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Impact of Diversity on Regional Economic Growth: A Case Study of Indonesia[1]

Abstract. Economic development at the national level cannot be separated from the influence of economic performance at the regional level. As a country with abundant natural resources and great human resource potential, Indonesia has 34 provinces with relatively different economic bases. Some areas depend on a single category: the primary, secondary, or tertiary sector. Meanwhile, the other provinces have business fields that contribute relatively equal to forming a fairly balanced Gross Regional Domestic Product (GRDP). These different economic bases produce various impacts when an economic shock occurs. Unfortunately, the effect of economic diversity on GRDP has rarely been the focus of previous studies. Therefore, this study investigates the influence of economic diversity on regional economic growth. Data were collected from the Central Agency of Statistics (BPS) from 2013 to 2020. Then, panel data with a fixed effects generalised least squares method were employed to determine the changes in the dependent variable caused by the changes of the independent variable. Furthermore, data analysis revealed that economic diversity positively and significantly impacts GRDP. In other words, encouraging all business fields to generate value-added goods and services within the region may increase its economy. Moreover, past time experiences empirically conclude that economic shocks heavily hit the tertiary sector. At the same time, the primary industry relatively survived and played the role of economic bearing to prevent an area from further suffering. Lastly, a suggestion for further study is to investigate a combination model of the primary, secondary, and tertiary sectors to support sustainable economic growth.

Keywords: agricultural country, economic activity, entropy, human development index, regional economic growth, risk spread, trade openness

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ИССЛЕДОВАТЕЛЬСКАЯ СТАТЬЯ

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Влияние диверсификации на региональный экономический рост (на примере Индонезии)

Аннотация. Национальное экономическое развитие во многом зависит от региональных экономических показателей. Индонезия — страна с богатыми природными ресурсами и огромным человеческим потенциалом, в ней 34 провинции с различной экономической базой. В некоторых регионах развит только один из секторов экономики: первичный, вторичный или третичный. В других провинциях наблюдается равномерное развитие всех трех секторов, влияющее на формирование достаточно сбалансированного валового внутреннего регионального продукта. Экономическая база региона определяет его реакцию на экономические шоки. Поскольку вопрос взаимосвязи между разнообразием экономики и валового внутреннего регионального продукта остается малоизученным, в данной статье исследуется влияние диверсификации на региональный экономический рост. Данные Центрального статистического агентства Индонезии за период с 2013 г. по 2020 г. были проанализированы при помощи обобщенного метода наименьших квадратов с фиксированными эффектами для определения изменений зависимой переменной, вызванных изменениями независимой переменной. Проведенный анализ показал, что диверсификация экономики положительно и существенно влияет на валовый внутренний региональный продукт. Другими словами, производство бизнесом товаров и услуг с добавленной стоимостью во всех секторах способствует экономическому развитию региона. Выявлено, что в условиях экономических потрясений наиболее сильно пострадал третичный сектор экономики, в то время как первичный сектор понес меньшие потери, смягчив последствия кризиса. Дальнейшие исследования могут быть направлены на изучение комбинированной модели, включающей в себя все три сектора экономики, для обеспечения устойчивого экономического роста.

Ключевые слова: аграрная страна, экономическая активность, энтропия, индекс человеческого развития, региональный экономический рост, распространение риска, открытость торговли

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Introduction

The gross domestic product (GDP) generated by a country cannot be separated from the influence of economic activity at the regional level. Furthermore, each region has different potential resources, thus forming an unequal economic base. For example, in areas with relatively abundant natural resources, the contribution of the primary sector (agriculture, mining, and quarrying) to the formation of the gross regional domestic product tends to be large. On the other hand, areas with relatively small arable land generally rely on the secondary sector (electricity, gas and water, industry, and construction) to process raw materials from other regions or instead focus on the service sector (trade, transport and communications, finance, and services)[1].

In 2020, the COVID-19 pandemic started, directly affecting all countries' economies. The existence of policies on physical activity limitations and restrictions for entry and exit in an area at the local, national, and international levels has weakened the economic activities of business actors in all types of business fields. Hence, the negative value-added growth and economic recession was observed (Caraka et al., 2020; Ozili, 2021; Liñán & Jaén, 2022).

World Bank[2] and Badan Pusat Statistik (BPS — Central Agency of Statistics)[3] published infor-

[1] World Bank. (2022). 4.2. World Development Indicators: Structure of Output. Retrieved from: http://wdi.worldbank.org/table/4.2 (Date of access: 09.04.2022); World Bank. (2022). Arable Land (% of Land Area). Retrieved from: https://data.worldbank.org/indicator/AG.LND.ARBL.ZS (Date of access: 09.04.2022).

[2] World Bank. (2022). GDP Growth (Annual %). Retrieved from: https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?most_recent_value_desc=false (Date of access: 09.04.2022).

