Location Quotient Analysis in Facing Economic Competition during Covid-19 Pandemic

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Abstract

The Covid-19 pandemic has had a significant impact on people’s lives. The economic sector is so affected that a balanced and well-targeted policy is needed to overcome the difficulties arising from pandemic. Large-Scale Social Restrictions (PSBB) which has been intended to reduce the spread of Covid-19 indirectly makes economic activities in production, consumption, and distribution to be hampered, so to speak, causes an economic contraction. The national economy was contracted by 5.32 percent (y-o-y) and the economy of East Java was contracted 5.90 percent (y-o-y) in the second quarter of 2020. Nevertheless, there are several economic sectors that still have good performance and have contributed greatly to East Java’s Gross Regional Domestic Product. Using Location Quotient (LQ) analysis, this study aims to identify basic sectors and formulate the composition and shift of the basic sectors by using GRDP as an indicator of regional growth.

Keywords: location quotient; Klassen typology; economic sectors: regional economy.

Introduction

The Covid-19 pandemic has led to an economic slowdown. Efforts and preventive measures have not been found to stop the spread of the virus. Control measures carried out with Large-Scale Social Restrictions/Pembatasan Sosial Berskala Besar (PSBB) must really be able to minimize the impact on the health care system (Raoult, Zumla, Locatelli, Ippolito, & Kroemer, 2020). However, it is unclear whether similar measures should be taken by regions with a lower number of victims because each region has a different response in dealing with the spread of Covid-19.

Sosa and Sosa (2020) mention several factors that can affect the spread of a pandemic which may complicate modeling, so that it will be more difficult to predict. First, the coronavirus that has been genetically identified has turned out to be the most aggressive and infectious. Researchers have even noted that it is unclear whether viruses follow the same pattern in different regions. Second, environmental factors, air humidity, and temperature are relevant in determining the transmission and stability of viruses to the human respiratory system, such as SARS-Cov2 (Chan et al., 2011; Pica & Bouvier, 2012). Therefore, the diversity of environmental conditions will determine the dynamics of a pandemic in various regions in
Indonesia. Third, older age and patients with heart problems are always associated with a higher risk of death (Shi et al., 2020). Fourth, the corona virus spreads through close interaction with people who have been infected through contact with droplets of saliva, gusts of air, and coughs containing the corona virus (Heymann & Shindo, 2020). Thus, public action needs to be designed to reduce the mobility of people in spreading disease. However, this action is closely related to the economic impact, as well as the social and cultural changes of the people (Sosa & Sosa, 2020).

One of the several changes that has an impact on the economy is the change in the consumption pattern of the people. Public consumption of basic goods is not affected by the price level due to risk factors and concerns that affect consumer psychology (Hutauruk, 2020), while public consumption of tourism and transportation has decreased due to the implementation of PSBB (Sari, 2020; Ubaidillah & Aji, 2020). On the other hand, Indonesian people's savings are still growing, as evidenced by the growth of Third Party Funds (DPK) in the savings component of 10.2 percent (year-on-year) in April compared to 9.5 percent in both last March and 8.11 percent in February (Badan Pusat Statistik, 2020). This shows that people tend to be careful in consuming and preparing funds to deal with pandemic conditions that are still uncertain.

Of all the factors that cause the spread of the corona virus, as a whole it will have an impact on social inequality, poverty, malnutrition, lack of clean water, as well as the lack of readiness of public infrastructure and government budgets in dealing with the pandemic. As a result, it significantly increases people’s risk of infection and the risk of morbidity during a pandemic (Madhav et al., 2018). In its calculations, the parametric model is unable to take into account the collective factors that can change the dimensions and impacts that occur during a pandemic. Focusing on economic side, when it is developed maximally, it can be an advantage for the region. By maximizing economic activity in potential sectors, it is hoped that these sectors can develop into basic sectors. This effort was made in order to increase the GDP of East Java Province. This is due to the emergence of specialization in accordance with the leading sectors or sub-sectors and can be used to increase the effectiveness and efficiency of society in carrying out economic activities. To encourage maximum action, it needs the role of local government in supporting the management of regional economic potential to make it more potential.

In this study, we used a non-parametric model to understand the dynamics of regional economic conditions during the pandemic using a Location Quotient (LQ) to account for problems that occurred during the pandemic. This study aims to analyze sectors in East Java's GDP which are still in the advanced category and have the potential to develop. These two sectors have great opportunities to develop in supporting GRDP growth if their performance is supported by the government, stakeholders and the community as actors in economic activities in East Java.

