THE POTENTIAL ECONOMIC LOSS OF 1965-66 COMMUNIST MASSACRE: LESSONS FROM CENTRAL JAVA AND EAST JAVA

A Thesis

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by

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ABSTRACT

The 1965-66 communist massacre is a sensitive and traumatic issue in Indonesia until today. The issue is covered under the September 30th, 1965 movement shadow, which is recognized as one of Indonesia's failed *coup d'état* attempts since the independence era. Approximately 500,000 deaths are estimated from this massacre, especially in Java, Bali, and North Sumatra. This research focuses on what happens to regional economic loss because of the 1965-66 communist massacre. I use the deterministic interpolation method from Indonesia census data to estimate the number of victims in 1965-66 communist massacres at the regency/city level and then use it to determine the impact of the 1965-66 communist massacre on economic performance from especially in the manufacturing sector by using Indonesia annual manufacturing survey data. By focusing the study on the two most significant sources of the communist base in the 1960s, Central Java and East Java, and using 2SLS regression estimation, I found that there is a positive relationship between population loss in 1965-66 communist massacre and regional economic loss, and the impact is even more significant when the new-order regime was still in power. Total potential output loss from 1965-66 communist massacre in Central Java and East Java for 27 years (from 1988-2015) are estimated up to 1.188 trillion USD (constant value 2010). We also find that the 1965-66 estimated population loss only spatially clustered Central Java, while 1988-2015 potential economic loss is spatially random in Central Java and East Java.

Keywords: communist, massacre, regional, economic, spatial

BIOGRAPHICAL SKETCH

Muhammad Hazmi Ash-Shidqi was born in Tuban, Indonesia on June 17th, 1994. He spent his childhood time in Tuban until he finished middle school. He went to Surabaya to attend high school at SMAN 5 Surabaya before joining Economics major at the University of Indonesia in 2012. After completing his undergraduate study, Hazmi went to Macroeconomics, Trade, and Investment (MTI) Division in The World Bank Jakarta to work as a research assistant until June 2019. In August 2019, Hazmi went to Cornell University to join the master program in Regional Science.

Hazmi works on various topics of economic research since he finished his undergraduate study. Most of his works are related to the trade and investment research he conducted with his team at the World Bank Jakarta. However, he found his research interest in development economics and regional economics, especially related to Indonesia's economic history, when he explored a research topic for his thesis at the Cornell University. Hazmi aspires to continue studying at the Ph.D. level to do more profound and extensive research about Indonesia's economic development and economic history.

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I would like to express my gratitude to my mother and my brother back to Indonesia, who give full support that I have received throughout my study at Cornell University. This thesis is also a special gift for my late father, who passed away while I am in the middle of my study at Cornell University. My late father was the person who always pushes me to get the best education and fully support me to join research and academic work. Although my father cannot support me until the end of my master study, he was one of my strongest reasons to finish my study until master level, and hopefully, I can fulfill one of his final wishes to join and finish my doctoral study.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1:
INTRODUCTION

The Communist and September 30th, 1965 movement is still a sensitive issue to be discussed in Indonesia. The September 30th, 1965 movement, which is usually called a 'fail-coup d'état' movement by the New Order government under President Suharto, which held power from 1966 until 1998, is still wired a collective memory of Indonesian until today. The failed coup become the best reason to eliminate Indonesia's Communist Party (Partai Komunis Indonesia or PKI) existence, which becomes the army's main rival at Sukarno's government from Indonesia (Feith, 1964). A bigger phenomenon called the 1965-66 communist massacre came right after the September 30th, 1965 movement, and it is usually ignored from official and semiofficial accounts such as the National History of Indonesia and the so-called "White Book" on the 1965 coup (Cribb, 2002). The 1965-66 communist massacre is also categorized as the largest and swiftest, yet least examined, instance of mass killing in the twentieth century (Robinson, 2018). The study about 1965-66 is limited, and even there is a fewer study conducted about the impact of the 1965-66 communist massacre since not all data is fully unclassified. However, with those all limitation, in this study, we try to estimate the economic impact of the 1965-66 communist massacre, especially in East Java and Central Java.

There are studies conducted by (Chandra 2017), (Chandra 2019a), and (Chandra 2019b) that estimated the number of 1965-66 killings, victims in regency/city level in two provinces, East Java and Central Java. East Java and Central Java were the two biggest communist bases for PKI, besides Bali (Chandra, 2019). These studies are conducted by using a deterministic demographic technique in East Java and Central Java. It also conducted a spatial analysis of communist massacre victims by using main road connectivity in East Java (Chandra, 2019a). Thus, we may obtain a more reliable number of 1965-66 killings, victims in each regency/city in East Java and Central Java from these researches. We also know the spatial distribution of 1965-66 killings victims in each regency/city. A previous study conducted by (Seerneels and Verpoorten 2015) and (Staines 2004) shows there is a negative relationship between conflict and massacre to the economic performance, especially in African countries. By using these new and important findings by

(Chandra 2017), (Chandra 2019a), and (Chandra 2019b) and study about the massacre and economic performance by (Seerneels and Verpoorten 2015) and (Staines 2004) as our literature, we made further analysis of estimated communist massacre to the regional economic performance. We conducted the study at the regency/city level in East Java and Central Java, two main communist bases for PKI in Java, even in Indonesia.

A study from Van Zanden said Indonesia's economy in the first 20 years after the independence is called the lost decades period, a transition from colony to a nation-state. Moreover, after the government regime transfer to Suharto as the second president, Indonesia was one of the fastest-growing economies globally, which substantially narrowed the gap with the rest of the world economy. By all standards, between 1967 and 1997, growth was remarkably rapid: Indonesia's GDP and GDP per capita increased 6.8 and 4.6 percent annually, respectively. Indonesia's growth was much faster than its market access (defined by its weighted export markets), indicating a significant improvement in its international competitiveness. Indonesia's achievement is considered impressive if we consider its initial condition from a comparative perspective (Van Zanden 2010)[1].

Nevertheless, our study suggested that behind the impressive national economic performance, some regions, especially in East Java and Central Java, may not reach their full potential to gain economic performance because of the 1965-66 communist massacre and the political approach related to 1965-66 communist massacre. In this study, we find a negative impact of the 1965-66 communist massacre on regional economic performance even though the rapid growth of national economic performance, especially in Central Java and East Java, were the two strongest regions supporting PKI.

From our estimation, we may infer that on average, an additional 1% of 1965-66 communist massacre will lower 2.85% labor participation, 2.35% labor productivity, 1.47% of output, and 2.49% of value-added annually in the 1988-2015 manufacturing sector in Central Java and East

[1] The (Van Zanden 2010) study use data from Maddison Historical Statistics (https://www.rug.nl/ggdc/historicaldevelopment/maddison/)

Java. It is estimated that for 27 years, there is potential manufacturing output loss from this massacre up to 10,799 trillion IDR or 1.188 trillion USD (both values are constant value 2010).

We also investigate the spatial pattern of both estimated percentage population loss by the 1965-66 communist massacre and estimated socio-economic loss (especially output and labor) in this study. We found that there are differences in spatial patterns between these variables. There is a spatial clustered indication in Central Java for estimated percentage population loss, while in East Java, we cannot find a spatial cluster of the percentage of population loss because of the 1965-66 communist massacre. These spatial pattern findings are related to how the army forces deployed in each region. While for potential economic loss, we find no spatial clustered patterns of socio-economic loss in East Java and Central Java. However, we find that the cities are relatively hit harder than regencies in Central Java and East Java.

In sum, this study shows that the 1965-66 communist massacre brought potential regional economic loss, especially for the manufacturing sector in Central Java and East Java that became the two most hit regions by the 1965-66 communist massacre. This study contributes to the empirical study about the impact of the 1965-66 communist massacre and its aftermath. The literature about the 1965-66 communist massacre is limited since most of the literature focuses on the September 30th movement. From the limited literature, most of them, such as (Chandra 2017) and (Robinson 2018), focus on the number of victims in the massacre itself or the discrimination related to the discrimination of ex-communist family members Pohlman, A. (2016). This study takes a further consequence of the 1965-66 massacre; it shows the relationship between the massacre and regional economic loss. Hence, this study might also trigger other studies to examine the systemic consequences of the 1965-66 massacre to regional socio-economic conditions in East Java and Central Java even for national level for future studies.

