



Export Dynamics in South Sulawesi: A Comparative Examination of the 2018-2023 Period

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Abstract. Based on the export base on the theory, the economic growth of a region depends on its export activities. South Sulawesi Province as an example of experienced a decline in exports during the January-December 2017 period, but exports rebounded in 2018 and 2019. This upward trend continued even during the Covid-19 pandemic, persisting until the pandemic's end in 2023. This study aims to analyze the differences in exports across the manufacturing, mining, and agriculture-fisheries sectors in South Sulawesi Province between the pre-pandemic period (2018-2020) and the Covid-19 pandemic period (2021-2023). A non-experimental quantitative way of approach with the event study method was employed in this research. The hypothesis was tested using a paired sample t-test. The Test resulting and indicate a significant difference in export values across these sectors between the two periods, suggesting that the Covid-19 pandemic had a substantial impact on export changes especially in South Sulawesi Province.

Keywords: Manufacturing; Mining; Agriculture-Fisheries

1. Introduction

The province of South Sulawesi plays a crucial role in international trade activities, particularly in exports [1]. According to data, the province's exports steadily increased from 2018 to 2022, with export values reaching US\$ 257.69 million in December 2022. Although export values initially declined before the Covid-19 pandemic, since 2020, South Sulawesi has recorded a trade surplus through to the end of 2022 [2]. The largest export commodity group is nickel, contributing approximately 61.65% of South Sulawesi's total exports, followed by oilseeds, fish, and other aquatic animal products [3].

Over the past few years, nickel has consistently been the largest contributor to South Sulawesi's exports, with contributions reaching US\$ 764.41 million in 2020 (Ronald, 2020). In addition to nickel, oilseeds and iron and steel commodities have also been key contributors, although their share remains smaller than nickel. In 2021, the province's export value increased to US\$ 1,438.41 million, with nickel maintaining its dominant position. However, a significant change occurred in 2022, when iron and steel exports ranked second after nickel [4].

Exports from the manufacturing sector have dominated the economy of South Sulawesi, accounting for about 86% to 89% of total exports between 2019 and 2021. The agricultural and fisheries sectors have also made significant contributions, though on a smaller scale. Exports from the agriculture, forestry, and fisheries sectors have

reached around US\$ 130 million over the past three years, with aquaculture leading the way. This indicates that these sectors have remained competitive in international markets despite the impact of the pandemic.

This study aims to examine the export development in South Sulawesi from the agricultural, manufacturing, and mining sectors before and during the Covid-19 pandemic. The pandemic has had a significant impact on international trade, leading to a global decline in export volumes and values. By investigating these effects, this research seeks to assist the government and policymakers in formulating better strategies to support economic recovery and enhance resilience against future crises.

The scope of this research focuses exclusively on export analysis and is divided into three main commodity sectors in South Sulawesi: the agriculture-fisheries sector, the manufacturing industry, and the mining sector. The study examines two periods: 2018-2020 and 2021-2023. The division of these periods is based on several factors: first, the research is limited to Indonesia, specifically the province of South Sulawesi; second, the period 2018-2020 predates the occurrence of Covid-19 in Indonesia, as the first case was reported in March 2020, marking the beginning of various Covid-19 policies that affected economic activities, including international trade; and third, the 2021-2023 period is used to represent the Covid-19 period, during which several policy changes influenced international trade. Lastly, this study employs a paired sample t-test to analyze the differences in exports across the studied sectors.

2. Literature Review

Export base theory explains that the economic growth of a region is primarily driven by basic sectors oriented toward exports, where export activities generate inflows of money from outside the region, which are crucial for stimulating local growth [5]. The non-basic sectors, such as local trade and services, support the basic sectors by providing necessary goods and services for export industries and workers in those sectors [6]. Initially, this theory only covered pure exports, but it later expanded to include activities that bring in money from outside the region, such as tourism. The theory assumes that exports are the main factor determining regional income growth, while other sectors grow in tandem with overall income increases [6].

According to Akbar et al. (2022), aspects of food security, such as availability, accessibility, and stability, were severely affected by the economic recession resulting from the Covid-19 pandemic in Indonesia [7]. Meanwhile, research conducted in China by Cao et al. (2020) showed that the pandemic impacted agricultural exports, which are a critical component of farmers' income, both in the short and long term [8]. Additionally, Rohmi et al. (2021) revealed that the pandemic also affected Indonesia's foreign trade, especially oil and gas exports, as well as the import of raw materials and capital goods, although it did not impact the import of non-oil and gas consumer goods [9]. Another study by Hayakawa & Mukunoki (2021) on 34 countries demonstrated the significant negative effects of Covid-19 on international trade, affecting both exporters and importers [10].