[3] BPS. (2022). [2010 Version] Growth Rate of Gross Regional Domestic Product at 2010 Constant Market Prices by Province (Percent), 2019-2021. Retrieved from: https://www.bps.go.id/indicator/52/291/1/-seri-2010-laju-pertumbuhan-pro-

mation that there is a tendency for the COVID-19 pandemic to have a relatively more enormous impact on countries that focus their economy on the tertiary sector. For example, in the first year of the pandemic, Maldives, Lebanon, and Panama were three countries that experienced an economic decline of around 33.50 %, 21.46 %, and 17.94 %. Concerning the business sector's contribution, services accounted for more than 70 % of the three countries. On the contrary, Guyana recorded economic growth of around 43 % in the same period. Agricultural, industrial, and manufacturing activities account for more than 50 % of value-added creation in this country.

The diversity of business fields in creating value added and resilience to economic shocks also occur at the regional level. As one of the countries with abundant natural resources and great human resource potential, Indonesia consists of 34 provinces with different responses to economic disturbances in 2020. According to BPS[1], only three out of thirty-four provinces could generate more considerable value added from 2019 to 2020. In fact, according to the study by Siregar et al. (2021), eighteen regions in Indonesia have a primary sector economic base, which is estimated to become a barrier to the decline in the pace of the economy. Unfortunately, most of these provinces experienced economic contraction as well. On this basis, it is necessary to investigate further the impact of economic diversity on regional economic growth.

Furthermore, World Bank (2022) stated that a year after the economic downturn, developing countries, including Indonesia, recorded positive economic growth. This increase was due to the smoother international trade activity and the rise in commodity prices. Next, according to BPS, Indonesia's economic growth in 2021 was 3.69 %. This positive performance is encouraged by approximately 90 % of 34 provinces within the country that generate higher value-added goods and services.

Moreover, the agricultural sector plays an essential role in maintaining the stable pace of economic growth at the provincial level in Indonesia and the national level. This type of business contributes greatly to the provision of food, foreign exchange, employment, as well as to the formation of gross regional domestic product (GRDP). On this basis, the availability of land as the main production factor in agricultural activities is crucial. However, conversion of agricultural land to non-agricultural land is unavoidable (Rondhi et al., 2018). First, farm owners sell their assets to earn additional income. Then, the land buyer changes the land to be used for industrial, manufacturing, housing or service activities (Murhaini & Ludang, 2020). On the one hand, this cycle encourages economic growth, but on the other hand, it can reduce food supply which can cause food insecurity for the community.

Additionally, human resources are the main actors in economic development. This type of resource can be viewed in terms of quantity (population) and quality. The quality of human resources can be proxied from the human development index, which is published annually by each province in Indonesia through BPS.

The literature on regional economic growth is dominated by studies on the role of investment, consumption (government and public), infrastructure, government policies, and human capital (Zhou et al., 2018; Hong et al., 2021; Mose, 2021). Meanwhile, diversity, trade openness, agricultural land, population, and human development index are still rarely investigated. In fact, for regions in developing countries, these five variables play a strategic role.

The assumptions for combining these variables are:

1. The government strives to optimise the economic base and explore business fields that have not been optimally explored. Thus, whether diversity has a positive role in economic growth may be used as the basis for policymakers to formulate economic development strategies.

2. Trade openness may encourage economic growth if capital goods dominate imports, and exports can become a means of absorbing the production output. However, if it turns out that consumer goods dominate imports, this will weaken local producers.

3. The availability of land always has a trade-off between food supply and sources of acceleration of economic growth. Not infrequently in developing countries, agricultural land must be converted to accommodate investment needs in industrial estate development, manufacturing, or even to meet the needs of a growing population that demands more housing. Therefore, the national and regional government issues an obligation/law for each region to have perpetual agricultural land that is prohibited from converting.

duk-domestik-regional-bruto-atas-dasar-harga-konstan-2010-menurut-provinsi.html

[1] BPS. (2022). [2010 Version] Growth Rate of Gross Regional Domestic Product at 2010 Constant Market Prices by Province (Percent), 2019-2021. Retrieved from: https://www.bps.go.id/indicator/52/291/1/-seri-2010-laju-pertumbuhan-produk-domestik-regional-bruto-atas-dasar-harga-konstan-2010-menurut-provinsi.html

4. Population and the human development index are two essential parameters indicating that development is not merely about the economy but also concerning the increasing capacity of human resources as the leading actor of economic growth.

The investigation of the combination of these five variables on regional economic growth is the goal and the novelty offered in this study. In addition, to support the originality, the data used covers all provinces in Indonesia. Thus, it strives that the resulting output is valid and reliable.

Literature Review

Dissart (2003) studied the effect of economic diversity on economic stability. Entropy, which is the ratio between the contributions of a sector to total economic activity, is an indicator of economic diversity. The higher the entropy value, the more even the contribution is between one sector and another to the total economic activity. On the other hand, if a region has an economic activity concentrated in one sector, then the entropy score will decrease. The results showed that the higher the entropy score, the higher the economic growth. Therefore, this study needs to be followed up by considering Indonesia as a country with 17 economic sectors divided into primary, secondary, and tertiary sectors. Whether these sectors are more evenly distributed between one sector and another to encourage economic growth or the other way around must be determined.

On the other hand, Keho (2017) identified the extent to which trade openness plays a role in economic growth. The research analysed data on exports, imports, gross domestic product (GDP), capital stock, and the number of workers in Cote d'Ivoire from 1965 to 2014. The results showed that trade openness positively influences short and long-term economic growth. Additionally, this study comprehensively measured the impact of international trade activities on economic development for a region. However, related research must be conducted to determine the extent of export plus import to GRDP.