The remainder of the study is organized as follows. Section 2 discusses the historical background from early Indonesian independence until the end of Sukarno's regime, which was related to the 1965-66 communist massacre, and Section 3 describes the data and methodology used in this

study. Section 4 examines the 1965-66 communist massacre's impact on regional economic loss and spatial analysis. Section 5 concludes.

CHAPTER 2:
HISTORICAL BACKGROUND

Indonesia General History (1945-1966)

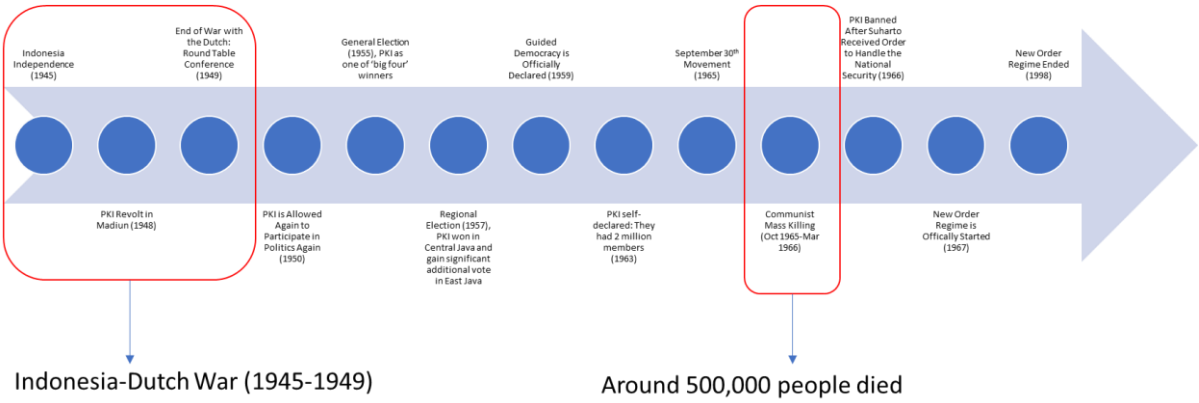

Figure 1: The General Modern Indonesia History Timeline Since Its Independence
Source: Ricklefs, M. C. (2008). A History of Modern Indonesia since c. 1200

The first two decades after Indonesia's independence were the most volatile times in modern Indonesian history. The four-year with the Dutch was the beginning of the series, and it ends with the fall of Sukarno's Presidency. These also the only period where the Indonesian communist party (PKI) was alive in modern Indonesian history. In this period, PKI was doing revolt (1948), declared as a forbidden party until 1950, permitted to join the politics again in 1950, become "top-four party winners" in general election 1955, become the biggest communist party outside China and U.S.S.R in 1963, and finally accused to be the main actor of September 30th coup and declared once again as a forbidden party until today. PKI was one of the essential parties in the first 20 years of Indonesia's independence. Their impressive win in the general election in 1955 and even getting more votes in the regional election in 1957 indicates that more people were interested in the idea and action offered by PKI. PKI's strongest basis based on the general election in 1955 and the regional election in 1957 was in two provinces in Java, Central Java, and East Java. In this chapter, we may see Indonesia's historical timeline focusing on the first twenty years of Indonesia's independence and the role of PKI in the particular period.

Indonesia Early Independence (1945-1959)

Indonesia is a newly formed country based on a Dutch colony named Dutch East Indies. Indonesia is a multi-ethnic country that officially was built under Dutch rule on January 1st, 1800, after *Vereenigde Oostindische Compagnie* (VOC), or Dutch East Indies Company, went bankrupt and handed over all their colony to the Dutch government. After being colonized by Dutch until 1942, Indonesia was under the Japanese empire since the Dutch did unconditional surrender in March 1942 until the end of World War 2 in the Asia Pacific on August 15th, 1942. Two days later, Indonesia declared its independence on August 17th, 1945, in the name of Sukarno and Hatta, who elected as the first president and vice president of Republic Indonesia. However, Indonesia must struggle facing war with the Dutch until four years later, which try to colonialize Indonesia again. Finally, the Dutch acknowledged Indonesia's independence on December 27th, 1949 on Round Table Conference, ending the war between these two countries.

After Dutch-Indonesian Round Table Conference, Indonesia faced a peace period for a while. However, various challenges arise both from inside and outside of the country. In the 1950's decade, there are many changes in Indonesia: Indonesia changes the governmental system from a federal to a unitary country in less than a year (December 1949-August 1950). There were eight cabinets in less than ten years in the Indonesian parliamentary system. Indonesia paid 960 million US$ from 1.13 billion US$ debt of Dutch East Indies debt as Round Table Conference deal, 1955 general election, and 1957 regional election, nationalization of all Dutch companies in Indonesia in 1957-1958, there is some local revolt such as *Darul Islam* revolt in West Java which insists on creating an Indonesia Islamic country and many others.

The various phenomenon in the 1950s brought instability to Indonesia, and Sukarno tried to end this instability. First, he created a cabinet under the non-party politician Djuanda Kartawidjaja (1911–63) as a Prime Minister. Djuanda had been in almost every cabinet since 1945. He was respected as an able and sensible man with an understanding of economics (Ricklefs, 2008). After all national instability and the failure of the Constitution Assembly to reach a deal between all parties to create a new constitution, on June 29th, 1959, Sukarno decided to adopt General

Nasution's proposal to dissolve the Constitution Assembly, aback to a presidential system and restored the old 1945 constitution. On July 5th, 1959, Sukarno declared a presidential decree and officially started a new era for Indonesia called the "Guided Democracy" era; however, whether Presidential Decree violates the Constitution, no one effectively brave enough opposed President Sukarno decision since he also got full support from Indonesia military.

With all of the instability, both for the economy and social-politic view, the 1955 general election and 1957 regional election were considered a success and big achievement for Indonesia (Ricklefs, 2008). In the 1955 general election, people chose People Representative (DPR) and Constitution Assembly (Konstituante), while in the 1957 regional general election, people choose regional people representative (DPRD). There are more than 20 parties that had a seat in DPR. However, 78% of the seat are dominated by the big four parties, Indonesia National Party (Partai Nasionalis Indonesia or PNI) with 22.3% seats, Council of Indonesian Muslim Associations Party (Masyumi) with 20.9% seats, Revival of the Ulama Party (Nahdlatul Ulama or NU), with 18.4%, and Indonesia Communist Party (Partai Komunis Indonesia or PKI) with 16.4%. PNI, PKI, and NU got most of their vote from Java, while Masyumi only got 51% of their vote from Java (Feith, 2006). However, none of these four parties exists today. The 1955 general election is considered the most democratic election which Indonesia has until today.

Indonesia Guided Democracy (1959-1966)

The new era started with Presidential Decree on July 5th, 1959. President Sukarno announced a new system called "Guided Democracy." Sukarno was impressed with the progress and political stability created by Mao Zedong in China. He believed that 'democracy under strong leadership guidance' will bring stability and order. Thus, the country will have a stable condition and may achieve its goals efficiently. Under Guided Democracy, all opposed parties are banished. The press was limited and must follow government protocol. Two parties that opposed Sukarno, Masyumi and Indonesia Socialist Party (PSI), were abolished later. The other party was careful to express their opinion. At the same time, Sukarno's Party, PNI, and PKI were 100% support Sukarno's decision. NU was split, although those who opposed Sukarno did not express their opinion in

public. With these three big parties left, Sukarno had a big idea to unite Nationalist, Communist, and Religious force into unity, which is later called Nasakom as an abbreviation of Nasionalis (Nationalist), Agama (Religious), and Komunis (Communist). Nasakom later became an ideology in the Guided Democracy era.

