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Research Paper

How Different Geographical Areas React to Covid19 Shock

Regional Resilience and Structural Transformation

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Abstract

In the last 10 years, Covid19 has emerged as an important recent shock that has had an effect on the global economy. Regional resilience may have an effect on how different regions are affected. This study intends to look at how regional resilience is affected by structural change both before and after Covid19. We identify two different situations (prior to and during the Covid19 shock) that affect whether structural reform increases regional resilience. The findings show that Covid19 has a number of negative effects on regional resilience. Additionally, raising a sector's productivity has a significant positive effect on resilience under typical conditions (prior to Covid19). A sector's increased productivity and contemporaneous workforce transfer to other sectors with higher productivity during the COVID19 shock, however, have a significant beneficial effect on regional resilience. Therefore, when the circumstance is stable, productivity becomes more crucial. However, amid a shock, the industry and its employees' flexibility and agility are more crucial.

Keywords: Structural Change, Regional Resilience, Covid19, Shock, Transformation

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1. Introduction

Covid19 recently caused a huge blow to the world economy. Depending on the degree of regional resilience, what happened before and during the crisis may have had various economic repercussions on different areas within the same nation. Scholarly attention has been brought to the idea of resilience because of its widespread drawbacks, and the resiliency of the regional economy may be observed in an economy's capacity to rebound swiftly from shocks.

This study's findings will further reveal the structural restructuring enhanced regional resilience before and after the Covid19 shock in Indonesia, as the country with the fourth-largest population in the world and Southeast Asia's largest economy. The findings would be of major importance in assessing the correlation between structural change and regional economic resilience can be a tool in improving the regional economy performance in different geographical area.

According to this study, resilience in a stable situation is highly correlated with rising sectoral production (i.e., before Covid19). Nevertheless, during the Covid19 shock, rising productivity and concurrently rising labor migration into other industries positively affected resilience. Therefore, while the economy is stable, increasing productivity is highly correlated with regional resilience. However, the important factor positively connected to resilience during the Covid19 shock is improving sectoral productivity while concurrently boosting employees' flexibility to shift toward new sectors.

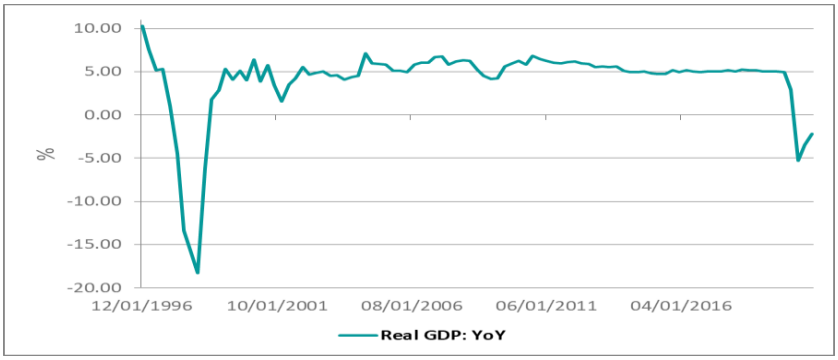

Chart 1. Indonesia's GDP for 25 years

Source: Author's calculation

Chart 1 demonstrates that, compared to other years, Indonesia's economy contracted at the greatest rate during the 1997 Asian financial crisis. The intensity of its crisis was unexpected due to its enormous and unanticipated economic collapse, which matched the regional economic effects following the financial crisis. It was the most badly affected economy in the Asian crisis (Iriana & Sjöholm, 2002). Due to reliance on short-term loans and the contribution of 175 percent of foreign exchange reserves, the economy contracts by -13% (Tambunan, 2010). As a result, it hurts big businesses, especially those with substantial international debt commitments. In addition, the banking industry has been the most negatively affected sector due to corporate defaults.

The Indonesian economy was far more stable throughout the 2008 crisis than during the previous crisis (1997). At the time, reliance on foreign debt had significantly decreased, reaching only 35% in 2008. (Tambunan, 2010). During that time, Indonesia's economy grew by 4.6% as a result of it. But even so, this number was the lowest level in the previous eight years (Tambunan, 2010). Chart 2 demonstrates how the global financial crisis has influenced Indonesia. However, along with China and India, it was just three Asian countries to have positive progress. In contrast to several of its neighbours, especially Malaysia, Singapore, and Thailand, whose economies saw major declines, its GDP grew by 4% in June 2009.

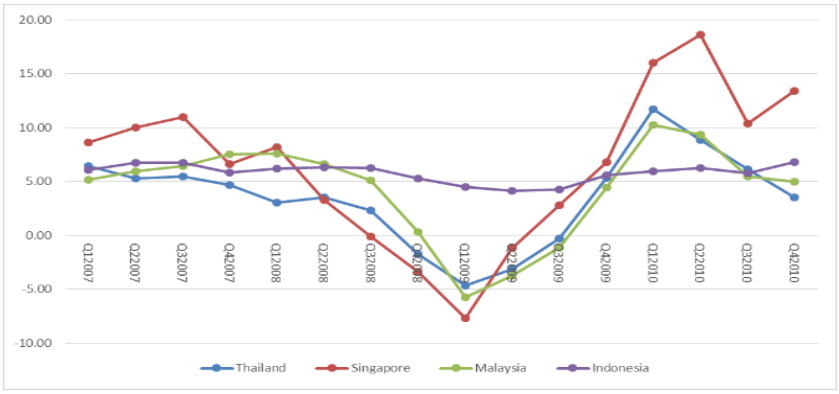

Chart 2. Indonesia's GDP compare with other ASEAN Countries

Source: Author's calculation

With 1,904,569 square kilometers in size, Indonesia ranks as the largest archipelagic state (UNCLOS). With over 275 million inhabitants, Indonesia is the fourth most populous country in the world, with more than half of its citizens living on Java Island, which is also the most populated island in the world. In the years after the Asian financial crisis, Indonesia has seen economic development that is unparalleled (in the 1990s). However, Indonesia saw the most Covid19 cases during the Covid19 shock in 2020 compared to other Southeast Asian countries (World Health Organization, 2020). Indonesia's economy shrank by 2.1 percent in 2020 after the GDP increased by 3 percent in the first quarter of 2020 (Badan Pusat Statistik, 2021). This is undoubtedly something to be grateful for, given that Indonesia's GDP fell by 13.3 percent in 1998. The development and fiscal policy plan ultimately shift due to this circumstance. The state was forced by the effects of this situation to reevaluate all its 2020 development goals and drastically cut its 2020 state budget to divert cash to Covid-19 countermeasures (Muhyiddin, 2020).

Demand and supply shocks have been caused by Covid19's abrupt economic upheavals, which have rippling effects on society and have affected nearly all human endeavors. (Malahayati et al., 2021) also mentioned how the epidemic terribly affects underdeveloped countries. One of the Asian countries that has had a substantial economic effect is Indonesia. Regional incomes fell, unemployment rates increased, and people's purchasing power declined (Malahayati et al., 2021). As a result, Indonesia was downgraded from higher middle income to lower middle income and worsened poverty (World Bank, 2022). According to (Martin et al., 2016), shock are frequently unexpected and startling incidents that throw off the "normal" course of economic progress.