Prasetya et al. (2022) found no significant difference in the value of non-oil imports before and during the pandemic in Indonesia. However, total exports, oil and gas exports, non-oil exports, as well as total imports and oil and gas imports, experienced significant changes [11]. Furthermore, the studies by Prayoga et al. (2022) and Thirafi (2020) indicated that despite the pandemic, the increase in exports and imports signaled an economic recovery in Indonesia, with the trade balance performance remaining relatively impressive [12]. A specific study by Elvierayani et al. (2021) examined the differences in Indonesia's exports to China before and after the pandemic, with results showing no significant differences [13].

Previous research clearly demonstrates that Covid-19 had a significant impact on the global economy, particularly in terms of international trade, affecting both exports and imports. This study is important as it refers to export base theory, which explains regional economic growth by focusing on export activities [14]. This theory posits that regions able to specialize in the production of goods and services more efficiently than other regions will be more competitive in international trade, thereby supporting regional economic growth [15].

3. Research Methodology

This study employs an event study approach [16] with the aim of identifying and explaining the differences in exports from South Sulawesi Province before and during the Covid-19 pandemic. The research adopts a non-experimental quantitative approach. The population consists of export data from South Sulawesi Province, with samples selected using purposive sampling techniques based on predetermined criteria. The sample selection criteria include: (a) annual export data, (b) export data from three main sectors—agriculture-fisheries, manufacturing, and mining, and (c) the period before and during the Covid-19 pandemic.

In accordance with these criteria, the study covers three years before the Covid-19 pandemic (2018-2020) and three years during the pandemic (2021-2023), with data from the three main sectors for each year. The data used is secondary data obtained from documents published by the Central Bureau of Statistics (BPS) of South Sulawesi, accessed through its official website, <https://SulawesiSelatan.bps.go.id/>. The data collection method used is documentation.

The data analysis technique follows a quantitative approach, utilizing Statistical Product and Service Solutions (SPSS) software, version 26. The analysis includes both descriptive and inferential statistics. To test the hypothesis, a parametric test, namely the paired sample t-test, was used to examine the differences in export values before and during the pandemic.

4. Results and Discussion

Based on the results of the Shapiro-Wilk normality test in Table 1, all export sectors (Manufacturing, Mining, and Agriculture) both before and after the Covid-19 pandemic have significance values (Sig.) greater than 0.05. This indicates that the export data from these three sectors are normally distributed, both in the pre-pandemic and post-pandemic periods, with the highest p-value observed in the Manufacturing sector after the pandemic (Sig. = 0.720).

Table 1 Tests of Normality

Sektor Ekspor	Covid-19 Status	Shapiro-Wilk		
		Statistic	df	Sig.
Manufacturing	Before	.974	36	.551
	After	.979	36	.720
Mining	Before	.958	36	.193
	After	.952	36	.118
Agriculture	Before	.974	36	.543
	After	.950	36	.101

Source: SPSS Output version 26 (processed data, 2024)

4.1. Comparative Test of Export in South Sulawesi’s Manufacturing Sector Between 2018-2020 and 2021-2023

Based on the paired sample t-test results, there is a significant difference in South Sulawesi’s manufacturing sector exports between the pre-pandemic period (2018-2020) and during the pandemic (2021-2023). The significant difference between the 2018-2020 and 2021-2023 periods is attributed to the Covid-19 pandemic. Research by Rohmi et al. (2021) stated that the Covid-19 pandemic affected Indonesia's foreign trade, particularly in terms of oil and gas exports, raw material imports, and capital goods imports, although it had no impact on non-oil and gas consumer goods imports (Rohmi et al., 2021). Meanwhile, a study on exports from 34 countries to 173 countries found a significant negative effect of Covid-19 on international trade, impacting both exporters and importers [17].

Table 2: Paired Samples Statistics for the Manufacturing Sector

P air 1		Mean	N	Std. Deviation	Std. Error Mean
		Before	86751272. 31	36	17096184.9 42
After	142286400 .47	36	34964310.1 06	5827385. 018	

Source: SPSS Output version 26 (processed data, 2024)

The average export value in the manufacturing sector increased during the pandemic, highlighting the critical role this sector plays in supporting economic

growth. The manufacturing sector is predominantly driven by exports of base metals, particularly nickel, iron/steel, and aluminum, with nickel being the primary commodity that showed a significant increase in exports.