In reality, using Nasakom ideology did not merely make Indonesia united under the Guided Democracy era. While supporting Sukarno, PKI got access to the executive branch and also have the opportunity to gain a bigger mass. However, a bigger communist mass was disliked by many groups, including Indonesia's army and some religious groups, including some parts of NU. For example, some conflicts happened in East Java when the communist party tried to apply Agrarian law by force. The casualties could not be avoided. PKI has associated themselves with progressive and modern movements and, on many occasions, were willing to do physical conflicts to apply their progressive ideology to society.

In July 1962, PKI's peasant front (BTI) claimed 5.7 million members, one-quarter of all adult peasants. Later in the year, SOBSI claimed nearly 3.3 million members. Early in 1963, the youth front *Pemuda Rakyat* and Gerwani (*Gerakan Wanita Indonesia*, Indonesian Women's Movement, established 1954) each claimed 1.5 million members. PKI itself claimed over 2 million members by the end of 1962, making it the largest Communist party in any non-Communist nation. The PKI intellectuals' front Lekra claimed 100,000 members in May 1963 and promoted a bitter attack on its opponents' 'bourgeois' mentality in intellectual circles. By1965, PKI was the third biggest communist party in the world, behind Soviet Union Communist Party and China Communist Party.

PKI's resurrection in the 1955 general election and become the top-four party in parliament was a big surprise for many people and groups. PKI had a negative track record with revolt and rebellion. In 1926, they created the first big revolt against the Dutch East Indies government. Soon after, their party was banned until Indonesia's independence in 1945, and their leader was exiled either in Boven Digul, Papua, which is known as the worst political prison in the Dutch East Indies era or exiled to other countries. In 1948, PKI created a rebellion against Indonesia's government since

they were disappointed with Indonesia's government war with the Dutch and established a new country in Madiun. It was an extra effort for Indonesia's government in that particular time since Indonesia was still at war with the Dutch. However, PKI's rebellion is quickly defeated, and their leader was executed this time. PKI just revive after Indonesia's government gave another chance in 1950. PKI has a young leader at the time. With Dipa Nusantara Aidit (or usually called D.N. Aidit) as their leader, they transform the previously forbidden party full of a negative track record to the top four of the general election seats in 1955. However, although PKI has an enormous number of seats with those negative records, and it is crucial to decide a winning coalition, PKI was not given a ministry seat. When Sukarno starts the Guided Democracy and PKI gave 100% support to Sukarno, PKI is given some important positions, but still, there is no seat in the executive branch, such as the ministry level.

In the 1960s, two groups rose and were very close to Sukarno and his nationalist forces, the military group and the communist group (PKI). These two groups try to get Sukarno's full attention, and these two forces did not have a good relationship. Presidential decree on July 5th, 1959, and martial law application until 1963 came from army initiative. At the same time, Land Reform Law was mainly initiated by PKI. These forces, including the religious side, are consolidated under Sukarno's ideology, Nasakom. However, a closer tie between Sukarno and Eastern-bloc countries in the 1960s brought many advantages to PKI. Since Sukarno never officially appoints a successor, the military and PKI were trying hard to show their loyalty to Sukarno to get Sukarno's full support.

Sukarno never officially appointed anyone as his successor, even until the end of his regime. The Guided Democracy system, which was centralized in Sukarno, and Sukarno was appointed as president for life by the temporary house of assembly in 1963. Everyone near Sukarno was trying so hard to get his best attention, so Sukarno will appoint him/her when there is a succession of power. In the first week of August 1965, a phenomenon created massive speculation for Indonesian politics, especially two main forces who support Sukarno, the army and PKI. In that time, Sukarno suddenly vomited and collapsed while receiving a delegation. He soon recovered,

but the intrigues now went into high gear as the president's mortality was forcibly impressed upon political leaders.

30th September Movement and Aftermath

The nation's social, political, and economic structures were now near to collapse at that time. The economy never became a priority in the Guided Democracy regime. Inflation was extreme, with prices rising at something like 500 % for the year. By the end of 1965, the price of rice was believed to be rising at an annual rate of 900 %. In the cities, towns, and villages, communists and anti-communists believed stories of assassination squads were prepared and lists of victims drawn up. Prophesies, omens, and violence spread among the people. In September 1965, there was a rumor about the General Council, which was believed by PKI that consisted of a top-rank army officer and want to overthrow the government. By late September, with tens of thousands of troops gathering in Jakarta in preparation for Armed Forces Day on October 5th, expectations of a coup were high. On September 27th, General Ahmad Yani finally announced that the army opposed creating a 'fifth force' or Nasakomisation of the military in any structural sense (Rickfles, 2008).

Some people affiliated with PKI had the initiative to prevent that by kidnapping some top-rank army officers on September 30th, 1965, and finally, murder them the next day. It created national chaos. On October 1st, 1965, PKI announced on some radio that they successfully save the president and prevent the General Council movement, so they were in Presidential Palace holding power. However, it is seen as treachery and rebellion from the army side. Since the army has better weaponry, they easily crushed the communist troops, and it became the beginning of the communist's end in Indonesia.

On September 30th–October 1st, 1965, the tensions were released by an ill-planned coup attempt in Jakarta. House of cards came prematurely crashing down. What happened on that night and the following days is reasonably straightforward. Nevertheless, complicated and sometimes partisan arguments continue over who masterminded the events and what maneuvers lay behind them. The intricacies of the political scene, the contacts, friendships, and hatreds that linked most of the

major participants to one another, and the suspect nature of much of the evidence make it unlikely that the whole truth will ever be known. It seems improbable that there was a single mastermind controlling all the events, and interpretations that attempt to explain events solely in terms of a PKI, army, Sukarno, or Suharto plot must be treated with caution (Rickfles, 2008).

It was months before the consequences were clear, but on that night, the balance of hostile forces which underlay guided democracy came to an end. After the September 30th movement by PKI, it is viewed by PKI's enemy as the best opportunity to shut the communist party down. Since the army easily wins from the communist troop and taking control nationally, they create propaganda that PKI becomes a national traitor and must be banished from Indonesia. Soon after that, until 1966, there was a massacre of communist mass in Indonesia. After Sukarno gives March 11th Order (Super Semar), the action got legal legitimation, which asked General Suharto as army leader to take any important and necessary action to bring security and stability to Indonesia. A few days later, PKI and communist ideology are forbidden in Indonesia. It also becomes the beginning of a new era since the executive branch is now are controlled under Suharto, and one and a half years later, Sukarno officially step down from the Presidency.

Many political observers have seen tragedy in the period, especially the tragedy of Sukarno, the man who outlived his time and used his popular support to maintain a regime of grand corruption and hypocrisy. The following phenomenon was extremely terrible. PKI was declared as the main culprit of an ill-planned coup attempt. Then, it was the best reason to eliminate PKI. The army got its full power to captured, prisoned, and even killed those suspected as communist people or just communist sympathizers. It led to the 1965-66 communist massacre, the largest and swiftest yet least examined instances of mass killing in the twentieth century (Robinson, 2018). Central Java, East Java, and Bali became the three most hit regions since these provinces were the biggest communist bases in Indonesia.

Banning communist ideology is not a smooth transition for Indonesia. It is estimated that between 100,000 until 2,000,000 communist people are eradicated between 1965 until 1966. The four most

affected region was Central Java, East Java, Bali, and North Sumatera since these provinces are the main based of PKI's vote.

The failed coup attempt on September 30th, 1965 has a systemic impact on Indonesia's political condition. The army under General Suharto was pictured as a national hero since they were considered to successfully exterminate the coup and maintain security with 'secured' those communist people and their sympathizers. Sukarno lost his power and charisma incrementally since he was considered does not to have a firm decision on PKI, and Indonesia's economy was getting worse. Indonesia's economy was effectively in hyperinflation (more than 100% annual inflation) since the end of 1961.

Although President Sukarno was asking everyone not to judge the PKI until the official investigation result is conducted, the massacre of those suspected as PKI and their affiliated organization cadres and the communist sympathizer is unavoidable. Many people were going to prison without getting a proper trial. Many of these prisoners who still survived were moved to Buru Island, a remote island in the eastern part of Indonesia. They were then released after Indonesia getting a warning by an international organization around 1978-1979.