Some research proved that shock influence might result in growing regional disparities in development and prosperity. (Cutrini, 2019), who investigated the connection between the escalation of regional disparities and structural change in Europe, found that after the 2008 crisis, polarisation increased, and numerous economic groups were created. The group also depends on path-dependent processes and local economic structures. Different living standards among areas were caused by this mismatch in local economic systems, which had an uneven effect and became a regional issue (Gentili et al., 2020). Shock influences the evolution of sectors, especially when the economic cycle abruptly shifts to the downside (Holm & Østergaard, 2015). However, responses may vary between areas (even within the same nation) and function as a catalyst for structural change.

Unfortunately, very little research has been done to date on how the industrial revolution may affect regional resilience. Most studies highlight the effect of structural transformation on overall output. In contrast, the factors influencing overall productivity over time in various economic environments might vary (Vries et al., 2013). (Vries et al., 2013) discovered that over the time, the speed of structural change continues to alter and that its consequences on economic development are diverse in their research of the African economy. Identifying the structural change component that significantly affects resilience might be key in accelerating recovery so that it does not widen regional disparity.

Hence, the three alternative definitions of structural change are examined in this study. The first term indicates changes in productivity within a sector (within effect), while the second term gauges whether workers move to sectors with higher productivity (between effect). The third item, called the interaction term, sums together the effects of shifting labour shares and sectoral productivity (dynamic effect). The remainder of the

study is divided into the following sections: Section II's examination of the literature on structural change and resilience. The discussion and findings are in Section III. Section IV also provides the conclusion. The appendix then gives further information regarding how our database was created.

Regional Resilience

Shocks can vary in intensity and duration, and they can also have different consequences depending on where they occur. Additionally, different shocks evoke different reactions and, hence, different levels of resilience (Martin et al., 2016). Economic resilience is also frequently employed to establish how to comprehend and react to various effects of shock periods and to take the ability to forecast economic situations. The capacity of an area to endure and adapt during times of adversity is the definition of regional economic resilience used in this research. It may be understood in terms of the country's economic growth, which may slow down during crises but may quickly pick up steam and modify its economic structure.

Engineering resilience and ecological resilience are the two main principles of resilience. Engineering resilience is the return to the previous position or trajectory following the regional economic recovery. Ecological resilience is the amount of stress a system can withstand before changing the way it functions, looks, or is situated (Walker et al., 2006). As a result, "ecological" resilience is evaluated by contrasting the pre-shock and post-shock (stable) conditions. (Martin, 2012) has used the word "adaptive" resilience to describe a region's capacity to restructure itself, that is, to change its structure (technology, enterprises, industries, and institutions) over time in order to maintain a positive development trajectory in employment, output, or wealth. Based on its ability to create more/less productive industries than those decimated by the recession, an area is seen to recover strongly (weakly) from a recession.

Structural Transformation

There are several ways to define structural change. The majority of suggestions for structural transformation are focused on the results of the process. Theoretically, shifts in demand preferences and sector-specific productivity lead to a structural shift (Dietrich, 2012). Although structural transition also includes structural unemployment and societal costs, it may restrict the beneficial effects of structural change on economic progress (GHK, 2011). This might cause a structural change from more productive to less productive activities on a continent like Africa (McMillan et al., 2014). This negative flow may be influenced by a number of factors, including the quantity of natural resources, globalisation, and institutional and governmental frameworks. Despite the extractive sectors' normally high productivity, the availability of natural resources has a growth-restricting effect on structural change since they do not offer a significant amount of employment to absorb the extra labour from agriculture (McMillan et al., 2014).

Economic shock frequently causes significant structural changes to the labour market, including increases in employment and a gradual expansion of another economy (Orlowski, 2021). The growth of industries frequently reveals regional differences. The formation of enterprises depends on the capacity of certain locations to keep up with the condition, thus some regions provide better conditions and more fascinating surroundings than others (Brenner, 2004). The industry's development in response to outside events is also influenced by responsiveness (such as a shock). Thus, structural change in productivity and resilience are two key traits that govern the development of a sector in a given area (Holm & Østergaard, 2015). According to some study, structural change is necessary to increase labour productivity and has a significant impact on regional performance. However, many claim that the structural productivity gain of employee reallocations across sectors is overshadowed by the impact of productivity increases inside individual industries (Andriansyah et al., 2021).

Structural Change Effect to Regional Resilience

An external shock (like the Covid19 epidemic) might lead to market saturation and labour movement constraints, which can negatively affect the growth of multiple businesses and even the entire economy (Bessen, 2019). The capacity of the region to diversify into developing economic activities and modify its industrial structure to accommodate evolutionary change is one of the aspects of regional resilience, according to

(Boschma, 2015). A high level of industrial resilience and more flexibility allow regions that keep diversifying their businesses to respond more quickly to changing circumstances and open up new economic avenues. (Boschma, 2015).

An area may show resilience during the process in response to a certain shock. Its ability to withstand more shocks, though, might decrease. Theoretically, any site may have a certain amount of resistance to potential shocks at any given time. The capacity to adapt led to changes that led to the downfall of certain sectors while causing others to prosper. Some industries in each region may experience a decline as a result of these dynamics at the industrial level. But it could also lead to a long-lasting economic boom in a certain area. However, these dynamics vary depending on the environment. The industry may appear untouched in some locations while falling or growing in others.

2. Methodology

In this analysis, panel data was utilized and the notation for calculating regional economic resilience suggested by (Martin et al., 2016) was followed. In their 2016 study, Martin et al. measured the shock resistance of the provinces and looked at existing and anticipated changes (decreases or increases) in regional economic production. It is believed that regional employment will fluctuate along with the national average, falling during a recession and rising during a recovery. Following would be the way to indicate the anticipated change in employment in region r during shock or recovery periods of length k:

$$(\Delta E_r^{Contraction})^{expected} = \sum_i g_N^{t+k} E_{ir}^t \qquad (1)$$

Where g_N^{t+k} is the pace of national employment change throughout periods of shock; $(\Delta E_r^{Contraction})^{expected}$ is the 'expected' (counterfactual) regional response; and E_{ir}^t is employment in the industry i in region r in starting time t, the base year where the moment at which shock or recovery begins, while $\Delta E_r^{Contraction}$ is real counterfactual regional response. Then, the regional resistance may be quantified as:

$$Resis_r = \frac{(\Delta E_r^{Contraction}) - (\Delta E_r^{Contraction})^{expected}}{|(\Delta E_r^{Contraction})^{expected}|} \qquad (2)$$

The resistance index measurements are centered at zero. If the Resistance-value larger than zero shows that a region's economy is more resistant to shock and capable of recovery than the national economy (good resilience).

Then, in order to calculate the structural change, this study adopted a different nomenclature from Vries et al. (2013). It is break down the total structural change into three decomposition form—"within effect," "between effect," and "dynamic effect". The "within effect" reflects the increase in productivity within sectors, whereas the "between effect" reflects the productivity effect of labor movement to above productive sectors, and the "dynamic effect" captures if employees shift to sectors with above-average productivity levels and if productivity growth is greater in sectors with rising employment shares. The annual employment provincial statistics (regional level) for the nine major economic sectors are used for the empirical study (table 1), which is based on time-series data from the Indonesian business sector's BPS (Bureau of Statistics).