Next, the conversion of agricultural land into non-agricultural land cannot be avoided due to population growth and increased economic activity. Azadi et al. (2011) conducted a study of the drivers of agricultural land conversion in less developed, developing, and developed countries. The data used were from nation masters and earth trends from 1961 to 2003. The study revealed that the economic growth drives a shift in economic structure from the agricultural sector to the non-agricultural business field. Therefore, agricultural land is being converted into non-agricultural land to facilitate development, such as those of industries and services. This research is comprehensive, but the extent to which land conversion plays a role in economic growth, especially in countries with an agricultural base, must be followed up.

Additionally, Peterson (2017) explained that the role of population growth in economic performance is still controversial. On this basis, a study was conducted using the long-period (from 1820 to 2010) data on Western Europe, Eastern Europe, the Former USSR, Western offshoots, Latin America, Asia, Africa, and the world. The study results showed that the small increase in population in high-income countries can create socio-economic problems. Meanwhile, high population growth in low-income countries slows down their development.

Moreover, Becker et al. (1999) stated that the relationship between population and per capita income lies in whether an area focuses on economic activity by managing natural or human resources. An increasing number of people can reduce per capita income if the economy in their area is focused on managing natural resources, resulting in diminishing returns. Meanwhile, in areas based on human capital management, the larger the population, the higher the per capita income. In line with this condition, Zhang and Danish (2019) argued that human capital can be reflected by the conditions of health, education, and expenditure standards, which are arranged as indicators of the human development index (HDI). Based on the research conducted in Asian countries, the HDI has a positive effect on economic growth. Human resource management is reflected in the HDI. Based on these findings, studies should explore further how the HDI impacts economic growth in areas with population growth dominated by the younger generation and with an economy based on natural resource management.

Methods

Model and Data

The data analysis in this study begins with the model selection for panel data. Chow, Hausman, and Lagrange multiplier tests are the three parameters to determine the best model. Furthermore, Eviews 10 was used to run the three tests, with the hypothesis for selecting the best model using probability levels of 5 % (Baltagi, 2008). The selection process reveals that a fixed effects model was the best.

However, the fixed effects panel data still used the Ordinary Least Squares (OLS) method. Thus, a

classical assumption test is needed. Based on the results of the classical assumption test, heteroscedasticity was found. According to Murhaini & Ludang (2020), this issue may be tackled by using the fixed effects generalised least squares method. Moreover, the next step is to estimate the effect of independent variables on dependent variable (1).

$$Y_{it} = \beta_1 + \beta_2 E_{it} + \beta_3 OP_{it} + \beta_4 K_{it} + \\ + \beta_5 L_{it} + \beta_6 HDI_{it} + \mu_{it}, \quad (1)$$

where Y is GRDP per capita; E, TO, K, L, and HDI are entropy, trade openness, area of agricultural land, population, and human development index, respectively. Furthermore, β_1 is intercept, β_{2-6} is coefficient, i is the i-th province, and t is the research period (2013–2020).

GRDP per capita is the division between the value-added goods and services and the total population in certain regions with specific year (2). This variable is used as a proxy for economic growth because an increase/decrease in GRDP per capita indicates a strengthening/weakening economic condition. In addition, the higher/lower real income per capita can be associated with particular regions' ability to generate value-added goods and services. Therefore, according to Diener et al. (2018), when these variable increase, it can be interpreted as a positive growth to develop the region's welfare.

Next, E (entropy) describes the diversity of the regional economic structure, using the calculation proposed by Dissart (2003) (3). Meanwhile, TO is generated from the ratio of exports and imports to GRDP (Tahir & Hayat, 2020) (4). Additionally, the area of agricultural land (L) is employed with the assumption that economic activities in Indonesia and the conversion of agricultural land into non-agricultural areas are happening as time goes by. For example, in the Special Region of Yogyakarta, one of the provinces in Indonesia, the productive land area is relatively limited. Therefore, policymakers or investors decide to use agricultural land to develop industry, tourism, or the service sector. However, the government established a policy to maintain agricultural land conversion in recent years. Landowners are encouraged to manage agricultural land and receive incentives for such efforts.

Then, the population is the number of people in a particular region and specific year. Lastly, the HDI is generated by calculating the health, education, and expenditure indices[1] (5).

$$GRDP\ \ per\ \ capita_{it} = \frac{GRDP_{it}}{number\ of\ population_{it}}, \quad (2)$$

$$Entropy_j = -\sum_{i=1}^{N} X_i \ln X_i, \quad (3)$$

where N is the number of sectors, X_i is the sectoral share of an economic sector.

$$TO_{it} = \frac{export_{it} + import_{it}}{GRDP_{it}}, \quad (4)$$

$$HDI = \sqrt[3]{I_{health} + I_{education} + I_{expenditure}}, \quad (5)$$

where I_{health}, $I_{education}$, and $I_{expenditure}$ are health, educational, and expenditure dimensions, respectively.