**Methodology**

In this study, the Location Quotient (LQ) method is used to assess economic conditions and identify specializations/bases of economic activity. The LQ value can be used to determine the basic sector, namely sectors that still have high productivity and can support the growth of other sectors during the pandemic. The data used in this LQ analysis is the Gross Regional Domestic Product (PDRB) of East Java Province.
according to employment in Quarter I-II 2020 based on constant prices 2010. The formula for calculating LQ with the GRDP variable is as follows:

\[
LQ = \frac{X_{ij}}{X_i} \frac{RV_j}{RV}
\]

Where:
- \(LQ\) = Index / Location Coefficient Quotient for sector \(i\) in province \(j\)
- \(X_{ij}\) = GRDP sector \(i\) in province \(j\)
- \(X_i\) = GRDP sector \(i\) at the national level (reference area)
- \(RV_j\) = Total GRDP in province \(j\)
- \(RV\) = Total GRDP at the national level (reference area)

The criteria for decision making based on the interpretation of the LQ Index are as follows (Arsyad in Wiratama, Diartho, & Prianto, 2018):

a. If the LQ of a sector (i) > 1, then the production sector (i) is a profitable base sector to develop
b. If the LQ of a sector (i) = 1, then the production of sector (i) is only able to meet local needs
c. If the LQ of a sector (i) < 1, then the production of sector (i) is a non-base sector that is less profitable

This study also uses the Klassen typology approach to describe the pattern and regional economic growth. According to Leo Klassen in (Ragiliawan, Saputri, & Nuraeni, 2018) this analysis is used to determine the patterns and structures of regional economic growth. Klassen's typology technique can also be used to describe the pattern and structure of regional sectoral growth. This analysis can identify the position of the economic sector of a region (province) by paying attention to the economic sector in a wider area as a (national) reference area. Klassen typology produces four sector classifications with the following characteristics (Ragiliawan et al., 2018):

| Contribution to GRDP (sk) | GRDP Growth (s) |
|--------------------------|-----------------|
| \(sk_i > sk\)            | \(s_i > s\)     | \(s_i < s\)     |

- **Quadrant I**: Sector is developed and grew rapidly (developed sector)
- **Quadrant II**: Advanced but depressed sector (stagnant sector)
- **Quadrant III**: Potential and still evolving sector (developing sector)
- **Quadrant IV**: Relatively left-behind sector (underdeveloped sector)

**Result and Discussion**

Based on the results of the LQ analysis, the following is the specialization/basis of economic activity in East Java Province:

**Tabel 2**: LQ Value of East Java Economic Sectors
Basic sectors that support the economy in East Java, including agriculture, forestry and fisheries; mining and excavation; processing industry; water supply, waste management, waste and recycling; construction; wholesale and retail trade; car and motorcycle repair; transportation and warehousing; providing accommodation and food and drink; information and communication; education services; and other services. Meanwhile, the rest are included in the non-basis sector category. In addition to LQ data,
based on the GRDP data of East Java Province, it can also be found business categories from the Klassen’s Typology analysis of the business fields in East Java Province as follows:

| Economic Sector                                 | GRDP Growth Rate (per Economic Sector of East Java) (S) (%) | GDP Growth Rate (per Economic Sector of Indonesia) (S) (%) | Sector’s Contribution to East Java GRDP (Ski) (%) | Sector’s Contribution to National GDP (Sk) (%) | Category                        |
|------------------------------------------------|----------------------------------------------------------|-----------------------------------------------------------|-------------------------------------------------|-----------------------------------------------|----------------------------------|
| Agriculture, Forestry, and Fisheries          | 21.519                                                   | 13,973                                                   | 10,643                                          | 13,181                                        | Potential and Still Evolving     |
| Mining and Quarrying                          | -17,033                                                  | -3,890                                                   | 4,969                                           | 7,446                                         | Relatively Left-Behind           |
| Processing Agency                             | -8,688                                                   | -6,924                                                   | 30,218                                          | 20,721                                        | Advance but Depressed           |
| Electricity and Gas Supply                    | 0                                                        | -8,627                                                   | 0,2768                                          | 1,005                                         | Potential and Still Evolving     |
| Water Supply, Waste Management and Recycling  | 0                                                        | 0                                                        | 0,101                                           | 0,087                                         | Advanced but Depressed          |
| Construction                                  | -7,627                                                   | -7,929                                                   | 9,246                                           | 9,959                                         | Potential and Still Evolving     |
| Wholesale and Retail Trade; Auto and Motorcycle Repair | -10,735                                                  | -7,194                                                   | 18,027                                          | 13,005                                        | Advanced but Depressed          |
| Transportation and Warehousing                | -38,372                                                  | -41,236                                                  | 2,579                                           | 3,614                                         | Potential and Still Evolving     |
| Accomodation; Food and Beverage               | -22,703                                                  | -28,771                                                  | 5,183                                           | 2,779                                         | Advanced but Depressed          |
| Information and Communication                 | 5,970                                                    | 3,286                                                    | 6,542                                           | 5,995                                         | Developed and Grew Rapidly      |
| Financial and Insurance Services              | -5                                                       | -11,553                                                  | 2,579                                           | 4,325                                         | Potential and Still Evolving     |
| Real Estate                                   | 0                                                        | -0,248                                                   | 1,837                                           | 3,049                                         | Potential and Still Evolving     |
| Corporation Service                           | -17,857                                                  | -16,444                                                  | 0,767                                           | 1,840                                         | Advanced but Depressed          |
| Government Administration, Defense, and Mandatory Social Security | 1,136                                                    | -2,724                                                   | 2,202                                           | 3,375                                         | Potential and Still Evolving     |
The results of the analysis of the East Java economy during the pandemic using LQ and Klassen’s Typology, it is known that most sectors are in quadrant II with a category that can still develop and respond to current conditions. Sectors that can survive a pandemic include agriculture, forestry and fisheries; electricity and gas supply; construction; transportation and warehousing; financial and insurance services; government administration, defense and mandatory social security; as well as health services and social services. On the other hand, sectors in the relatively underdeveloped category, namely mining and quarrying and other services.