The decomposition of structural change concept was phrased as follows:

$$\Delta P = \sum i\ (P_i^T - P_i^0)*S_i^0 + \sum i\ (S_i^T - Si^0)*P_i^0 + \sum i\ (P_i^T - P_i^0)*(S_i^T - S_i^0) \qquad (3)$$

Where Si is the share of sector *i* in total labor, Pi the labor productivity level of sector *i*, and superscript 0 and T are the start and end periods, respectively.

Table 1: Indonesian Sector Database

Nine Major Economic Sectors	Agriculture, Forestry, Hunting and Fishery (AFH) Mining and Quarrying (Min) Manufacturing Industry (Man) Electricity, Gas and Water (EGW) Construction Wholesale, Trade, Retail, Restaurant and Hotels (TR) Transportation, Storage and Communication (TSC) Financing, Insurance, Real Estate and Business Services (FR) Community, Social and Personal Services (CS)
Variables included	Labour (person) Gross value added at current national prices (regional output)
Regional included	34 provinces of Indonesian Regions
Year of the Study	2011-2020

The study introduced the Human Development Index as the control variable using Lagged Dependent Variables (LDVs) with a 3-year lag in HDI since the effects of HDI can take years to manifest (Martini, 2020). To examine the effect of Covid19 during the observation period, this study additionally included a dummy variable of Covid19 that is 1 if a Covid19 shock occurs at that moment and 0 otherwise.

3. Results and Discussions

3.1. Economic Resilience Profile of Indonesian Regions

Figures 2 and 3 display the data distribution for resilience indicators. The greater the resistance index, which indicates a higher level of resilience in the region, the bluer the colour. Equations (1) and (2) were used to obtain the resilience index (depicted in appendix 4). When a shock occurred, the resistance of most Indonesian provinces decreased, but the deep was different. During COVID19, the effect of covid differs among island depending on the locale. On Java Island, there is almost no change in the resilience index between covid and before covid. In contrast, Papua Island's resistance index increased significantly following the covid epidemic compared to before it happened. This odd phenomenon resulted from Papua's increased labor force during COVID19 (2020), especially in the AFH industry, which will be responsible for roughly 80% of the new jobs. It has seen a substantial reduction during Covid19 compared to its nearest neighbor, Maluku Island.

Figure 1. Economic Resilience index before Covid time (2019)

Source: Author's calculation

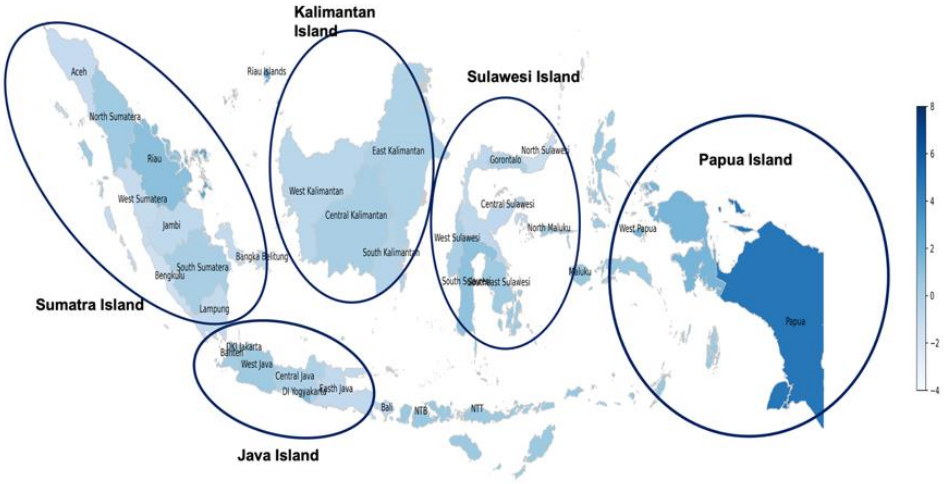

Figure 2. Economic Resilience Index during Covid time (2020)

Source: Author's calculation

When comparing the figures above, it is apparent that the NTT (East Nusa Tenggara) and Maluku region's resistance index of resilience has significantly decreased. Both provinces saw growth in the total number of workers (see appendix), but only roughly 3% from the prior year. In general, it can be said that the effect of covid prior to and during covid varies across Indonesia. While most provinces endure declines, others have improved or maintained their resilience. The western provinces of Sumatra Island, including Bengkulu, Lampung, Aceh, and West Sumatra, are in the worst possible position as they shift the sign from positive to negative. On the other hand, the best position corresponds to those on Java Island, where resilience is still growing positively on average.

3.2. Structural Transformation in Indonesia

However, when we break down the total level of output into its three structural components—the "within effect," "between effect," and "dynamic effect"—it becomes clear from Chart 3 that not all three elements of production decline in response to a significant shock. Starting in 2011, structural changes "within effect" had a greater positive effect on overall productivity than its "dynamic effect," which had a smaller effect.

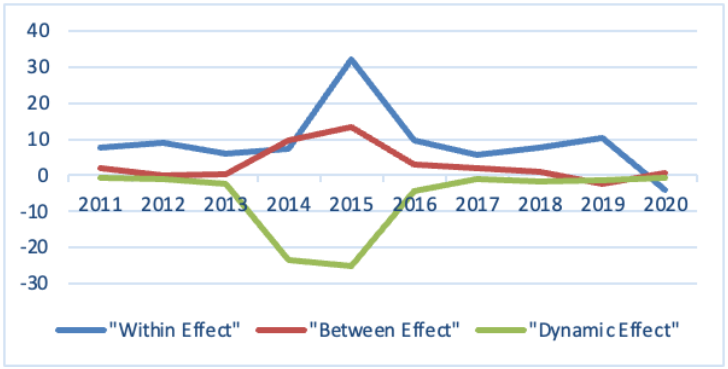

Chart 3. Decomposition of Labor Productivity Growth 2011—2020

Source: Author's calculation

The rate of structural change and growth in Indonesia both fell in 2014. If we take a closer look at each structural change's breakdown, only the "dynamic effects" have dropped, while the "within effect" and "between effect" continue to increase in value. It demonstrates that during this time, the sector's productivity

continued to increase, and people continued to shift between industries, resulting in significant labor flows. As a result, this year saw enough individuals moving from the agricultural sector to other industries (see figure 6).

Static reallocation gains (within and between effects) substantially contribute to the increase in total productivity from 2014 to 2015. The services sector grew, and its aggregate productivity increased from -2 in 2014 to 10 in 2015. Because there is a sector with a sizable percentage that saw great productivity growth, the labor share is declining, so the "dynamic effect" is still experiencing a drop in productivity in the interim. At the same time, the corporate world started returning to normal in 2015. In 2017, the "dynamic effect" grew to a steady point while the "within effect" and "between effect" started to decline. The covid-19 epidemic dealt Indonesia's commercial sector a significant hit until 2020. The decomposition results show that productivity fell across almost all industries.