The high rank of PKI officials was killed when the army captured them, just like PKI leader D.N. Aidit, getting a military trial and either getting a death sentence such as Njoto or a life prison sentence such as Syam Kamaruzzaman. Some PKI officials (both high and lower rank) escaped from the 1965-1966 massacre. However, since there is no more protection from Sukarno and the army's effective control of the Indonesian government since March 11th, 1966, many of them are captured in their hiding. The last big survival attempt of PKI officials was located in South Blitar, East Java, in 1968. Around two thousand people were killed in the Trisula operation, which also becomes the penultimate of communist people's attempt to build the communist bases for the future (Hearman, 2018b).

Indonesia New Order Regime: After 1966

With the instability in a parliamentary system and various rebellions, the economy was not a focus of Sukarno's government. However, General Suharto understood that economy is an important pillar for stability in society. General Suharto then takes decisive action by assembling economists and technocrats in Indonesia to build the economy. Suharto takes a reverse action of Sukarno's economy. Suharto tried to open Indonesia's economy. It is started by the Law of Foreign Direct Investment in 1967, tries to rejoin United Nations, and has a better relation to western bloc countries and development agencies such as World Bank and the IMF.

Soon after that, Suharto's team successfully reduced 650% inflation in 1966, just into two digits in 1969. Economy and stability become Suharto's government's main purpose. Then, Suharto did every needed action to reduce the possibility of domestic stability, such as reducing general election participant into Golongan Karya (Suharto's election vehicle) and two other parties (PPP as Islamic Party and PDI as Nationalist Party), control press, and control all information which may lead to social and political instability. Suharto also has a five-year plan (PELITA), such as in Communist country economic plan so Indonesia economic plan is clearly organized in PELITA and thus Indonesia's economy is starting to have a better condition.

In the new order regime, Indonesia was considered one of the fastest-growing economies globally, which was able to substantially narrow to gap with the rest of the world economy. By all standards, growth was remarkably rapid: its GDP per capita increased more than that of its neighbors; growth was also much faster than its 'market access' (its weighted export markets), pointing to great improvements in its international competitiveness; and the quality of institutions, as measured via the functioning of rice markets, also improved dramatically (Van Zanden, 2010). In the 30 years between 1967 and 1997, GDP and GDP per capita grew, on average, 6.8 and 4.6 percent per year, respectively. In 1972 GDP per capita, at last, exceeded the peak reached in 1941, and by 1997 it was almost three times that of 1941 (Van der Eng, 2002).

CHAPTER 3:
DATA AND METHODOLOGY

Data

The main challenge of this study is that the only data available before 1965 in the regency/city level is only data from the 1955 general election, 1957 regional election, and census data in 1960. We could only create a simple correlation and spatial analysis using this data. Furthermore, Indonesia's economic performance data post-1965, which has long series and complete regency/city level, mostly come from microeconomic survey data. We use Indonesia's annual manufacturing survey (known as *Statistik Industri* (SI)) as our main data to measure potential regional economic loss. Statistik Industri is Indonesia's annual manufacturing survey at a firm level. It has been conducted since 1975. It surveys all firms with a minimum of 20 workers (or it is categorized as a medium and large enterprise by Central Bureau Statistics). It is a longitudinal survey (a Plant has the same ID) from 1975 until 2015. However, we only use the data from 1988 to 2015 in conducting our research since the SI data before 1988 does not have the variable needed to conduct our research.

Manufacturing is an important sector in Indonesia, and it is rising in line with Indonesia's development, especially in the new order regime. Although most of Indonesia's workers are still in the agriculture sector until today, Indonesia workers in the manufacturing sector are steadily more than 10% since 1989 and stable around 12-14% from 1994 until 2020 (World Development Indicator, 2020). At the same time, the manufacturing sector has become more important to Indonesia's GDP, although it has slightly declined since 2003. The manufacturing sector share per GDP in 1961 is only around 8 percent, and it rises to 10% percent in 1976 and has its peak around 31% in 2002.

We use two indicators from the manufacturing survey, output and value-added, to measuring potential economic loss. Output and value-added are well defined and easily calculated here. Output is principally defined as sales or revenue from production, including electricity sold, industrial service for other companies, and other revenue. While value-added is the difference

between output and intermediate inputs and represents the value of labor and capital used in producing output[2]. As we know, the general production function consists of output or value-added as the dependent variable and some inputs, at least capital and labor, as its independent variable.

One major econometric issue in estimating production functions is the possibility that there are determinants of production that are unobserved to the econometrician but observed by the firm (Ackerberg et al.,2015), which is commonly called Total Factor Productivity (TFP). This unobservable variable is called the 'productivity shock,' and it has a serious endogeneity problem to the model. Over the past 20 years, techniques proposed by Olley and Pakes in 1996 (OP) and Levinsohn and Petrin in 2003 (LP) to address this endogeneity problem has seen extensive use in the empirical literature. Under OP and LP technique and assumption, we can invert optimal input decisions to allow us to observe the unobserved 'productivity shock.' OP identified in which firm-level investment condition is a strictly increasing function of a firm-level unobserved productivity shock. While LP identified in which firm-level input demand (in this case raw material) condition is a strictly increasing function of a firm-level unobserved productivity shock.

OP and LP methods gave empiricists a new way to estimate TFP. However, these approaches have some drawbacks. The investment value which is used in OP is usually suffering from zero values. LP method tries to fix this by using raw material instead of investment. However, the OP and LP functional forms moment conditions underlying the first stage estimating equation do not identify the labor coefficient. These functional forms also suffer from multicollinearity problems. Hence, in this study, we use Ackerberg-Caves-Frazer (ACF) method, which already fixes these problems (Ackerberg et al.,2015). They provide an alternative approach based on the ideas in these papers but do not suffer from the functional dependence problems and produce consistent estimates under alternative data generating processes for which the original procedures do not. The ACF method overcomes both the missing value problem that persists in OP estimates by using raw material as the instrumental variable and the multicollinearity problem that persists in the LP method by changing the functional form of TFP.

[2] Based on the definition on https://www.bps.go.id/subject/9/industri-besar-dan-sedang.html

In this study, we measure TFP using the ACF method. The TFP is defined as (ω_{it}) in the

$$y_{it} = \beta_0 + \beta_1 k_{it} + \beta_2 l_{it} + \beta_3 m_{it} + \beta_4 \omega_{it} + \varepsilon_{it}$$

A y_{it} is the economic performance indicator, k_{it} is the fixed capital value, l_{it} is the quantity of labor, m_{it} is raw material value, and ω_{it} is an unobserved variable which is defined as total factor productivity.

Since we do our analysis at the regency/city level, we aggregate these variables into regency levels after getting the variables needed in the firm's level (output, value-added, TFP, capital, labor, material). Thus, we could create aggregated manufacturing production functions at the regency level.

We limit our study to the regency/city level in Central Java and East Java. It is related to the major assumption of estimating the 1965-66 communist massacre method and reliability data (especially data prior to the year 2000). It is also important to note that Central Java and East Java were two main communist bases in the 1960s. The illustrative map about PKI's vote in the 1955 general election below might supports the statement above.