Table 3 Paired Samples Test Results for the Manufacturing Sector

		Paired Differences			t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean			
Pair 1	Before - After	-55.535.128. 167	34.858.115. 509	5.809.685 .918	-9.559	35	.000

Source: SPSS Output version 26 (processed data, 2024)

In addition to base metals, exports of non-metallic mineral products such as cement also played an important role, though they experienced fluctuations during the pandemic. In the wood industry sector, although its contribution was relatively small, the exports of key products such as plywood remained stable. In the food industry sector, despite a decline in export values, the variety of commodities increased during the pandemic, indicating potential for export growth in the future.

The Covid-19 pandemic has had a significant impact on international trade, including Indonesia's exports. Various studies have shown that the pandemic affected exports and imports in many countries, with reduced demand and supply chain disruptions. However, the global recovery post-pandemic, including increased demand from trading partners such as Japan, contributed to the recovery of exports.

Moreover, the economic recovery strategies implemented by the government, such as increasing the availability of raw materials, providing business stimulus, and developing industrial zones, played a vital role in supporting the manufacturing sector during the pandemic. The downstream processing of natural resources and increased investment in this sector were also key factors in driving export growth in South Sulawesi.

The results of this study differ from some previous studies, such as [18], which suggested that the pandemic did not always significantly affect exports in certain countries. However, in South Sulawesi, the Covid-19 pandemic was found to have a significant impact on exports, particularly in the manufacturing sector, with nickel being the leading commodity.

4.2. Comparative Test of South Sulawesi's Mining Sector Exports Between 2018-2020 and 2021-2023

The mining sector encompasses various stages of activities such as exploration, extraction, processing, and sales of minerals or coal (Law No. 4 of 2009). The Covid-19 pandemic in 2020 affected the entire mining sector, including a decline in the index prices of mining commodities such as iron, aluminum, nickel, and copper. The price of gold was the only exception, experiencing an increase.

Lockdown policies in various countries, including Indonesia, hindered mining production and impacted worker safety due to limited availability of health equipment.

During the pandemic, many coal and mineral-producing countries such as China, India, and Indonesia experienced a decrease in production and commodity prices. In South Sulawesi Province, mining exports were neither substantial nor diverse. From 2019 to 2021, the mining sector's exports showed a significant declining trend, with ornamental and building stones being the only commodities consistently exported. Metal ore exports only occurred in 2020, with a minimal value.

Table 4 Paired Samples Statistics for the Mining Sector

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Before	281472.39	36	172545.401	28757.567
	After	68645.44	36	38507.214	6417.869

Source: SPSS Output version 26 (processed data, 2024)

The statistical data show that the average export value before the pandemic was higher compared to during the pandemic.

Table 5 Paired Samples Test Results for the Mining Sector

		Paired Differences			t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean			
Pair 1	Before - After	212826.944	177470.714	29578.452	7.195	35	.000

Source: SPSS Output version 26 (processed data, 2024)

The study results indicate a significant difference in the export values of the mining sector between the pre-pandemic period (2018-2020) and the pandemic period (2021-2023).

Nationally, mining exports fluctuated, but overall, they showed an increasing trend. In 2020, when the pandemic began to spread, mining sector exports decreased by 15.52%. The mining sector in South Sulawesi was dominated by the export of ornamental and building stones, although their export value was small and not considered a key commodity in the national mining sector.

Ornamental and building stones, classified as Group C minerals, are used as raw materials for the industrial or construction sectors. While they are not flagship commodities, these materials still contribute to South Sulawesi's exports. However, due to their low value, they do not have a significant impact on either the national or provincial economy.

4.3. Comparative Test of South Sulawesi's Agricultural Sector Exports Between 2018-2020 and 2021-2023

The export commodities from South Sulawesi's agriculture, forestry, and fisheries sectors are divided into three main groups: crop agriculture, livestock and fisheries, and forestry. From 2018 to 2022, these sectors showed an increasing trend in both the volume and value of exports, even during the Covid-19 pandemic. The agricultural sector proved to be a key economic pillar during the pandemic, continuing to meet both domestic and export demands.

South Sulawesi's agricultural sector is supported by small and medium-scale enterprises and produces a variety of commodities such as rice, corn, cocoa, cloves, coconut, and sugarcane. Although agricultural exports slightly declined in 2021 compared to the previous year, the sector-maintained stability throughout the pandemic. On average, the sector's export value exceeded US\$ 130 million over the past three years.

Statistical analysis revealed a significant difference between export values before the pandemic (2018-2020) and during the pandemic (2021-2023), with the post-pandemic export values being higher.

Table 6 Paired Samples Statistics for the Agricultural Sector

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Before	12183144.72	36	4080170.123	680028.354
	After	17806427.83	36	5998452.128	999742.021

Source: SPSS Output version 26 (processed data, 2024)

This result is supported by the paired sample test, which shows that the export trend for agriculture and fisheries increased during the pandemic, particularly in 2022 and 2023.