3.3. Regional Resilience and Structural change Relation

Using the panel regression model, the results of this section's analysis of the effect of structural change variance on regional resilience are reported in Tables 2 and 3 (see appendix for more detail explanation). The study employs three alternative types of structural change to stabilize the residual variance of all variables, as indicated in the table, and a natural logarithmic value for resilience. Results from the regression of the three main types of structural change are shown for all models in columns (1) through (6) of table 4 in this paragraph ("within effect", "between effect", and "dynamic effect"). The first three columns in Table 4 give the panel regression results for the observation period (2011–2020). This model demonstrates the general effect of Covid19 and HDI. Additionally, table 5 from columns (1) to (3) displays observation during Covid19 (2020), while the final three columns (4) to (6) revealed the result for observation between 2011 and 2019 for examining the link between structural change and resilience.

Table 2's columns (1) through (3) show that Covid19's effect is consistently substantial. With a 1% significant level, it has a detrimental effect. Moreover, the "within effect" coefficient remains constant even after including all sectors. It is demonstrated that, while holding all other factor constant, an average 1% increase in the "within effect" of structural change is predicted to enhance resilience by 0.23% and significance by 5%. In contrast, there is no statistically significant effect on resilience from the other two types of structural change (the "between effect" and "dynamic effect"). When Covid19 is absent, the resilience index drops by an average of 170,1%, which is significant at 1%, holding all factors constant. This result provides proof that the effect of Covid's presence is substantial. Holding all other factors constant, an increase in the HDI after three years is associated with the resilience of 11,9%, significant in 1%.

Next, columns (4) through (6) in table 2 showed the panel regression before the Covid19 occurred (period 2011 to 2019), with the results being provided. The results are nearly identical from column (1) to column (3); while leaving all other variables constant, an average 1% change in the "within effect" of structural change is associated with a change in the resilience about 0.244%, significant in 5%. By paying great attention, we can observe that some sectors each contribute significantly to the region's resilience. Due to its high export share, particularly in crude oil, natural gas, and coal, the AFH dan Min sector plays a vital role in the robustness of the regional economy in Indonesia. In addition to producing a wide range of other goods, such as sugar, tea, tobacco, copra, and spices, Indonesia is one of the top exporters of cocoa, palm oil, rubber, and coffee. Consequently, productivity will enhance regional resilience under normal circumstances, particularly in the AFH and Min sectors (no shock). While this is happening, the Min sector's job reallocation to its sector and concurrent productivity increase will favor regional resilience. On the other hand, certain services do not contribute to a rise in regional resilience, while others have a constructive effect but are not statistically significant.

Table 2: Panel Regression Result (1)

Dependent Variable: Resistance Index of Resilience						
Independent Variable (Ln Res)	**Without control each Sector**	**With control each Sector**	**With control each Sector & HDI**	**Without control each Sector**	**With control each Sector**	**With control each Sector & HDI**
ln "within effect"	0.285***	0.229***	0.230**	0.280***	0.260***	0.244**
	(0.0588)	(0.0835)	(0.0923)	(0.0623)	(0.0873)	(0.0953)
ln "between effect"	-0.145	-0.179	-0.191	-0.146	-0.149	-0.170
	(0.1213)	(0.1402)	(0.1342)	(0.1327)	(0.1497)	(0.1440)
ln "dynamic effect"	-0.363***	-0.142	-0.0678	-0.376***	-0.140	-0.0451
	(0.0856)	(0.0847)	(0.0837)	(0.0918)	(0.1012)	(0.0995)
hdi3_lag			0.119***			0.117***
			(0.0398)			(0.0399)
cov	-1.211***	-1.771***	-1.701***	No	No	No
	(0.2370)	(0.3977)	(0.4138)			
Years	2011-20	2011-20	2011-20	2011-19	2011-19	2011-19
State effects	Yes	Yes	Yes	Yes	Yes	Yes
Time effects	Yes	Yes	Yes	Yes	Yes	Yes
Clustered standard errors	Yes	Yes	Yes	Yes	Yes	Yes
_cons	-0.155	0.0763	-8.221***	-0.138	0.294	-7.829***
	(0.1042)	(0.2145)	(2.7964)	(0.1102)	(0.2345)	(2.8378)
N	336	334	330	302	300	296
R-sq	0.1731	0.2647	0.2933	0.1665	0.2859	0.3163
adj. R-sq	0.1631	0.1893	0.2171	0.1581	0.2062	0.2361

Robust standard errors in parentheses.
* p<0.1; ** p<0.05; *** p<0.01
Source: Author's calculation. Data retrieved from BPS.

Table 3 shows the cross-sectional regression between structural change and regional resilience during the Covid19 (2020). The strategy is based on (Meng et al., 2022)'s cross-sectional assessment of the regional economic resilience of several Chinese provinces in the face of the Covid19 pandemic. As can be observed from the table, resilience is strongly and negatively associated with the "within effect," but resilience is significantly and positively correlated with the "dynamic effect." Compared to prior regression, the "within effect" shows the opposite relationship to resilience during the Covid19 epidemic than it had before Covid19.

Holding other factors constant, an increase in the "within effect" of structural change of 1 is typically linked with a fall of around 0.141 on the resilience index, significant at 1% level. In other words, during the Covid19 shock, a rise in sector productivity relates to a decrease in resilience. This association may be understood by looking more closely at the various sectors that substantially affect resilience. Some industry will presumably reduce employment as it raises production, maybe by utilizing more effective technologies. On the other hand, it is best to avoid decreasing the workforce during the Covid19 time since it presents a serious resilience issue. Based on the results in table 5, industries like construction and social communities (SC) that are not dependent on cutting-edge technology to increase their productivity have a statistically significant positive "within effect" on resilience.

Additionally, Table 3 demonstrates a substantial positive correlation between "dynamic effect" and resilience. A further modification in the "dynamic effect" of structural change results in an average correlation of 0.393 points on the resilience index, which is significant at the 5% level and controls for other factors. Therefore, to significantly affect resilience during COVID19, it is necessary to take both measures to increase productivity and reallocate labor to more productive sectors simultaneously to build regional resilience during the Covid19 shock.

Only the "dynamic effect" shows a substantial positive link to regional resilience throughout the Covid19 phase, showing that building resilience requires boosting sector productivity and extending employment share to more productive sectors. The increase in productivity shows that the industry may survive despite the shock effect. At the same time, the number of new hires keeps growing, reducing the possibility of unemployment in the industry. Encouragement of the quantity and diversity of occupations available in a region is one strategy that may be used to make it simpler for people to transition from one industry to another. These characteristics concur with (Martin et al., 2016) finding that more varied industrial structures in a regional context are probably more resilience.