This study used $GRDP$, TO, L, and HDI data at the provincial level in Indonesia through BPS (2013). On the other hand, the land area data came from Agricultural Land Data Statistics published by the Ministry of Agriculture[2]. However, publication from Ministry of Agriculture is limited to the year 2019. Therefore, data on agricultural land area for 2020 was generated from the forecasting with using trend analysis (linear (6), quadratic (7), and exponential (8)).

$$Y = a + bX, \quad (6)$$

$$Y = a + bX + cX^2, \quad (7)$$

$$Y = Ae^{bX}, \quad (8)$$

Three types of trend analysis were employed because every region has a different data pattern. Therefore, to find a relatively fit forecasting, the result of each trend analysis will be compared using Mean Absolute Deviation (MAD) (9), Mean Absolute Percentage Error (MAPE) (10), and Mean Squared Error (MSE) (11). These measurements revealed a region with a linear pattern, and others were quadratic or exponential.

$$MAD = \frac{\sum_{t=1}^{n} \left| \frac{e_t}{Y_t} \right|}{n}, \quad (9)$$

$$MAPE = \frac{\sum_{t=1}^{n} |e_t|}{n}, \quad (10)$$

$$MSE = \frac{\sum_{t=1}^{n} |e_t^2|}{n}. \quad (11)$$

[1] BPS. (2015). Human Development Indices. Retrieved from: https://www.bps.go.id/subject/26/indeks-pembangunan-manusia.html#subjekViewTab5. (Date of access: 25.06.2021).

[2] Ministry of Agriculture. (2021). Statistik Lahan Pertanian. Retrieved from: http://epublikasi.setjen.pertanian.go.id/arsip-perstatistikan/167-statistik/statistik-lahan. (Date of access: 06.07.2021).

Results and Discussion

GRDP per Capita

The Special Capital Region of Jakarta was the province with the largest GRDP per capita in 2013 (US$ 8.9 thousand). In 2020, in the middle of the COVID-19 pandemic, the capital city of Indonesia experienced an economic decline (around 2 %). This decline was inevitable because the Special Capital Region of Jakarta relies relatively high on the service sector, which was affected extensively compared to other business fields. Nevertheless, this province was still ranked with the highest GRDP per capita in Indonesia in 2020, which recorded approximately US$ 11.7 thousand. According to Rahadi (2015), this province has a strategic role as the centre of business and government in Indonesia, contributing to higher value-added goods and services.

Moreover, in 2013, East Kalimantan Province was ranked second as the region with the highest GRDP per capita (US$ 7.8 thousand). The positive trend continued, and seven years later, this province generated GRDP per capita of around US$ 8.9 thousand, placing this region with the same predicate as the previous period. Furthermore, East Kalimantan experienced a relatively more minor economic downturn (around 1.1 %). According to Achmad (2018), economic development in East Kalimantan is driven by various activities. In 2020, the contribution of each business sector to the gross domestic regional product was as follows: agriculture, mining and quarrying (54 %); electricity, gas and water, industry, and construction (8 %); trade, transpor-

Table 1

Provinces in Indonesia according to GRDP per Capita (*Y*), Entropy (*E*), Trade openness (*OP*), Agricultural land (*K*), Population (*L*), Human Development Index (*HDI*) (% per year during 2013–2020)

No	Provinces	*Y*	*E*	*OP*	*K*	*L*	*HDI*
1	Aceh	0.743	–1.390	21.101	–3.222	1.632	0.755
2	North Sumatra	3.016	0.167	–3.386	0.308	1.224	0.698
3	West Sumatra	3.021	0.266	–7.591	–1.057	1.299	0.705
4	Riau	–0.349	–1.786	–2.943	2.238	2.044	0.563
5	Jambi	2.792	0.106	–0.503	–2.091	1.329	0.729
6	South Sumatra	3.085	0.394	1.769	–2.578	1.353	0.812
7	Bengkulu	2.994	0.335	–0.674	–3.976	1.360	0.806
8	Lampung	3.106	0.256	–6.307	0.238	1.052	0.840
9	Bangka Belitung Islands	1.625	–0.617	–5.074	–8.691	1.602	0.731
10	Riau Islands	0.439	–0.575	0.091	–3.553	3.130	0.496
11	Special Capital Region of Jakarta	3.897	0.518	–8.071	4.320	0.847	0.485
12	West Java	2.884	0.264	–4.630	–0.556	1.281	0.785
13	Central Java	3.540	0.203	–3.264	0.483	0.621	0.790
14	Special Region of Yogyakarta	3.083	0.159	1.957	1.852	1.242	0.648
15	East Java	3.815	0.186	–3.212	1.386	0.583	0.858
16	Banten	2.483	0.304	–1.698	–1.235	1.710	0.602
17	Bali	2.643	–0.189	–8.495	–0.421	1.216	0.663
18	West Nusa Tenggara	2.973	0.259	8.443	0.105	1.493	0.978
19	East Nusa Tenggara	2.663	0.114	0.573	0.453	1.540	0.795
20	West Kalimantan	2.682	0.019	–5.723	–2.769	1.369	0.072
21	Central Kalimantan	3.456	0.987	–0.863	–1.495	1.717	1.447
22	South Kalimantan	2.170	–0.150	–4.196	–4.353	1.469	0.777
23	East Kalimantan	2.018	–1.794	0.845	0.158	–0.626	0.582
24	North Kalimantan	2.145	0.675	–2.353	14.434	2.529	0.547
25	North Sulawesi	4.143	0.855	28.121	3.066	0.898	0.693
26	Central Sulawesi	8.690	4.820	59.958	0.723	1.454	0.798
27	South Sulawesi	5.126	1.550	–12.278	–0.230	0.911	0.823
28	Southeast Sulawesi	3.722	1.229	10.167	1.169	1.736	0.805
29	Gorontalo	4.496	1.327	–2.876	3.133	1.112	0.857
30	West Sulawesi	3.787	1.143	714.459	–1.218	1.587	1.031
31	Maluku	3.480	0.596	42.567	–3.423	1.338	0.720
32	North Maluku	4.525	–0.123	66.054	22.805	1.675	0.800
33	West Papua	1.191	–0.123	1.744	1.434	2.521	0.953
34	Papua	1.025	–0.869	–15.976	1.450	1.618	1.035