In the East Java economy, the information and communication sector has experienced quite advanced growth. This is supported by the high need for information and communication to support community productivity. The actual restrictions have not affected the growth of the information and communications sector, because as the labor force shifts to work from home and students turn to online learning, the demand sector is experiencing an unprecedented surge. Increased productivity builds to develop services in the information and communication sector (Yu, Aviso, Santos, & Tan, 2020). Therefore, it is important for the East Java Provincial Government to develop facilities and services so that this sector can grow and contribute to regional economic growth.

Meanwhile, matters that need to be developed to support social activities during a pandemic are health services and social activities, as well as government administration, defense and mandatory social security. The health service sector is experiencing inability to operate due to the high exposure to Covid-19 which is difficult to control and high risky of transmission. For companies with employees exposed to Covid-19, they will issue active workers to carry out independent isolation. Meanwhile, a downturn in the labor market reinforces declining incomes in times of the pandemic. Informal workers do not have access to health insurance which has led to the emergence of cash transfer programs to cope with the impact of the pandemic (Lustig & Tomassi, 2020). Furthermore, the poor are very limited in jobs that can be done remotely, considering that the lack of infrastructure (internet connection) predisposes them to isolation at home.

Given that the poor do not have the means to meet basic needs; therefore, poverty alleviation and response to the high impact of morbidity during a pandemic, in these two sectors need to be improved. Fiscal policies and social assistance funds have been issued to alleviate poverty and the impact of morbidity, so that its management needs to be implemented optimally so that it can have a positive impact on society, as well as support the regional economy. This is intended to protect health and people’s lives, jobs, human capital and economic growth. To overcome the deterioration of various sectors during the pandemic and
overcome the impact of losing people's income as a result of changing economic conditions, the government must expand the cash transfer assistance program (Lustig & Tomassi, 2020). This type of cash assistance not only reduces people's economic vulnerability, but also boosts productivity at work, as well as increases community health and education capacity.

We need to learn from China, a social protection system that is more adequate and responsive to shocks and forms of sustainable financing. During the crisis due to the Covid-19 pandemic, income security must provide resources for living to reduce long-term social and economic impacts. Local governments have been instructed to increase the number of national social assistance schemes for all vulnerable communities or those infected with Covid-19 (Dialogue & Protection, 2020). Social protection is an important investment, especially in order to be better prepared to face further shocks and to build a resilient society, as well as to maintain the stability of the regional economy in the long term (Dialogue & Protection, 2020). Therefore, cooperation between the government and the community needs to be increased to support the sustainability of the East Java economy, such as the allocation of targeted fiscal assistance and support for health services. The second quadrant is indeed the place that provides the majority of local employment which accounts for the majority of employment in East Java. Therefore, policy and economic development are needed to support the provision of human resources that are lost in some sectors to support the flow of income in this section. A strong local economy and employment are important factors that contribute to the prosperity of East Java Province.

**Conclusion**

In the economic development of East Java during this pandemic, proper priorities from the provincial government are needed. The results of the analysis show that the agricultural, forestry, fisheries and mining sectors are supporting the economy of East Java. The information and communication sector has the most advanced growth due to the high need for information and communication to support community productivity. Especially during this pandemic, many community activities such as offices and education must be carried out remotely and online. The East Java Provincial Government is expected to develop facilities and services for this sector so that it can further develop and contribute to the economic growth of East Java. In addition, poverty alleviation through fiscal policy and social assistance funds needs to be implemented optimally in order to support the regional economy by increasing people's purchasing power and consumption. Local governments are instructed to increase the number of national social assistance schemes for all vulnerable communities in order to be better prepared to face further shocks and to build resilient communities, as well as to maintain regional economic stability in the long term. Economic development policies is also needed to support the provision of lost human resources in several sectors because a strong local economy and employment are important factors that contribute to the prosperity of East Java Province. This research is limited to the leading sectors of East Java's GRDP; therefore, it is hoped that further research can cover more various sectors so that it can be comprehensive in determining solutions in overcoming the economic problems of East Java during the Covid-19 pandemic.
References

Badan Pusat Statistik. (2020). Berita Resmi Statistik: Pertumbuhan Ekonomi Indonesia Triwulan-II 2020. (64), 1–12.