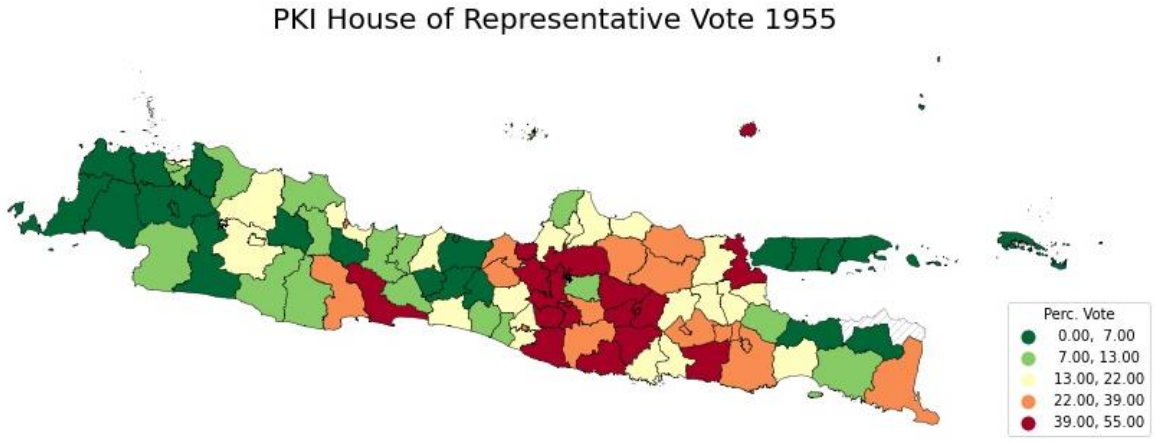

Figure 2: PKI's Vote from 1955 General Election in Java
Source: Author's Calculation from http://www.pemilu.asia/

Estimating 1965-66 population loss from the communist massacre

There is no reliable official data available for 1965-66 communist massacre victims. There are some difficulties in estimating the accurate number of massacres victims since the information about PKI in 1965-1966 is not fully unclassified and considered as one of the most traumatic political events after Indonesia's independence (Chandra, 2017). It is estimated that 100,000 to 2 million people died from communist eradication in 1965-1966. An official Fact-Finding Mission in late 1965 put the figure at 78,000 people, but the killings were still underway when this figure was issued, so it has been omitted from this range. Robert Cribb suggests that 500,000 people died of the eradication as most accurate (Cribb, 2001). Since there is no reliable official data available, we estimate population loss in this study using one-time population shock, which is defined by (Chandra 2017) as a break in an otherwise smooth population growth trajectory.

This study tries to replicate the 1965 population loss using (Chandra 2017) method. The method estimates population loss as the discrepancy between the expected population estimated using trajectory from census data. The two population trajectories can be extrapolated forward and backward at the time the shock occurred. The difference between forward-extrapolation and backward-extrapolation will give us our estimated population loss. The higher backward extrapolated population creates a surplus of population, while the opposite condition creates a missing population. This method fits with the analysis of data collected over interval time, such as the Indonesia population census.

Indonesia's census data is conducted every ten years. Our study will estimate the population loss using three census data, 1961, 1971, and 1980 data. When we do our estimation, certain major assumptions about population growth are needed to estimate the one-time population change attributable to the 1965-1966 communist massacre. The first major assumption is that no other major one-time intervening events significantly disrupted the population growth trajectory. A second major assumption is that the population growth rate between 1971 and 1980 is constant and equal to the population growth rate calculates using the census observations for 1971 and 1980. A third major assumption is about population growth pre-1971. The simplest condition is

to assume an equal population growth rate for pre-1971 and post-1971; we can calculate the difference between backward and forward extrapolated 1965 population using 1971 and 1961 data, respectively. However, various literature demonstrates a large drop-in fertility rate in 1971 since some government's program related to the demography in Central Java, Yogyakarta, and East Java, such as transmigration to Island outside Java and family planning program. Based on (Poedjiastuti 1987) works, therefore, it is safe to assume that an annual pre-growth rate that is uniformly 0.2 percent higher than observed for the post-period was used across all districts. As a result, even under these strong simplifications about population growth, a compelling picture of 1965-1966 emerges.

In this particular framework, the one-time change in population can be interpreted as the loss in the population associated with the 1965-66 massacres. While this change corresponds to the severity of population changes, it comprises not just mortality but also other fundamental changes in demography such as fertility and migration. It does allow for and is robust to regional variations in steady ongoing demographic phenomena, such as constant in-migration or out-migration or consistently lower or higher fertility rate in each district, among others.

Because there are only three relevant census observations for each of the fifty-eight regencies and fourteen cities in East Java and Central Java, rather than use the stochastic estimation strategy of Chandra et al. (2012), involving panel data models, a "deterministic" method for computing population loss was employed.

In the deterministic method, the data from the 1971 and 1980 censuses are used to calculate a rate of population growth for each regency as follows:

$$P_{t1} = P_{t0} e^{r(t_1 - t_0)}$$

It is the standard exponential population growth model, widely used by demographers. Here, P_{t1} represents the population at time t_1 (in this case, the date of the 1980 census), P_{t0} represents the population at time t_0 (in this case, the date of the 1971 census), r is the rate of population growth

per unit time (in this case, the daily rate of population growth), and e is the base of the natural logarithm. Taking natural logarithms of both sides of the above expression yields

$$\ln P_{t1} = lnP_{t0} + r(t_1 - t_0)$$

In the case of the two immediate post-1965 censuses of Indonesia (1971 and 1980), for each regency or city, we know P_{t1}, P_{t0}, t_1, and t_0. Therefore, we can compute the rate of population growth r for that regency.

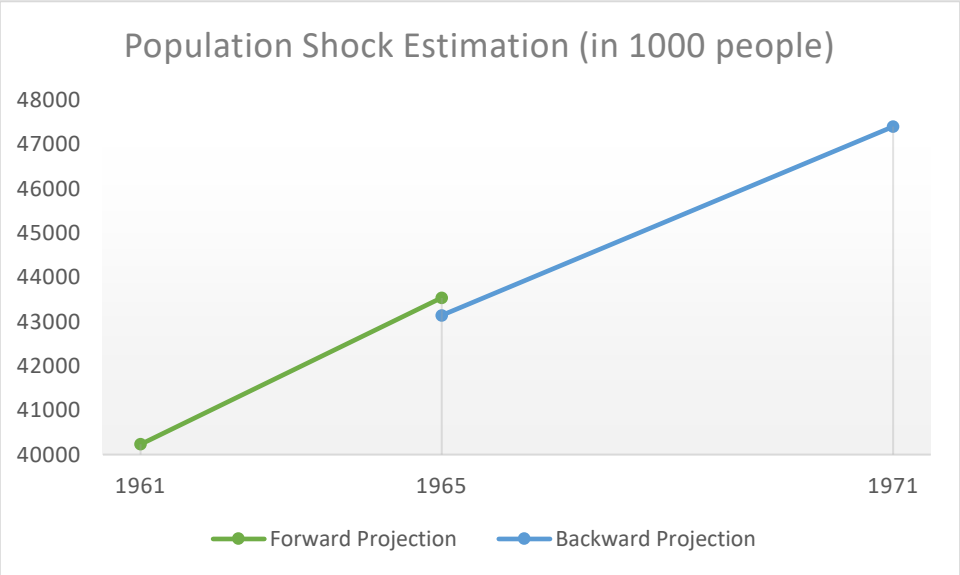

Figure 3: Simple Demographic Projection Illustration
Source: Author's Calculation from Indonesia Census Data

Notes: The projection above is just an illustration. The projection estimation used in this study using the exponential method. The real demographic dynamic may neither fully fit with linear projection nor exponential projection.

Using this computed growth rate, we can

1) extrapolate the population growth trajectory backward from the population as of the 1971 census to the beginning of 1966 to obtain the "observed" population based on the post-massacre growth trajectory, and

2) compute the "expected" population based on a pre-massacre population growth trajectory using the 1961 census population figure as the starting point and extending it forward to the end of 1965.

The discrepancy between the "observed" and "expected" populations represents the number of people in a regency/city who are unaccounted for either as a deficit or a surplus.

Theoretical Framework

From Romer (2012), we know that the economic growth model, which derived from classical production function, focuses on four variables: output (Y), capital (K), labor (L), and "knowledge" or the "effectiveness/productivity of labor" (A). The combinations of some amounts of capital, labor, and knowledge are used to produce output. The production function takes the form:

$$Y = AF(K, L)$$

The function above is one of the most general forms of a production function. The production function above is assumed a Hicks-Neutral technical change. A Hicks-Neutral condition means that the knowledge or technological change that happens does not affect the balance of labor and capital in the production function (Hicks, 1963). If the function changes the balance between capital or labor in the production function, it is called augmented capital or augmented labor production function. The most convenient production function is usually defined as follows:

$$Y = AK^{\alpha}L^{\beta}$$

The most convenient and straightforward production function is when we assume production function as Cobb-Douglas function, where $\beta = 1 - \alpha$. Thus, we can say that α and β is the proportion of how much capital and labor needed in the production. Whereby using the first derivative, we could get the marginal value of each variable as follows:

$$dY = \frac{\partial Y}{\partial A}dA + \frac{\partial Y}{\partial K}dK + \frac{\partial Y}{\partial L}dL$$

Thus, the value of output changes if at least one of the three inputs to production changes, including labor changes.