Table 3: Cross-Section Regression Result (2)

Dependent Variable: Resistance Index of Resilience			
Independent Variable (Resilience)	**Without control each Sector**	**With control each Sector**	**With control each Sector & HDI**
"Within effect"	-0.0409*	-0.113	-0.141***
	(0.0216)	(0.0786)	(0.0112)
"Between effect"	-0.0804	0.0637	-0.0117
	(0.0709)	(0.1684)	(0.0313)
"Dynamic effect"	-0.148	0.581	0.393**
	(0.1154)	(0.4997)	(0.0685)
hdi3_lag			-0.209**
			(0.0232)
Covid19	Yes	Yes	Yes
Years	2020	2020	2020
State effects	No	No	No
Time effects	No	No	No
Robustness	Yes	Yes	Yes
_cons	-0.0971	10.62	21.23***
	(0.2429)	(5.0137)	(1.4898)
N	34	34	34
R-sq	0.1272	0.9431	0.9992
adj. R-sq	0.0399	0.3743	0.9868

Robust standard errors in parentheses.
* p<0.1; ** p<0.05; *** p<0.01
Source: Author's calculation. Data retrieved from BPS.

3.4. Java Island and Outside Java Island

We investigate whether there is statistical support for the idea that a particular industry plays a significant role in areas with various workforce compositions by dividing the provinces in Java and outside of Java Island. Because Java Island is home to the nation's capital (Jakarta Province) and around 150 million Indonesians, or 60% of the country's population, reside there, there is a distinction between Java and the other islands (Badan Pusat Statistik, 2022). Since Java is home to around 80% of the processing industries, there is a wider variety of workers there (sources from BPS).

Table 4 shows the results of panel regression for Java Island in columns 1 through 3 and outside Java Island in columns 4 through 6. From the result in the table, "between effect" and "dynamic effect" have a major effect on regional resilience on Java Island, but "within effect" is the only factor that significantly affects resilience outside of Java. In Java Island, 1% of a structural change's "between effect" is linked to a 1,486% decline in resilience, significant at 10% level. In comparison, 1% of a change in its "dynamic effect" is linked to a 0,405% change in resilience, significant at 10% level, while holding all factors constant. When all other factors are held constant, a situation outside Java Island that changes by 1% is typically related to a 0.244% change in resilience, which is substantial at 5%. Additionally, there are different result on HDI effect (human development index) between the two groups. When all other parameters are held constant, the HDI has significant correlation on regional resilience outside Java about 0.00117% while in Java Island HDI has no statistically significant effect.

Focusing on locations outside of Java, HDI can be one aspect in imposing regional resilience. This result is consistent with some research, including (Giannakis & Bruggeman, 2017) finding that resilience and regional education levels are highly correlated. Therefore, promoting regional resilience for the area outside of Java may concentrate on raising sectoral production. For the areas on Java Island, increasing sectoral productivity while facilitating workers' movement to other, more productive industries can boost the region's resilience. These characteristics concur with (Martin et al., 2016) finding that more varied industrial structures in each region are probably more resilient. So, it may be advantageous to boost regional resilience to make it easier for people to transition from one industry to another by fostering more varied enterprises.

Table 4: Panel Regression between Java and Outside Java Island

	Java Island			Outside Java Island		
Independent Variable (ln Res)	**Without control each Sector**	**With control each Sector**	**With control each Sector & HDI**	**Without control each Sector**	**With control each Sector**	**With control each Sector & HDI**
ln "within effect"	0.0907	-0.692	-1.170	0.280***	0.260***	0.244**
	(0.0599)	(0.8349)	(1.1788)	(0.0623)	(0.0873)	(0.0953)
ln "between effect"	-0.767	-1.001*	-1.486*	-0.146	-0.149	-0.170
	(0.3913)	(0.4635)	(0.6513)	(0.1327)	(0.1497)	(0.1440)
ln "dynamic effect"	-0.0533	0.404	0.405*	-0.376***	-0.140	-0.0451
	(0.2250)	(0.2750)	(0.1880)	(0.0918)	(0.1012)	(0.0995)
hdi3_lag			0.190			0.117***
			(0.1595)			(0.0399)
Years	2011-19	2011-19	2011-19	2011-19	2011-19	2011-19
State effects	Yes	Yes	Yes	Yes	Yes	Yes
Time effects	Yes	Yes	Yes	Yes	Yes	Yes
Clustered standard errors	Yes	Yes	Yes	Yes	Yes	Yes
_cons	0.111	-0.314	-14.07	-0.138	0.294	-7.829***
	(0.3156)	(2.1849)	(10.0172)	(0.1102)	(0.2345)	(2.8378)
N	54	54	54	302	300	296
R-sq	0.2214	0.7035	0.7410	0.1665	0.2859	0.3163
adj. R-sq	0.1747	0.3168	0.3761	0.1581	0.2062	0.2361

Robust standard errors in parentheses.
* p<0.1; ** p<0.05; *** p<0.01
Source: Author's calculation. Data retrieved from BPS

There are several potential gaps in this study. First off, there is a potential bias since the effect estimates in the model differ between those done before Covid19 using panel data (from 2011 to 2019) and those done during Covid19 using cross sectional regression (using only 2020 data base). Therefore, it is preferable for future study if the data utilized is presented as a panel between non-covid19 (from 2011 to 2019) and during covid (from 2020 to 2022). Second, the potential of adopting a more accurate model (other than the one now being used, namely natural logarithmic), such employing the second order model, third order model, and so on, has not been noticed by the study, it is used to accommodate the possibility of exponential data. Third, to determine whether there is a geographic region effect, the spatial panel regression option can be added as a comparison with the panel regression model in the current study.

Conclusions

According to this study's findings, the pandemic has generally had a negative effect on the regional resilience in Indonesia's provinces (Covid19), and the effect varies among areas due to their different economic structures. The findings highlight that before the Covid19 shock (normal condition), only the "within effect" of structural change exhibited a substantial positive correlation with regional resilience. It implies that, prior to Covid19, rising sectoral production is positively associated with regional resilience.

Min (mining and quarrying) and AFH (agriculture, forestry, hunting, and fishing) sectors have a beneficial influence on regional resilience when individually examining each sector that favourably affects regional resilience prior to Covid19. The "dynamic impact" has a strong positive link with resilience in the Min sector, which means that if productivity levels rise in the Min sector and employment in the sector grows concurrently, regional resilience will rise as well. In the AFH sector, however, both the "within effect" and the "between effect" have a significant positive correlation on regional resilience. This means that, depending on the direction, either increasing the shift in employment shares in the sector or increasing productivity in the AFH sector can help to increase regional economic resilience. It should be highlighted that because most processing is still done manually or with basic technologies, the issues facing Indonesia's agriculture industry are still low-tech (Suprehatin, 2021).

Meanwhile, to boost regional resilience during Covid19, the "dynamic effect" is significantly and has positive correlated to resilience while the "within effect" is significantly and negative correlated to resilience. Meaning, during covid19, it is necessary to increase sectoral productivity and reallocate jobs to this sector (above the productive sectors). It can be said that a worker's ability to switch to a more productive industry in a crisis can increase a region's resilience in a downturn. Laborers will find it simpler to shift occupations during this recession if there are more diversified business sectors accessible in their community. Economic diversity has been shown to affect resilience.

This study intends to construct a collection of facts relating to structural transformation and regional economic resilience that, in our opinion, will help policymakers better understand local economies. It is not intended to resolve questions of causality or circularity. It was discovered that regional disparities in economic structure brought on distinct types of structural change affecting resilience. However, the geographical considerations to cope with the possible autocorrelation have not been used in this work. Because of this, it may be essential for future studies to explore the geographical dependency of structural change and regional resilience.