tation and communications, finance, and services (38 %). Surprisingly, amid international health issues, the tertiary sector recorded positive growth, while the other two sectors (primary and secondary) experienced contraction. Financial services are one of the barriers to further economic downturn. According to Bank Indonesia Provinsi Kalimantan Timur (2020), among all types of credit, investment credit experienced positive growth.

Additionally, only 3 out of 34 provinces in Indonesia experienced economic growth during the COVID-19 pandemic, one of which is Central Sulawesi. In 2020, primary, secondary, and tertiary sectors contributed 38 %, 36 %, and 25 % to the gross domestic regional product, respectively. In other words, this contribution is relatively equal. In the middle of physical restriction, these business fields produced goods and services higher than in the previous period: mining, quarrying, electricity, gas and water, trade, communications, finance, and health services. Managing all of the business fields proportionally has made this province generate the highest annual GRDP per capita, namely 8.69 %.

Diversity

The entropy calculation provides information on whether a province is concentrated in one or several economic sectors or if the contributions of each business sector are the same. Therefore, the greater the entropy value, the more equitable the economic activity, and vice versa. From 2013 to 2020, Central Sulawesi ranked first as the province with the highest growth of entropy value. On the other hand, East Kalimantan is the region with the lowest diversity rate.

In 2013, the contributions of primary, secondary, and tertiary sectors to GRDP of Central Sulawesi were 48 %, 16 %, and 35 %. In other words, this province mainly depended on exploring natural resources as the driver of economic development. However, seven years later, stakeholders in this region shifted their orientation. As a result, the secondary and tertiary sector percentage of GRDP became more prominent, and the primary sector was slowing continuously.

Additionally, in 2013–2020, Central Sulawesi recorded regional economic growth as follows: 5.07 % (2013–2014), 15.50 (2014–2015), 9.94 (2015–2016), 7.10 (2016–2017), 20.60 (2017–2018), 8.83 (2018–2019), and 4.86 (2019–2020). In the same period, diversity of this region growth was 0.040 %, 8.82 %, 4.05 %, 1.56 %, 11.39 %, 2.84 %, and 5.03 %, respectively. Based on this data pattern, there is a similar pattern in Central Sulawesi's economic growth and diversity.

On the contrary, the contributions of primary, secondary, and tertiary sectors to GRDP of East Kalimantan in 2013 were 59 %, 26 %, and 15 %. Furthermore, in 2020, the activity in the primary industry was considered as intensive, and the contribution of this business field was still around 50 %. This condition shows that the economic activities in East Kalimantan still rely heavily on benefiting from the natural resources and processing the services.

Moreover, when the score becomes lower, this province is characterised by declining regional economic growth. This condition is similar to Central Sulawesi. However, from 2013 to 2020, East Kalimantan experienced negative annual development of diversity and three times slowing growth.

Trade Openness

Regions in Indonesia have different economic bases. For example, according to Hariyanti and Utha (2016), West Sulawesi, Central Sulawesi, and Lampung rely on agriculture, forestry, and fishery business fields. Therefore, these regions can produce agricultural commodities relatively higher in quantity than a region with a non-agriculture economic base. Furthermore, the higher the quantity, the producer trades the products beyond the local area to prevent the excess supply.

Moreover, provinces with industrial and service bases require imports of raw materials and basic needs to meet the production capacity and community's needs. Based on this situation, export and import become the mandatory activity for each region to achieve economic development goals.

In this study, TO was used to determine the extent of TO of provinces in Indonesia with other countries. Table 1 shows that the first ranked province with the highest growth of trade openness is West Sulawesi. On the other hand, Papua has the lowest growth rate.

West Sulawesi recorded a higher accumulated value of exports and imports than GRDP. Furthermore, the growth of international trade in this province is also more remarkable than the percentage increase in GRDP per year. According to BPS Sulawesi Barat (2021), between exports and imports, the delivery of goods and services abroad is much larger than buying goods and services from other countries. So, more than 90 % of export products from West Sulawesi are in the form of goods.