Table 7 Paired Samples Test Results for the Agricultural Sector

		Paired Differences			t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean			
Pair 1	Before - After	5623283.111	6810389.679	1135064.946	-4.954	35	.000

Source: SPSS Output version 26 (processed data, 2024)

This study aligns with research conducted in Tanzania and South Africa by Tripathi et al. (2021), which demonstrated that the Covid-19 pandemic significantly affected the agricultural sector and food security [19]. Supply chain disruptions, shifts

in demand, and declines in consumer income were the main challenges faced by this sector. A study in Romania also highlighted the importance of government support and innovation in addressing similar crises in the future.

In Indonesia, the agricultural sector has also shown a crucial role during the pandemic. The Rector of Widya Mataram University, Prof. Edy Suandi Hamid, emphasized that the agricultural sector was a lifeline for the national economy. This reflects that agriculture remains a vital economic support, both during the Covid-19 pandemic and previous global crises, such as in 2008, where the sector was not significantly impacted.

5. Conclusion

Based on the results of this study, it can be concluded that there are significant differences in the export performance of South Sulawesi Province's main sectors between the periods before and during the Covid-19 pandemic. First, the manufacturing sector showed a significant increase, with average exports in the 2021-2023 period being higher than in the 2018-2020 period, as evidenced by the paired sample t-test results. Second, the mining sector experienced a significant decrease, with the average export value before the pandemic being higher than during the pandemic, indicating the substantial impact of the pandemic on this sector. Third, the agriculture and fisheries sector demonstrated a significant increase during the pandemic, with export values in the 2021-2023 period exceeding those in the pre-pandemic period. Overall, the paired sample t-tests reveal that the Covid-19 pandemic had varying effects across different sectors, with the manufacturing and agriculture-fisheries sectors experiencing significant growth, while the mining sector faced a decline.

The Covid-19 pandemic has significantly impacted the exports of South Sulawesi Province. For the government, it is recommended to enhance the infrastructure of the manufacturing industry, provide workforce training, and diversify products. Priority should also be given to agricultural logistics and support for small and medium-sized enterprises (SMEs) through digitalization. For business owners, it is crucial to improve product quality, adopt technology, and increase the value of mining products through processing. Businesses should also develop resilient operations through automation and digital promotion. Future researchers are encouraged to separate the analysis of nickel commodities, as they are not related to the increased energy consumption observed during the pandemic.

6. References

- [1] A. Akbar, R. Darma, I. Mujahidin, and A. Irawan, "The Impact of the Covid-19's Economic Recession on Food Security in Indonesia," *IOP Conf. Ser.: Earth Environ. Sci.*, vol. 1012, no. 1, p. 012005, 2022, doi: 10.1088/1755-1315/1012/1/012005.