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Appendix

Appendix 1: Descriptive Statistic

Variable Description	Obs	Mean	Std.Dev.	Min	Max
Resilience Index	336	-.746	55.318	-354.145	496.36
Log of resilience index	336	.013	1.99	-5.193	6.207
Whitin effect structural transformation	336	9.173	16.884	-28.251	143.949
Between static effect of structural transformation	336	2.956	10.025	-46.044	56.675
Dynamic effect of structural transformation	336	-6.202	12.118	-72.145	2.677
Log form of SC1	336	1.701	1.32	-3.631	4.969
Log form of SC2	336	.645	1.555	-3.95	4.037
Log form of SC3	336	.28	1.85	-5.537	4.279
Whitin effect structural transformation					
Agro, Forestry, Hunting and Fishery	336	1.298	1.913	-3.252	14.613
Mining and Quarrying	336	.984	6.444	-26.364	49.091
Manufacturing	336	.824	5.433	-19.318	39.243
Electricity, Gas and Water	334	.014	.214	-.919	1.968
Construction	336	.842	2.489	-14.954	15.105
Trade, Retail restaurants and hotels	336	.826	3.427	-10.868	45.238
Transport, Storage and Communication	336	2.85	11.1	-26.055	100.217
Financing, Real estate, business service	336	.642	3.706	-4.678	57.484
Community social and personal service	336	.894	1.828	-2.528	13.958
Between static effect of structural transformation					
Agro, Forestry,Hunting & Fishery	336	-.268	1.756	-9.464	9.446
Mining and Quarrying	336	-.227	5.07	-45.72	17.982
Manufacturing	336	.641	5.152	-21.023	31.831
Electricity, Gas and Water	334	.051	.243	-.847	1.83
Construction	336	.136	2.35	-10.698	24.511
Trade, Retail restaurants and hotels	336	.43	2.854	-16.678	34.824
Transport, Storage and Communication	336	1.885	8.941	-19.406	83.599
Financing, Real estate, business service	336	.197	2.835	-24.341	37.495
Community social and personal service	336	.112	1.939	-17.666	14.132
Dynamic effect of structural transformation					
Agro, Forestry,Hunting & Fishery	336	-.133	.411	-5.157	.407
Mining and Quarrying	336	-.565	1.509	-13.624	2.731
Manufacturing	336	-.539	1.906	-17.48	.894
Electricity, Gas and Water	334	-.044	.118	-1.251	.022
Construction	336	-.176	.597	-8.645	.636
Trade, Retail restaurants and hotels	336	-.248	2.546	-34.439	.885
Transport, Storage and Communication	336	-4.154	10.484	-69.91	.355
Financing, Real estate, business service	336	-.229	.886	-14.404	.515
Community social and personal service	336	-.114	.391	-4.638	2.006
During covid (1) or not (0)	340	.1	.3	0	1
Human development index	338	68.857	4.391	55.01	80.77
Growth rate	337	4.923	3.382	-15.74	21.76
Name of province	340	17.5	9.825	1	34
The value of export every year	304	437.232	810.699	0	4964.3
HDI with lag 3 year	335	68.828	4.399	55.01	80.77

Appendix 2: Regional Group Division between Java and Outside Java

No	Province	Location
1	Special Capital Region of Jakarta	Java Island
2	West Java	
3	Central Java	
4	Special Region of Yogyakarta	
5	East Java	
6	Banten	
7	Aceh	Outside Java Island
8	North Sumatra	
9	West Sumatra	
10	Riau	
11	Jambi	
12	South Sumatra	
13	Bengkulu	
14	Lampung	
15	Bangka Belitung	
16	Riau Islands	
17	Bali	
18	NTB	
19	NTT	
20	West Kalimantan	
21	Central Kalimantan	
22	South Kalimantan	
23	East Kalimantan	
24	North Kalimantan	
25	North Sulawesi	
26	Central Sulawesi	
27	South Sulawesi	
28	Southeast Sulawesi	
29	Gorontalo	
30	West Sulawesi	
31	Maluku	
32	North Maluku	
33	West Papua	
34	Papua	

Appendix 3: Regional Group Division in 5 Biggest Island

No	Province	Island
1	Aceh	Sumatra
2	North Sumatra	
3	West Sumatra	
4	Riau	
5	Jambi	
6	South Sumatra	
7	Bengkulu	
8	Lampung	
9	Bangka Belitung	
10	Riau Islands	
11	Special Capital Region of Jakarta	Java
12	West Java	
13	Central Java	
14	Special Region of Yogyakarta	
15	East Java	
16	Banten	
17	Bali	
18	NTB	
19	NTT	
20	West Kalimantan	Kalimantan
21	Central Kalimantan	
22	South Kalimantan	
23	East Kalimantan	
24	North Kalimantan	
25	North Sulawesi	Sulawesi
26	Central Sulawesi	
27	South Sulawesi	
28	Southeast Sulawesi	
29	Gorontalo	
30	West Sulawesi	
31	Maluku	
32	North Maluku	
33	West Papua	Papua
34	Papua	

Appendix 4: Panel Regression between Structural Change and Regional Resilience

(Table 2 Explanation)