Moreover, in terms of developing trade openness and economic growth, these two parameters recorded positive annual growth from 2013 to

2020. However, during the COVID-19 pandemic, export and import activities weakened and contributed to the economic contraction in South Sulawesi.

On the other hand, Papua tends to have positive annual regional economic growth. Nevertheless, the situation with both export and import international trade activities face is the opposite. Based on BPS Papua (2020), exports from this region are dominated by vegetable oil, copper ore and concentrates, and wood and wood goods. The biggest partner countries that import commodities from this province are Japan, India, China, the Philippines, and South Korea. However, aggregately, exports of products to those nations tend to decline annually. Moreover, Papua's declining import value is caused by imports of non-oil and gas (auxiliary raw materials and capital goods), which tend to fall from time to time.

Agricultural Land

Agricultural land is the main factor in the production of agricultural commodities, especially food crops. For example, rice is a food crop with a strategic role on a micro and macro scale in Indonesia. On this basis, the availability of agricultural land is an issue that involves various stakeholders, especially the government as a policymaker. However, population growth and the need to accelerate economic development encourage land conversion from this agricultural land to non-agricultural land.

The Bangka Belitung Islands are ranked first as the region with the most considerable reduction in agricultural land area in Indonesia. About 8 % of agricultural land is turned into non-agricultural land every year. This conversion activity is inseparable from the Bangka Belitung economy, which slowly shifts from the primary and secondary sectors to the tertiary sectors. In 2013, the primary and secondary sectors contributed 32.68 % and 35.09 % to GRDP. However, at the end of 2020, this contribution fell to 31.69 % for the primary sector and 30.40 % for the secondary industry. Thus, the value of the tertiary sector, which initially was 35.05 % at the end of 2013, became 37.91 % at the end of 2020.

Non-agricultural activities encourage the demand for land. Later on, this condition facilitates agricultural land conversion (Rondhi et al., 2018). At the same time, landowners are willing to sell their land since the revenue from agricultural production activities is relatively lower compared to the cash they will obtain in selling the asset.

Concerning this situation, Indonesia Government has issued the Spatial Act No. 26 of 2007. This act regulated the protection of Sustainable Agricultural Land in rural areas. However, this condition expanded the protection in rural and urban areas by enacting the Agricultural Land Protection Act No. 41 of 2009 (the SALP Act) (Sutrisno & Setiawan, 2018).

Moreover, to provide the landowners' incentives to maintain the agricultural land, Indonesia Government issued Regulation Number 12 of 2012 concerning Incentives for the Protection of Agricultural Land for Sustainable Food. One year later, the government issued a regulation in terms of Technical Guidelines for the Transfer of Functions of Agricultural Land for Sustainable Food (Minister of Agriculture Regulation Number 81 of 2013). By this regulation, the procedure for converting sustainable food agricultural lands into non-agricultural ones takes a relatively long time because it is required to pass several stages with a bunch of administration documents. First, it is necessary to prepare a report containing the background, aims and objectives, and land development plans and their designations, including strategic environmental studies, environmental impact analysis, environmental impact management, and agricultural land conversion plans. After all the requirements and criteria are met, the applicant for land conversion proposes to the regional leadership for approval. This process will last longer if the land conversion involves cross-regencies/cities because the governor must first approve it. Finally, the land conversion process can legally be carried out if approval has been given.

Population

Provinces in Indonesia experienced population growth differently. Almost half of the provinces' population increased, while others experienced a decline (Table 1). The highest population growth is experienced by West Java, while North Kalimantan has the lowest number on average, at 47,566,012 and 658,972 people per year, respectively.

Besides having the highest population, West Java is also the second-most populated province in Indonesia after the Special Capital Region of Jakarta[1]. According to Wajdi et al. (2015), high migration from another area to this province increases population. The most in-migrants are from Central Java, Special Region of Yogyakarta, and East Java Provinces, since living in more de-

[1] BPS. (2019). Population Density by Province (person/km2). https://www.bps.go.id/indicator/12/141/1/kepadatan-penduduk-menurut-provinsi.html. (Date of access: 13.04.2022).

veloped regions may offer better jobs or wages. Furthermore, Putri and Oktora (2020), explained that the population in West Java Province is increasing because of the high fertility rate. The Family Planning Program implemented in this province was not performed well, resulting in a population increase in the next year.

On the contrary, North Kalimantan is the least populous province since it is the newest province in Indonesia. This province was previously part of East Kalimantan (Wulung et al., 2019). Moreover, Agus et al. (2019) and Setiati et al. (2020) explained that North Kalimantan has imposed the Family Planning Program. This program relatively succeeds since most of the population follows it, resulting in a low fertility rate.

Moreover, Riau Islands experienced the highest population growth. This situation is reasonable since this area has a high urbanisation level (Wilonoyudho et al., 2017). People tend to move into cities in Riau Islands because they want to receive higher wages. Triningsih (2013) explained that Batam, one of the cities in this province, is known as an economic centre. The area itself is the strategic industrial location between Singapore and Johor, Malaysia.