- [2] S. Bakari, N. Fakraoui, and S. Tiba, "Domestic Investment, Export, Import and Economic Growth in Brazil: An Application of Vector Error Correction Model," MPRA Paper, no. 95528, p. 16, 2019.
- [3] BPS Sulsel, "Perkembangan Ekspor dan Impor Sulawesi Selatan, September 2021," Badan Pusat Statistik Sulawesi Selatan, 2021. [Online]. Available: <https://sulsel.bps.go.id/pressrelease/2021/11/01/619/perkembangan-ekspor-dan-impor-sulawesi-selatan--september-2021.html>.
- [4] L. Cao, T. Li, R. Wang, and J. Zhu, "Impact of COVID-19 on China's agricultural trade," *China Agricultural Economic Review*, vol. 13, no. 1, pp. 1–21, 2020, doi: 10.1108/CAER-05-2020-0079.
- [5] Editor, "Neraca Perdagangan Sulawesi Selatan Mengalami Surplus USD1,52 Miliar," Pemerintah Provinsi Sulawesi Selatan, 2023. [Online]. Available: <https://sulselprov.go.id/post/neraca-perdagangan-sulawesi-selatan-mengalami-surplus-usd1-52-miliar>.
- [6] R. R. Elvierayani, S. I. Dzikriah, R. D. Arifani, and R. Afriyandani, "Uji Beda Ekspor dan Import Indonesia-China Sebelum dan Sesudah Pandemi Covid-19," *J. Sains Sosio Humaniora*, vol. 5, no. 2, pp. 1077–1085, 2021, doi: 10.22437/jssh.v5i2.16485.
- [7] K. Hayakawa and H. Mukunoki, "The impact of COVID-19 on international trade: Evidence from the first shock," *J. Jpn. Int. Econ.*, vol. 60, p. 101135, 2021, doi: 10.1016/j.jjie.2021.101135.
- [8] K. J. Heyden and T. Heyden, "Market reactions to the arrival and containment of COVID-19: An event study," *SSRN Electron. J.*, 2020, [Online]. Available: <https://ssrn.com/abstract=3587497>.
- [9] Humas Sulsel, "Ekspor Sulsel Januari 2022 Meningkatkan 70,67%, Andi Sudirman: Langkah Pulihkan Ekonomi," Pemerintah Provinsi Sulawesi Selatan, 2022. [Online]. Available: <https://humas.sulselprov.go.id/index.php/tag/ekspor-sulsel/>.
- [10] N. N. Kassa, "Ekspor Sulsel 2022 Mencapai Rp35 Triliun, Naik 40,63 Persen," *Bisnis.com*, 2023. [Online]. Available: <https://sulawesi.bisnis.com/read/20230117/540/1618850/ekspor-sulsel-2022-mencapai-rp35-triliun-naik-4063-persen>.
- [11] W. C. Lewis, "A critical examination of the export-base theory of urban-regional growth," *Ann. Reg. Sci.*, vol. 6, no. 2, pp. 15–25, 1972, doi: 10.1007/BF01283888.
- [12] S. J. Matitaputty, "Teori Pertumbuhan Basis Ekspor: Penerapannya Untuk Pertumbuhan Regional Di Kabupaten Jepara," *Optimum: J. Ekon. Pembangunan*, vol. 5, no. 2, pp. 134, 2015, doi: 10.12928/optimum.v5i2.7838.
- [13] I. Morshidi, N. Omar, J. Said, S. Sulaiman, and I. K. Abdul Rahman, "Management accounting practices in export-oriented manufacturing small and medium enterprises in Malaysia," in *Contrib. Manag. Sci.*, Springer Science and Business Media Deutschland GmbH, 2021, p. 108, doi: 10.1007/978-3-030-66245-5_4.
- [14] M. A. W. Prasetya, C. Simorangkir, and D. M. A. Pribadi, "Perdagangan Internasional Indonesia: Sebuah Komparasi di Masa Pandemi COVID-19," *EXERO: J. Res. Bus. Econ.*, vol. 5, no. 1, pp. 87–115, 2022, doi: 10.24071/exero.v5i1.5043.
- [15] E. R. Prayoga, M. Ryansyah, and N. Jannah, "Dampak Covid-19 terhadap Pertumbuhan Ekonomi pada Sektor Ekspor dan Impor Indonesia," vol. 3, no. 3, 2022.
- [16] M. L. Rohmi, T. J. Jaya, and N. Syamsiyah, "The Effects Pandemic Covid-19 on Indonesia Foreign Trade," *J. Ekon.*, vol. 26, no. 2, p. 267, 2021, doi: 10.24912/je.v26i2.750.

- [17] Ronal, "Sulsel Penyumbang Terbesar Eksportir," Berita Kota Makassar, 2020. [Online]. Available: <https://beritakotamakassar.com/berita/2020/12/07/sulsel-penyumbang-terbesar-eksportir/>.
- [18] L. Thirafi, "Dua Dekade Terakhir Neraca Perdagangan Indonesia," J. Ekon. Pendidik., vol. 17, no. 2, pp. 70–82, 2020, doi: 10.21831/jep.v17i2.34616.
- [19] C. M. Tiebout, "Exports and Regional Economic Growth," J. Political Econ., vol. 64, no. 2, pp. 160–164, 1956, doi: 10.1086/257771.
- [20] G. M. Tobing and R. Panday, "Uji Beda Nilai Ekspor Nonmigas di Indonesia Sebelum dan Saat Terjadinya Pandemi Virus Corona," Res. Gate, 2022. [Online]. Available: https://www.researchgate.net/publication/348295375_UJI_BEDA_NILAI_EKSPOR_NONMIGAS_DI_INDONESIA_SEBELUM_DAN_SAAT_TERJADINYA_PANDEMI_VIRUS_CORONA.
- [21] A. Tripathi, N. Bharti, S. Sardar, and S. Malik, "Covid-19, disrupted vegetable supply chain and direct marketing: Experiences from India," J. Agribus. Dev. Emerg. Econ., vol. 13, no. 1, pp. 1–15, 2023, doi: 10.1108/JADEE-04-2021-0095.
- [22] R. B. Williamson, "Predictive Power of the Export Base Theory," Growth Change, vol. 6, no. 1, pp. 3–10, 1975, doi: 10.1111/j.1468-2257.1975.tb00774.x.

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