their competitive advantages.
2. In terms of GRDP: For the central government, it is necessary to focus on encouraging an increase in GRDP, especially in sectors that are experiencing reduced competitive advantage, such as the education sector. For regional governments, especially provinces that have a large decline in competitive advantage, it is necessary to develop potential sectors accompanied by subsidies for sectors that are starting to be abandoned. This can be done by developing infrastructure in relevant sectors, incentives and subsidies to companies, as well as cooperation between regions.

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