The communist massacre in 1965-1966 will affect effective labor. The communist massacre might affect either the productivity (A) or quantity of labor (L). Furthermore, Acemoglu (2014) stated that institutions would affect the human capital quality and affect the output value. Thus, discrimination for ex-communist families or prisoner might affect effective labor further and finally affect the output produced in the particular area. We could do a separate regression analysis for the new order period vs. the whole period of annual manufacturing data available to see this phenomenon. We may also add a dummy variable for the new order era to see this phenomenon.

Empirical Strategy and Spatial Analysis

The empirical model of the research will be conducted as follows:

$$y_{it} = \beta_0 + \beta_1 k_{it} + \beta_2 l_{it} + \beta_3 m_{it} + \beta_4 tfp_{it} + \alpha_i + \gamma_t + \varepsilon_{it}$$

A y_{it} is the economic performance indicator (either output or value-added), k_{it} is the fixed capital value, l_{it} is the quantity of labor, m_{it} is raw material value, and tfp_{it} is total factor productivity value. We use real value for all variables counted with monetary units such as capital, raw material, and output value. We use the constant 2010 value as our index base adjustment in this study. While α_i and γ_t show the unobservable heterogeneity and year-fixed effect variables used in the equation above, a lowercase in the equation above shows the log form variable.

We know that the 1965 communist massacre will affect (l_{it}) and (tfp_{it}) since some regencies lost some of the population, and there is a negative stigma for those who ever had been captured as a communist prisoner or even just communist sympathizers. Thus, we know that variables (l_{it}) and (tfp_{it}) in each regency may not be exogenous anymore. To handle the endogeneity problem in our model, we may use the Two-Stage Least Square (2SLS) method to estimate our production function. We have population loss in 1965 as our instrumental variable, and the first stage regression is as follows:

$$l_{it} = \pi_0 + \pi_1 shock_i + \alpha_i + \gamma_t + \mu_{it}$$

$$tfp_{it} = \pi_0 + \pi_1 shock_i + \alpha_i + \gamma_t + \mu_{it}$$

The $shock_i$ variable showed the estimated population shock in 1965-66. The possible explanation of the first stage regression mechanism is population shock in 1965, which is suggested caused by communist massacre estimated based on (Chandra 2017) and (Chandra 2019b) findings. The big negative shock happens in regions where PKI and the other three parties have conflict and have a relatively equal vote in a particular regency/city. In the 1965-66 communist massacre, the army got help from the Muslim party, especially NU (in East Java and the northern coast of Central Java), and help from PNI in Central Java by utilizing NU-PKI and PNI-PKI conflict.

We could use Global Moran's I statistics and Local Indicators of Spatial Association (LISA) analysis to see a percentage population loss spatial pattern. Global Moran's I am a standard statistics tool to measure spatial autocorrelation. The Global Moran's I is a cross-product statistic between a variable and its spatial lag, and it shows a correlation in terms of space. We may conclude whether a spatial pattern could be categorized as clustered, dispersed, or random from its inference. The distribution under the null hypothesis can be derived under the normality assumption. If we fail to reject the null hypothesis, we can say that the spatial distribution of a particular variable is spatially random, while if we reject the null hypothesis, we could say that a particular variable is spatially dispersed or clustered.

Even though Global Moran's I give us a spatial pattern (especially in the clustered spatial pattern) of a particular variable when we reject the null hypothesis, it does not provide us where the clustering happens. Thus, we may use Local Indicators of Spatial Association (LISA) analysis to remedy the problem. LISA has two important spatial features. First, LISA provides a statistic for each location with an assessment of significance. Second, LISA establishes a proportional relationship between the sum of the Local Statistics and a corresponding Global Moran's I.

We use the queen contiguity matrix as our spatial weighting matrix method in our analysis. In the queen contiguity matrix, polygons that share an edge or a corner will receive a dummy weight of one and zero otherwise. The main reason to use this method is that it is more likely that socio-economic indicators (either population shock or potential output loss) in a regency/city will be

correlated with the socio-economic indicator of surrounding regency/city if spatial autocorrelation does exist in the data.

CHAPTER 4:
RESULT AND DISCUSSION

Regression Analysis

We want to see the relationship between the estimated one-time population percentage shock in 1965 to the quantity of labor and productivity of labor in the manufacturing sector in East Java and Central Java from our first-stage regression result. The 1965 communist massacre brings many victims and population loss in some regions in East Java and Central Java, which is estimated by the variable percentage change in the table. From the table below, we know a positive relationship between the 1965 percentage of population change with both productivities of labor and quantity of labor variable. When a region lost population by the 1965-66 communist massacre, it will negatively respond to the labor quantity and the productivity in a particular region. Thus, from the first stage regression, we may infer that a regency/city with significant population loss in 1965, on average, has less labor and less productivity in the manufacturing sector since the regression coefficients are positive and statistically significant 1% significance level. A bigger regression coefficient in regression that only contains data from the new order period indicates that the impact of the 1965 population shock is even more significant in the new order era. The negative stigma and discrimination policy to ex-communist families, especially in the new order period, might contribute to this result, which becomes various research findings (Pohlman, 2016) and (Hearman, 2018).

We can infer from our first-stage estimation that the 1% additional percentage shock in the 1965 massacre will lower labor participation in 1988-2015 by 77.05% or, on average, 2.85% annually. In terms of labor productivity, 1% additional percentage shock in the 1965 massacre will lower labor productivity by 63.46% in 1988-2015 or, on average, 2.35% annually. The impact is higher in the new order era is indicated by a bigger regression coefficient in column (2) and column (4).

Table 1: First Stage of Regression

VARIABLES	LABELS	-1 First Stage ln_arm_lbr	-2 First Stage in New Order ln_arm_lbr	-3 First Stage ln_arm_tfp	-4 First Stage in New Order ln_arm_tfp
dummy_new_order	1=New Order Era 0=Otherwise	-0.0970* -0.0574		-1.727*** -0.112	
city_dummy	1=City 0=Regency	-7.451*** -0.456	-3.406*** -0.397	-4.513*** -0.998	-2.148** -1.065
perc_change	1965 Population Shock Percentage	1.472*** -0.0971	1.855*** -0.13	1.007*** -0.211	1.154*** -0.376
Constant	Constant	11.84*** -0.882	11.85*** -0.986	12.12*** -1.881	10.41*** -2.797
Observations		2,014	790	2,014	790
R-squared		0.954	0.975	0.843	0.862
Year FE		Yes	Yes	Yes	Yes
Region FE		Yes	Yes	Yes	Yes
*** p<0.01, ** p<0.05, * p<0.1					

Our main regression table below shows that both instrumented TFP and labor by percentage population shock in 1965 have a positive relationship with output and value-added. Moreover, in line with our first stage regression, the instrumented variable coefficients in the main regression are relatively bigger in the new order period, and for instrumented TFP cases, it becomes statistically significant. Dummy new order is consistent and negatively impacts output and value-added (although it is not statistically significant for TFP instrumented cases). We can say that a higher percentage of population loss in 1965 negatively impacts value-added and output through labor or productivity. Thus, based on our findings, we can infer that a regency/city with high population loss in 1965 may lose a higher value of potential economic output.