Human Development Index

Indonesia first applied the HDI as an indicator of regional development in 1996. Over time, the method changed as it adapted to current conditions. To date, HDI is formed based on a long and healthy life, knowledge, and a decent standard of living. Furthermore, for local governments, information on the HDI is essential, not only as a measure of success of efforts to build the quality of human life but also to identify the level of regional development and indicators for determining the general allocation fund, namely, the balancing fund provided by the central government to local governments with a proportion of 10 % allocated to provinces and 90 % to regencies/cities, with the aim of equitable distribution of financial capacity between regions to fund regional needs in the context of implementing decentralisation (Akita et al., 2021).

Among 34 provinces, the Special Capital Region of Jakarta ranked first (79.64) in HDI scores. Based on the dimensions of human development, the Special Capital Region of Jakarta has the highest capital expenditure. BPS[1] recorded the average capital expenditure of 2,112,676.37 IDR. This finding aligns with the study by Nur and Yuliansyah (2020), which explains that high spending can lead to higher HDI.

On the other hand, Papua is the province with the lowest annual HDI growth (58.59). Juliarini (2020) discovered that the HDI score is low because Papua has a big area and high population. Those two factors made economic and social development quite challenging to achieve. In addition, Saputro et al. (2021) explained that the geographical condition in Papua is the main reason for the relatively low HDI.

Table 1 shows that all provinces in Indonesia experienced an increase in HDI scores. However, West Kalimantan Province was recorded as an area with the lowest HDI growth among 34 provinces in Indonesia. According to Zainal et al. (2020), this growth is affected by low education level, health level, and labour force participation rate. Health level and the labour force relatively declined each year. In addition, low and decreased growth rate of labour force participation can cause poverty, leading to slow economic development and low HDI growth.

Factor Affecting the Regional Economic Growth

The primary sector consists of agriculture, mining, and quarrying business fields. Meanwhile, the secondary sector comprises electricity, gas and water, industry, and construction business fields. Finally, trade, transport and communications, finance, and services belong to the tertiary sector. Furthermore, the higher diversity score (E) indicates that between one sector and another, there is no relatively large disparity in contribution to the formation of GRDP.

The services sector took the most vital hit in the first year of the COVID-19 pandemic and pushed the business field to contract relatively profoundly. On the other hand, people still need products from the agricultural sector to meet basic needs. On this basis, this business field is relatively durable and prevents the economy from falling further. On the other hand, the activity sector in the industrial sector is also fairly uneven due to physical restrictions and disruptions to the supply chain.

Table 2 shows that entropy has a positive and significant effect on economic growth. This finding is in line with the study of Martin et al. (2016), which stated that through the distribution of risk to all economic sectors, the impact is rela-

[1] BPS Special Capital Region of Jakarta. (2022). Average Food and Non-food Expenditures Per Capita Per Month in Urban Area by Regency/City (Rupiah). https://jakarta.bps.go.id/indicator/5/136/1/rata-rata-pengeluaran-per-kapita-sebulan-makanan-dan-bukan-makanan-di-daerah-perkotaan-menurut-kabupaten-kota-rupiah-.html. (Date of access: 13.04.2022).

tively lighter than that in the areas with concentrated economic sectors when an economic shock occurs.

The results of this study indicate that dependence on one sector can bring losses in the long run, given that economic disturbances can occur again. Economic disruptions can occur early in the primary industry. For example, the availability of natural resources is decreasing and is not followed by efforts to explore new areas or increase productivity. In addition, labour shortages also can occur, given that the younger generation's desire to be involved in the primary sector, especially agriculture, tends to decline. At the same time, the adoption of agricultural technology is not running smoothly.

Meanwhile, disruption to the secondary sector can occur when the export destination country for industrial products experiences a weakening economy. These products cannot be absorbed and cause industrial activities to be not smooth. On the other hand, one example of economic disruption in the tertiary sector is the financial crisis that has occurred more than twice in the past.

Additionally, a one unit increase in trade openness escalates the economic growth by around 1,080,863 units. In each province in Indonesia, each region has a base sector, both primary, secondary, and tertiary. Among the three sectors, such as industry, production results cannot be fully absorbed by domestic consumers, both for reasons of price and quality. Therefore, trading partners from other regions (exports) are needed to be able to absorb products with relatively higher prices or better quality but not according to local market segments. Thus, business actors will get relatively greater value added and contribute to economic development.

On the other hand, regions in Indonesia experience excess demand for specific products. Therefore, it takes delivery of goods or services from the different areas (imports) to meet the industry's raw material needs or even consumption to meet basic needs. On this basis, the fulfilment of the requirements of each party encourages a smoother flow of the economy.

Moreover, the results revealed that extensive agricultural lands (K) have a positive and significant impact on economic growth. Assuming that other variables are constant, economic growth will increase by approximately 0.83 units for every one-unit increase in agricultural land area. Moreover, according to Hamidov et al. (2016), if the agricultural sector has a relatively large contribution to the economy in a region, then the sustainability of the availability of agricultural land is an essential element for economic growth. Moreover, the findings in this study support the government's efforts to maintain the availability of agricultural lands through a series of regulations.