Badan Pusat Statistik. (2020). Berita Resmi Statistik: Pertumbuhan Ekonomi Jawa Timur Triwulan-II 2020. 10(52), 114–122.

Badan Pusat Statistik. (2020). Pertumbuhan Ekonomi Indonesia Triwulan II-2020.

Chan, K. H., Peiris, J. S. M., Lam, S. Y., Poon, L. L. M., Yuen, K. Y., & Seto, W. H. (2011). The Effects of Temperature and Relative Humidity on the Viability of the SARS Coronavirus. Advances in Virology. https://doi.org/10.1155/2011/734690

Dialogue, U. N. P., & Protection, S. (2020). Social Protection at the Time of COVID-19 and Beyond : Building An Inclusive and Sustainable Social Protection System UN Policy Dialogue on Social Protection.

Heymann, D. L., & Shindo, N. (2020). COVID-19: What is Next for Public Health? The Lancet. https://doi.org/10.1016/S0140-6736(20)30374-3

Hutauruk, M. R. (2020). Pengaruh Pandemi Covid-19 terhadap Faktor yang Menentukan Perilaku Konsumen untuk Membeli Barang Kebutuhan Pokok di Samarinda. Jurnal Riset Inossa |, 2(1).

Lustig, N., & Tomassi, M. (2020). Covid-19 and Social Protection of Poor and Vulnerable Groups in Latin America : A Conceptual Framework. UNDP Latin America and the Caribbean, (8).

Madhav, N., Oppenheim, B., Gallivan, M., Mulembakani, P., Rubin, E., & Wolf, N. (2018). Chapter 17. Pandemics: Risks, Impacts, and Mitigation. Disease Control Priorities: Improving Health and Reducing Poverty. https://doi.org/10.1596/978-1-4648-0527-1/pt5.ch17

Pica, N., & Bouvier, N. M. (2012). Environmental Factors Affecting the Transmission of Respiratory Viruses. Current Opinion in Virology. https://doi.org/10.1016/j.coviro.2011.12.003

Ragiliawan, Z., Saputri, O. D., & Nuraeni, Y. (2018). Aplikasi Location Quotient dan Tipologi Klassen untuk Memghitung Produktivitas, Laju Produktivitas dan Elastisitas Tenaga Kerja pada Sektor basis. Prosiding Seminar Nasional Pendidikan Matematika Ahmad Dahlan 2018, (1999), 387–398.

Raoult, D., Zumla, A., Locatelli, F., Ippolito, G., & Kroemer, G. (2020). Coronavirus Infections: Epidemiological, Clinical and Immunological Features and Hypotheses. Cell Stress. https://doi.org/10.15698/cst2020.04.216

Sari, D. (2020). Fenomena Ekonomi Dan Perdagangan Indonesia Di Masa Pandemi Corona Virus Disease-19 ( Covid-19). Jurnal Akuntansi Dan Investasi, 5(1). Retrieved from http://dx.doi.org/10.35835/aktiva.v5i1.840

Shi, S., Qin, M., Shen, B., Cai, Y., Liu, T., Yang, F., … Huang, C. (2020). Association of Cardiac Injury with Mortality in Hospitalized Patients with COVID-19 in Wuhan, China. JAMA Cardiology. https://doi.org/10.1001/jamacardio.2020.0950

Sosa, W., & Sosa, R. P. (2020). A Non-Parametric Mathematical Model to Investigate the Dynamic of a Pandemic. MedRxiv. https://doi.org/10.1101/2020.04.30.20086199
Ubaidillah, M., & Aji, R. H. S. (2020). Aglomerasi Dalam Permenhub tentang Larangan Mudik dan Pengaruhnya terhadap Pertumbuhan Ekonomi. *Adalah: Buletin Hukum Dan Keadilan, 4*(1). Retrieved from https://doi.org/10.15408/adalah.v4i1.15667

Yu, K. D. S., Aviso, K. B., Santos, J. R., & Tan, R. R. (2020). The Economic Impact of Lockdowns: A Persistent Inoperability Input-Output Approach. *Economies, 8*(4), 109. https://doi.org/10.3390/economies8040109