Table 2: Main Stage of Regression: Output as Outcome Variable

VARIABLES	LABELS	(1) 2SLS Output Labor Instrumented	(2) 2SLS Output in New Order Labor Instrumented	(3) 2SLS Output TFP Instrumented	(4) 2SLS Output in New Order TFP Instrumented
ln_arm_kapFB	Log of Aggregate Capital	0.0373**	0.0575***	0.0456***	0.106***
		(0.0150)	(0.0167)	(0.0106)	(0.0215)
ln_arm_tfp	Log of Aggregate TFP	0.00871	0.0125	0.0626	0.415**
		(0.0133)	(0.0160)	(0.0911)	(0.165)
ln_arm_rmat	Log of Aggregate Raw Material	0.647***	0.573***	0.648***	0.573***
		(0.0179)	(0.0227)	(0.0171)	(0.0313)
dummy_new_order	1=New Order Era 0=Otherwise	-0.323***		-0.241	
		(0.0503)		(0.155)	
city_dummy	1=City 0=Regency	0.110	0.00404	0.0806	0.0151
		(0.0755)	(0.183)	(0.0695)	(0.249)
ln_arm_lbr	Log of Aggregate Labor	0.346***	0.499***	0.285***	0.0434
		(0.0589)	(0.0660)	(0.0594)	(0.126)
Constant	Constant	4.184***	3.480***	3.985***	2.439***
		(0.241)	(0.261)	(0.395)	(0.489)
Observations		2,014	790	2,014	790
R-squared		0.980	0.987	0.980	0.975
Year FE		Yes	Yes	Yes	Yes
Region FE		Yes	Yes	Yes	Yes
IV F-stat		229.8	203.4	22.89	9.445

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3: Main Stage of Regression: Value-Added as Outcome Variable

VARIABLES	LABELS	-1 2SLS VA Labor Instrumented	-2 2SLS VA in New Order Labor Instrumented	-3 2SLS VA TFP Instrumented	-4 2SLS VA in New Order TFP Instrumented
ln_arm_kapFB	Log of Aggregate Capital	0.0326 -0.0264	0.0823*** -0.0303	0.0697*** -0.0192	0.151*** -0.0352
ln_arm_tfp	Log of Aggregate TFP	0.0251 -0.0234	0.0636** -0.029	0.266 -0.165	0.631** -0.27
ln_arm_rmat	Log of Aggregate Raw Material	0.321*** -0.0314	0.221*** -0.0412	0.324*** -0.0309	0.221*** -0.0512
dummy_new_order	1=New Order Era 0=Otherwise	-0.806*** -0.0884		-0.439 -0.281	
city_dummy	1=City 0=Regency	0.313** -0.133	0.181 -0.332	0.183 -0.126	0.197 -0.408
ln_arm_lbr	Log of Aggregate Labor	0.762*** -0.103	0.902*** -0.12	0.491*** -0.107	0.26 -0.206
Constant	Constant	6.146*** -0.423	4.701*** -0.474	5.257*** -0.715	3.337*** -0.801
Observations		2,014	790	2,014	790
R-squared		0.943	0.961	0.939	0.94
Year FE		Yes	Yes	Yes	Yes
Region FE		Yes	Yes	Yes	Yes
IV F-stat		229.8	203.4	22.89	9.445

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

From first and second stage regression, we may infer that on average, an additional 1% of 1965-66 communist massacre will lower 2.85% labor participation, 2.35% labor productivity, 1.47% of output, and 2.49% of value-added annually in 1988-2015 manufacturing sector in Central Java and East Java. It is estimated that for 27 years, there is potential manufacturing output loss from this massacre up to 10,799 trillion IDR or 1.188 trillion USD (both values are constant value 2010)[3]. The 27 years potential economic loss is up to 4.8 times of Indonesia manufacturing value-added

[3] The calculation assumed that all the additional potential labor could be absorbed in the medium and large manufacturing sectors. Both potential loss values (in IDR or USD) are in constant value 2010.

in 2020 or on par with Indonesia GDP in 2020[4]. This considerable loss should reflect the importance of the 1965-66 massacre and how Indonesian should reflect this phenomenon for the future.

Our findings are limited only to the manufacturing sector in Central Java and East Java. The actual economic loss is more likely bigger than our estimation. The out-migration effect from Central Java and East Java, property ownership transfer such as land and building which was previously owned by the communist party and its member[5]The negative impact of discrimination on ex-communist prisoners and their relatives are a few aspects that have to be considered and discussed if we want to examine a more comprehensive economic loss by the 1965-66 communist massacres. Various socio-economic impacts of the 1965-66 communist massacre are discussed in (Eickhoff 2019) book. However, the comprehensive economic loss has not been properly estimated yet, and it still becomes a challenge for future study.

Spatial Analysis 1: Estimated Population Loss

The biggest challenge to understanding one of the darkest episodes in modern Indonesian history is the lack of reliable and coherent history sources. Government documents and newspaper reports at that time were not reliable at all (Farid, 2006). An official Fact-Finding Mission in late 1965 put the figure at 78,000 people, but the killings were still underway when this figure was issued, so it has been omitted from this range. However, it is estimated that 100,000 to 2 million people died from communist eradication in 1965-1966. This study estimates the 1965-66 communist massacre in East Java and Central Java by (Chandra 2017) and (Chandra 2019).

[4] GDP and Manufacturing data based on World Development Indicator (WDI) data from the World Bank and Indonesia Central Bureau of Statistics (BPS Indonesia)

[5] The land reform law was implemented in the 1960s, and its execution was mostly related to PKI. However, the reform had not finished since the 1965-66 communist massacre, and PKI are banned. See (Sawita 2018) to examine land reform and the 1965-66 communist massacre in Bali.

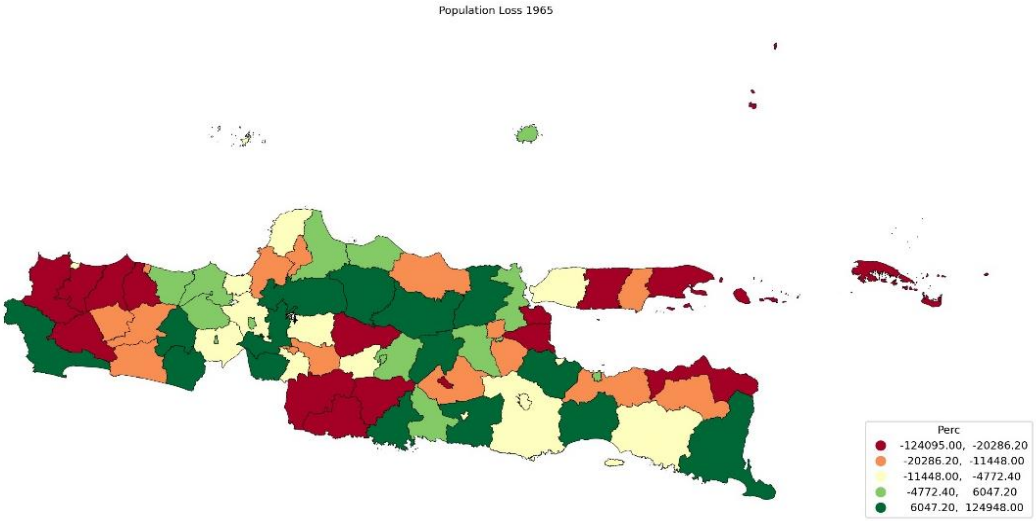

Figure 4: Estimated Population Shock in 1965
Source: Author's Calculation

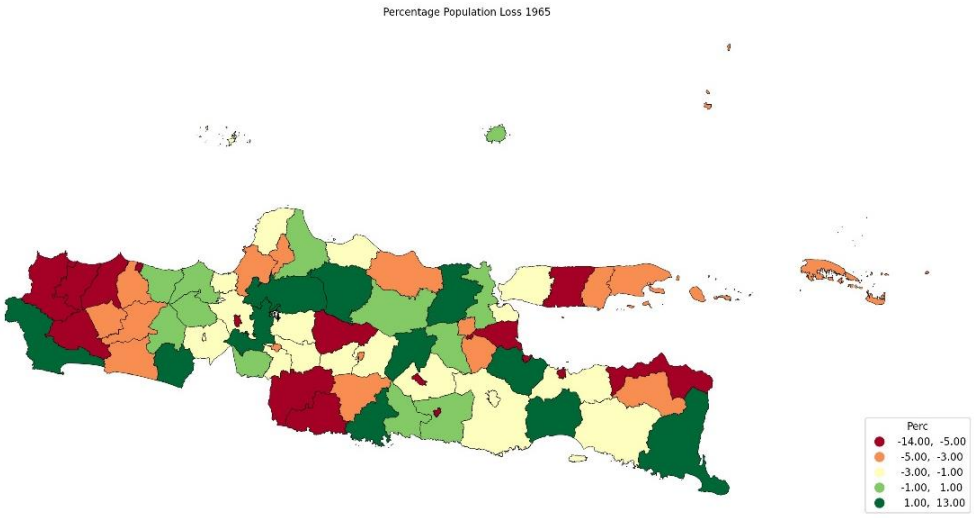

Figure 5: Estimated Percentage Population Shock in 1965
Source: Author's Calculation