Agricultural activities generally rely on land as the main production factor. However, this type of land is beneficial for plant cultivation and as land suitable to graze livestock, namely ruminants. According to McArthur and McCord (2017), the escalation of this land area, also supported by efficient inputs, can generate a higher yield. An increase in this yield may cause higher economic growth by about 14 %. Moreover, Al-Khalidi et al. (2013) explained that livestock grazing on agricultural land could boost economic growth. Therefore, an increase in this land area leads to animal husbandry escalation. Then, it can increase the production of livestock milk and meat and finally be a booster for economic growth, especially in the livestock sub-sector.

The increase in population is inversely proportional to the increase in a province's per capita income. This finding indicates that economic growth cannot absorb labour. According to Lim (1997), labour absorption and production growth depend on the developing sector. As explained by Prawoto and Cahyani (2020), Indonesia's primary and secondary sectors are classified as labour-intensive, while tertiary sector is capital intensive.

Moreover, agriculture, as part of primary sector, absorbs more labour than other sectors. Nababan (2019) demonstrated high absorption of labour in the agricultural sector. This study also discovered that high absorption was not followed by higher level of contribution to agricultural GDP. In addition, Malahayati et al. (2021) explained that agricultural employment increases because people see agriculture as alternative jobs if they are not getting other jobs yet or when labour from other sectors get fired.

Furthermore, bigger population has a tendency to increase the labour force. On the contrary, Wulandari et al. (2019) discovered that job opportunities are more likely to be capital-intensive than labour-intensive. Companies recruited less labour since they invest more in machineries and technologies, and resulting labour force growth is greater than employment growth.

Next, this finding is in line with the study of Peterson (2017) that explained that population escalation may lead to higher unemployment. This is reasonable since job opportunities have slower growth than population growth. Moreover, an increase in population that is not accompa-

Table 2

Factors affecting the regional economic growth in Indonesia

Variable (s)	Expected sign	Coefficient (million)	SE (million)	*t*-test	Probability
C		–329,544,031	5,504,288,493	–37.16	0.00***
E	+	370,773,009	24,354,425	15.22	0.00***
TO	+	1,080,863	449,917	2.40	0.02**
K	+	0.83	0.48	1.75	0.08*
L	–	–1.07	0.14	–7.87	0.00***
HDI	+	1855376	45,776	40.54	0.00***
R-squared	0.994				
Adjusted *R*-squared	0.993				
F-statistic	969.94				
Prob (*F*-statistic)	0.00***				

Source: Secondary Data Analysis, 2021.
***, **: significant at 1 % and 5 % probability level, respectively; ns: nonsignificant.
Source: Authors calculation, 2021.

nied by skill improvement can generate lack of skill and/or unskilled labour. Moreover, Ogunjobi et al. (2021) explained that population increase is related to unemployment. Less job creation with insufficient skill causes unemployed population. If it increases, economic sector cannot positively grow because there are less producers who can generate more value added. In addition, Siregar and Widjanarko (2022) describe that the government strives to improve population's skills by provide training with Pre-Employment Card program (Program Kartu Pra-Kerja) since the population grows, but lacks skill.

HDI shows a positive and significant influence on the economic growth of provinces. According to Maqin and Sidharta (2017), an increase in the HDI indicates an improvement in the quality of economic development. As a representation of economic development, the HDI is calculated not from its economic indicator, namely purchasing power, but also from health and education indicator. Nevertheless, the increasing of HDI is affected not only by three factors altogether, but also by one indicator or two indicators simultaneously. In addition, high HDI score is related to high expenditure, education, and health.

According to Miladinov (2020), lower infant mortality rate can lead to higher life expectancy. This can result in higher HDI and boost economic growth. This is in line with the World Bank[1] data which portray that Indonesia's mortality rate is declining along with increasing life expectancy. Moreover, Gulcemal (2020) suggested that to achieve a higher HDI score, the government should have some efforts to support that, for example, to provide better health facilities and education for every income level, so people can receive better service equally.

Conclusion

This study primarily aimed to determine the impact of economic diversity on regional economic growth. The data estimated was from 2013 to 2020.

The research results show that the distribution of economic activity in forming the Gross Regional Domestic Product (GRDP) has a positive impact on economic growth. In Indonesia, the economic sector is divided into three, primary (agriculture and mining), secondary (industry), and tertiary (services). Regions with a relatively higher diversification score can take advantage of opportunities to increase the value added of a product. If there is an increase in demand or prices for goods and services, regions with higher economic diversification can take advantage of these opportunities to accelerate economic growth. Conversely, regions with economic sectors that tend not to vary cannot optimise these opportunities.

In addition, regions with relatively higher diversity scores tend to survive better in times of economic shocks than regions with concentrated economic sectors. Therefore, diversification empirically drives the distribution of risk across all areas of the economy. In other words, when a sector collapses due to disruption, the region can still survive with the help of other sectors. Therefore, when a shock occurs, the province will be unlikely to experience a tragic economic decline.

Overall, the combination model of all sectors (primary, secondary and tertiary sectors) to support sustainable economic growth needs to be further explored.

[1] World Bank. (2020a). Mortality Rate, Infant (per 1,000 Live Births) — Indonesia. https://data.worldbank.org/indicator/SP.DYN.IMRT.IN?end=2019&locations=ID&start=2013. (Date of access: 17.04.2022).

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