Dependent Variable: Resistance Index of Resilience						
Independent Variable (ln Res)	**Without control each Sector**	**With control each Sector**	**With control each Sector & HDI**	**Without control each Sector**	**With control each Sector**	**With control each Sector & HDI**
ln "within effect"	0.285***	0.229***	0.230**	0.280***	0.260***	0.244**
	(0.0588)	(0.0835)	(0.0923)	(0.0623)	(0.0873)	(0.0953)
ln "between effect"	-0.145	-0.179	-0.191	-0.146	-0.149	-0.170
	(0.1213)	(0.1402)	(0.1342)	(0.1327)	(0.1497)	(0.1440)
ln "dynamic effect"	-0.363***	-0.142	-0.0678	-0.376***	-0.140	-0.0451
	(0.0856)	(0.0847)	(0.0837)	(0.0918)	(0.1012)	(0.0995)
"Within effect" in EGW Sector		1.147	1.118		0.915	1.010
		(1.0863)	(0.9994)		(1.1173)	(0.9446)
"Between effect" in EGW Sector		1.249	1.107		1.265	1.246
		(1.2682)	(1.1716)		(1.3912)	(1.2133)
"Dynamic effect" in EGW Sector		2.519	1.958		2.708	2.335
		(1.8432)	(1.8435)		(1.7918)	(1.6969)
"Within effect" in TSC Sector		-0.486	-0.492		-0.885*	-1.014**
		(0.3177)	(0.3276)		(0.5167)	(0.4967)
"Between effect" in TSC Sector		-0.474	-0.482		-0.901	-1.038*
		(0.3327)	(0.3440)		(0.5364)	(0.5183)
"Dynamic effect" in TSC Sector		-0.438	-0.444		-0.851	-0.981*
		(0.3199)	(0.3299)		(0.5230)	(0.5034)
"Within effect" in TR Sector		-0.0823	-0.0637		-0.479**	-0.444**
		(0.1115)	(0.1084)		(0.2122)	(0.2032)
"Between effect" in TR Sector		0.0325	0.0290		-0.429*	-0.419*
		(0.1319)	(0.1361)		(0.2377)	(0.2319)
"Dynamic effect" in TR Sector		-0.123	-0.104		-0.542**	-0.510**
		(0.1194)	(0.1202)		(0.2155)	(0.2082)
"Within effect" in Min Sector		0.0153	0.0250*		0.0000352	0.0136
		(0.0097)	(0.0144)		(0.0165)	(0.0207)
"Between effect" in Min Sector		-0.00472	0.0123		-0.0408	-0.0245
		(0.0274)	(0.0266)		(0.0344)	(0.0349)
"Dynamic effect" in Min Sector		0.123*	0.165**		0.135*	0.188**
		(0.0628)	(0.0698)		(0.0738)	(0.0837)
"Within effect" in Man Sector		0.00104	-0.00492		-0.0213	-0.0153
		(0.0355)	(0.0338)		(0.0589)	(0.0522)
"Between effect" in Man Sector		-0.0166	-0.0226		-0.0354	-0.0253
		(0.0338)	(0.0373)		(0.0607)	(0.0600)
"Dynamic effect" in Man Sector		0.0757	0.0809		0.0390	0.0311
		(0.0637)	(0.0590)		(0.0810)	(0.0770)
"Within effect" in FR Sector		-0.0534	-0.0447		0.307	0.340
		(0.1382)	(0.1579)		(0.2252)	(0.2455)
"Between effect" in FR Sector		0.00217	0.0287		0.331*	0.372*
		(0.1291)	(0.1434)		(0.1931)	(0.2056)
"Dynamic effect" in FR Sector		-0.388**	-0.384*		0.0881	0.155
		(0.1905)	(0.2207)		(0.3011)	(0.3444)
"Within effect" in Construction Sector		0.000682	0.00432		0.170	0.149
		(0.1110)	(0.1129)		(0.1750)	(0.1611)
"Between effect" in Construction Sector		-0.0475	-0.0348		0.133	0.115
		(0.1165)	(0.1161)		(0.1818)	(0.1655)
"Dynamic effect" in Construction Sector		-0.168	-0.0835		-0.0533	-0.0129
		(0.2796)	(0.2768)		(0.3099)	(0.2926)
"Within effect" in CS Sector		0.252	0.260		0.346	0.408**

		(0.2005)	(0.1758)		(0.2358)	(0.1877)
"Between effect" in CS Sector		0.171	0.174		0.252	0.291*
		(0.1895)	(0.1691)		(0.2010)	(0.1684)
"Dynamic effect" in CS Sector		0.767	0.537		0.993**	0.840
		(0.5415)	(0.5843)		(0.4880)	(0.5222)
"Within effect" in AFH Sector		0.249***	0.251***		0.395***	0.413***
		(0.0898)	(0.0790)		(0.1268)	(0.1142)
"Between effect" in AFH Sector		0.301***	0.283***		0.429***	0.411***
		(0.0807)	(0.0749)		(0.1098)	(0.0990)
"Dynamic effect" in AFH Sector		-0.104	-0.171		0.307	0.235
		(0.2327)	(0.2164)		(0.3399)	(0.2966)
hdi3_lag			0.119***			0.117***
			(0.0398)			(0.0399)
cov	-1.211***	-1.771***	-1.701***	No	No	No
	(0.2370)	(0.3977)	(0.4138)			
Years	2011-20	2011-20	2011-20	2011-19	2011-19	2011-19
State effects	Yes	Yes	Yes	Yes	Yes	Yes
Time effects	Yes	Yes	Yes	Yes	Yes	Yes
Clustered standard errors	Yes	Yes	Yes	Yes	Yes	Yes
_cons	-0.155	0.0763	-8.221***	-0.138	0.294	-7.829***
	(0.1042)	(0.2145)	(2.7964)	(0.1102)	(0.2345)	(2.8378)
N	336	334	330	302	300	296
R-sq	0.1731	0.2647	0.2933	0.1665	0.2859	0.3163
adj. R-sq	0.1631	0.1893	0.2171	0.1581	0.2062	0.2361

Robust standard errors in parentheses.

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Source: Author's calculation. Data retrieved from BPS.

Appendix 5: Cross-Section Correlation between Structural Change and Regional Resilience during Covid19 Outbreak (Table 3 Explanation)

Dependent Variable: Resistance Index of Resilience (Res)			
Independent Variable	**Without control each Sector**	**With control each Sector**	**With control each Sector & HDI**
"Within effect"	-0.0409*	-0.113	-0.141***
	(0.0216)	(0.0786)	(0.0112)
"Between effect"	-0.0804	0.0637	-0.0117
	(0.0709)	(0.1684)	(0.0313)
"Dynamic effect"	-0.148	0.581	0.393**
	(0.1154)	(0.4997)	(0.0685)
ln "Within effect" in EGW Sector		0.845	0.656
		(1.0990)	(0.2490)
ln "Between effect" in EGW Sector		-0.409	-1.041**
		(0.9809)	(0.1391)
ln "Dynamic effect" in EGW Sector		-0.0887	0.196
		(0.9272)	(0.1367)
ln "Within effect" in TSC Sector		-1.169	-0.349
		(1.5133)	(0.2569)
ln "Between effect" in TSC Sector		-0.409	0.465
		(1.5289)	(0.2357)
ln "Dynamic effect" in TSC Sector		0.671	-0.172
		(1.5840)	(0.2250)
ln "Within effect" in TR Sector		-0.486	-0.232
		(1.4467)	(0.1434)
ln "Between effect" in TR Sector		0.498	-0.175
		(2.2592)	(0.2952)
ln "Dynamic effect" in TR Sector		-0.624	-0.237
		(2.0323)	(0.2517)
ln "Within effect" in Min Sector		-0.640	-0.842***
		(0.5562)	(0.0743)
ln "Between effect" in Min Sector		-0.600	-0.542**
		(0.5715)	(0.0740)
ln "Dynamic effect" in Min Sector		0.615	0.711**
		(0.6225)	(0.0723)
ln "Within effect" in Man Sector		-1.564	-0.590*
		(0.9722)	(0.1763)
ln "Between effect" in Man Sector		-1.871	-1.260**
		(1.2830)	(0.2857)
ln "Dynamic effect" in Man Sector		1.971	0.991*
		(1.2234)	(0.2485)
ln "Within effect" in FR Sector		-4.215	-3.588**
		(1.9634)	(0.3736)
ln "Between effect" in FR Sector		-3.275	-3.027***
		(1.5481)	(0.2677)
ln "Dynamic effect" in FR Sector		3.889	3.420***
		(1.7876)	(0.3199)
ln "Within effect" in Construction Sector		3.657*	2.175**
		(1.4896)	(0.2805)
ln "Between effect" in Construction Sector		5.711*	4.388***
		(2.3615)	(0.3987)
ln "Dynamic effect" in Construction Sector		-4.290*	-2.743**
		(1.7883)	(0.3211)
ln "Within effect" in CS Sector		0.122	0.889**
		(1.1440)	(0.1339)
ln "Between effect" in CS Sector		1.229	1.642***
		(1.2877)	(0.1585)
ln "Dynamic effect" in CS Sector		-0.690	-1.323**
		(1.2625)	(0.1441)
ln "Within effect" in AFH Sector		-2.429	-2.267***
		(1.2685)	(0.2184)
ln "Between effect" in AFH Sector		-1.930	-1.730***
		(0.9977)	(0.1622)
ln "Dynamic effect" in AFH Sector		2.579	2.388***
		(1.2501)	(0.2045)

Years	2020	2020	2020
State effects	No	No	No
Time effects	No	No	No
Robustness	Yes	Yes	Yes
_cons	-0.0971	10.62	21.23***
	(0.2429)	(5.0137)	(1.4898)
N	34	34	34
R-sq	0.1272	0.9431	0.9992
adj. R-sq	0.0399	0.3743	0.9868

Robust standard errors in parentheses.

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Source: Author's calculation. Data retrieved from BPS.

Appendix 6: Panel Regression between Structural Change and Regional Resilience in Java and Outside Java Island (Table 4 Explanation)

	Java Island			Outside Java Island		
Dependent Var (ln Res)	**Without control each Sector**	**With control each Sector**	**With control each Sector & HDI**	**Without control each Sector**	**With control each Sector**	**With control each Sector & HDI**
ln "within effect"	0.0907	-0.692	-1.170	0.280***	0.260***	0.244**
	(0.0599)	(0.8349)	(1.1788)	(0.0623)	(0.0873)	(0.0953)
ln "between effect"	-0.767	-1.001*	-1.486*	-0.146	-0.149	-0.170
	(0.3913)	(0.4635)	(0.6513)	(0.1327)	(0.1497)	(0.1440)
ln "dynamic effect"	-0.0533	0.404	0.405*	-0.376***	-0.140	-0.0451
	(0.2250)	(0.2750)	(0.1880)	(0.0918)	(0.1012)	(0.0995)
ln "Within effect" in EGW Sector		-6.954	-9.174		0.915	1.010
		(5.9401)	(7.3883)		(1.1173)	(0.9446)
ln "Between effect" in EGW Sector		-8.170	-10.39		1.265	1.246
		(7.0433)	(8.1549)		(1.3912)	(1.2133)
ln "Dynamic effect" in EGW Sector		-5.689	-10.53		2.708	2.335
		(8.1018)	(8.3218)		(1.7918)	(1.6969)
ln "Within effect" in TSC Sector		0.0381	2.021		-0.885*	-1.014**
		(2.7400)	(3.8623)		(0.5167)	(0.4967)
ln "Between effect" in TSC Sector		0.271	2.364		-0.901	-1.038*
		(2.8694)	(4.0525)		(0.5364)	(0.5183)
ln "Dynamic effect" in TSC Sector		0.162	2.132		-0.851	-0.981*
		(2.7753)	(3.8913)		(0.5230)	(0.5034)
ln "Within effect" in TR Sector		1.165	1.015		-0.479**	-0.444**
		(0.6068)	(0.5230)		(0.2122)	(0.2032)
ln "Between effect" in TR Sector		0.581	0.123		-0.429*	-0.419*
		(0.8974)	(0.9878)		(0.2377)	(0.2319)
ln "Dynamic effect" in TR Sector		6.600	10.71**		-0.542**	-0.510**
		(4.5006)	(3.3568)		(0.2155)	(0.2082)
ln "Within effect" in Min Sector		2.202	2.111		0.0000352	0.0136
		(1.9042)	(1.8854)		(0.0165)	(0.0207)
ln "Between effect" in Min Sector		-0.975	-1.633		-0.0408	-0.0245
		(1.7002)	(1.8310)		(0.0344)	(0.0349)
ln "Dynamic effect" in Min Sector		9.120**	9.888**		0.135*	0.188**
		(2.7327)	(2.9128)		(0.0738)	(0.0837)
ln "Within effect" in Man Sector		-1.487	-1.990		-0.0213	-0.0153
		(1.1832)	(1.4675)		(0.0589)	(0.0522)
ln "Between effect" in Man Sector		-0.404	-0.452		-0.0354	-0.0253
		(0.7468)	(0.8096)		(0.0607)	(0.0600)
ln "Dynamic effect" in Man Sector		-1.370	-1.093		0.0390	0.0311
		(2.5882)	(2.3600)		(0.0810)	(0.0770)
ln "Within effect" in FR Sector		-0.717	-1.505		0.307	0.340
		(1.2786)	(1.9537)		(0.2252)	(0.2455)
ln "Between effect" in FR Sector		-0.386	-0.949		0.331*	0.372*
		(1.4728)	(2.0718)		(0.1931)	(0.2056)
ln "Dynamic effect" in FR Sector		0.950	0.282		0.0881	0.155
		(0.9646)	(0.9228)		(0.3011)	(0.3444)
ln "Within effect" in Construction Sector		0.252	0.524		0.170	0.149
		(2.4712)	(2.9425)		(0.1750)	(0.1611)
ln "Between effect" in Construction Sector		-0.454	-0.374		0.133	0.115
		(2.4219)	(2.7480)		(0.1818)	(0.1655)
ln "Dynamic effect" in Construction Sector		-5.464	-4.984		-0.0533	-0.0129
		(2.8410)	(2.8196)		(0.3099)	(0.2926)
ln "Within effect" in CS Sector		2.771	3.476*		0.346	0.408**
		(1.5033)	(1.4988)		(0.2358)	(0.1877)
ln "Between effect" in CS Sector		3.953**	4.940**		0.252	0.291*
		(1.2114)	(1.6197)		(0.2010)	(0.1684)
ln "Dynamic effect" in CS Sector		-6.524	-7.780		0.993**	0.840
		(5.1535)	(5.5556)		(0.4880)	(0.5222)
ln "Within effect" in AFH Sector		-0.621	-1.544		0.395***	0.413***
		(1.5929)	(1.9190)		(0.1268)	(0.1142)

ln "Within effect" in AFH Sector		-0.621	-1.544		0.395***	0.413***
		(1.5929)	(1.9190)		(0.1268)	(0.1142)
ln "Between effect" in AFH Sector		1.592	2.415		0.429***	0.411***
		(2.3294)	(3.1803)		(0.1098)	(0.0990)
ln "Dynamic effect" in AFH Sector		0.626	-5.789		0.307	0.235
		(6.9821)	(10.4387)		(0.3399)	(0.2966)
hdi3_lag			0.190			0.117***
			(0.1595)			(0.0399)
Years	2011-19	2011-19	2011-19	2011-19	2011-19	2011-19
State effects	Yes	Yes	Yes	Yes	Yes	Yes
Time effects	Yes	Yes	Yes	Yes	Yes	Yes
Clustered standard errors	Yes	Yes	Yes	Yes	Yes	Yes
_cons	0.111	-0.314	-14.07	-0.138	0.294	-7.829***
	(0.3156)	(2.1849)	(10.0172)	(0.1102)	(0.2345)	(2.8378)
N	54	54	54	302	300	296
R-sq	0.2214	0.7035	0.7410	0.1665	0.2859	0.3163
adj. R-sq	0.1747	0.3168	0.3761	0.1581	0.2062	0.2361

Robust standard errors in parentheses.

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

Source: Author's calculation. Data retrieved from BPS.