From the map above, we see that the southern and western parts of Central Java, the north-eastern part of East Java, and Madura Island was the most hit region from the map above. The cities also got relatively severe hits rather than regencies. From our estimation, we know that the Tegal regency was the most hit region by the 1965-66 massacre, both in terms of absolute number and percentage. Tegal regency was a stronghold for PNI and PKI; thus, they had a conflict since the 1957 regional election. The 27% increase of PKI vote from the 1955 general election to the 1957

regional election resulted in a 24% loss of PNI vote in the same period. The same pattern, increasing PKI vote at the expense of PNI loss, happened in the western part of Central Java, such as Brebes, Banyumas, and Pemalang, where it also has a high estimated loss in the 1965-1966 massacre. Two scatterplot graphs below confirm this relationship; PKI and PNI vote were substitute each other in Central Java, and higher PKI win will lead to a higher number of 1965-66 communities massacre casualties.

While the estimation shows, there are a lot of regencies/cities loss some of their population in 1965, at the same time, it also shows that there are a few regencies that gained additional population. Banyuwangi regency in East Java and Cilacap regency in Central Java are two regions that gained the most population, with more than 100,000 additional people in each regency, respectively. Banyuwangi and Cilacap are relatively remote regencies in East and Central Java; thus, it attracted in-migration, especially for those ex-communist members or sympathizers who are afraid to be captured if they stay in their original domicile. Banyuwangi is the most eastern regency in East Java, while Cilacap is the most western regency in Central Java. In addition, Cilacap was also the PKI stronghold in Central Java, which may be considered a safe haven from PKI-PNI conflict in the neighboring regencies (the neighboring regencies of Cilacap were strong PNI/nationalist stronghold).

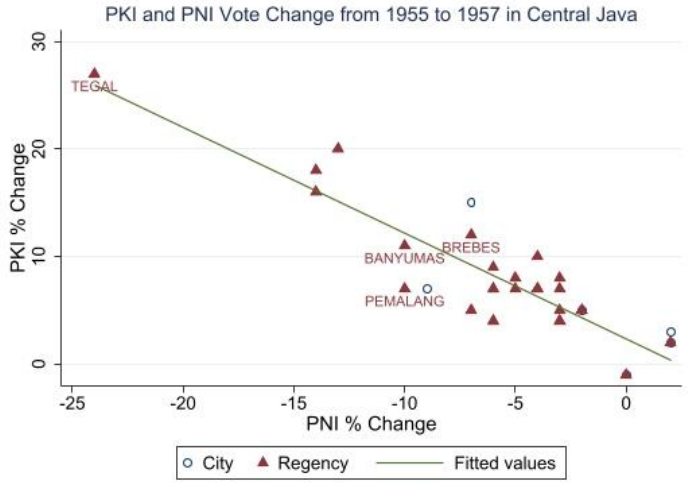

Figure 6: Percentage of PKI and PNI Vote Change in Central Java's 1955 and 1957 Election

Source: Author's Calculation from http://www.pemilu.asia/

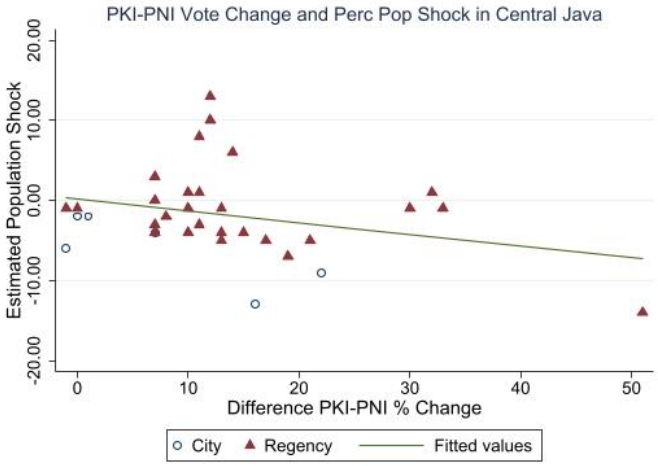

Figure 7: Estimated 1965 Population Shock and Difference Percentage of PKI and PNI Vote Change in Central Java's 1955 and 1957 Election

Source: Author's Calculation from http://www.pemilu.asia/

While in East Java, the story is quite different. The focus story is not between PNI and PKI but more on NU and PKI. PNI basis in East Java is not as strong as their basis in Central Java. In East Java, NU and PKI serve two different cultural streams, *santri,* and *abangan*. Furthermore, there is no significant substitution of these two cultural stream followers between 1955 and 1957 (see graph below). However, PKI got stronger in their basis, although NU was still the leader in East Java. Thus, in 1965-66 communist massacres mostly happened in NU stronghold regencies/cities in East Java. In contrast, PKI stronghold regencies/cities in East Java had relatively better conditions.

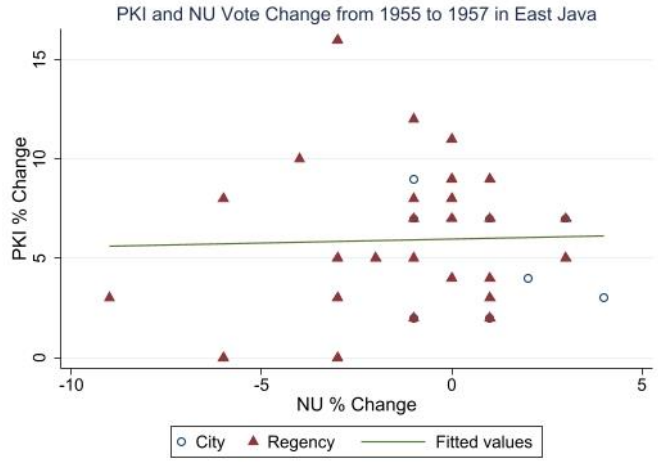

Figure 8: Percentage of PKI and NU Vote Change in East Java's 1955 and 1957 Election

Source: Author's Calculation from http://www.pemilu.asia/

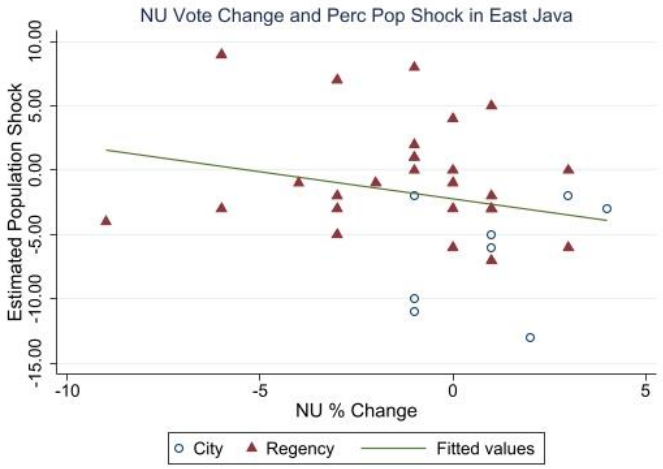

Figure 9: Estimated 1965 Population Shock and Percentage of NU Vote Change in East Java's 1955 and 1957 Election

Source: Author's Calculation from http://www.pemilu.asia/

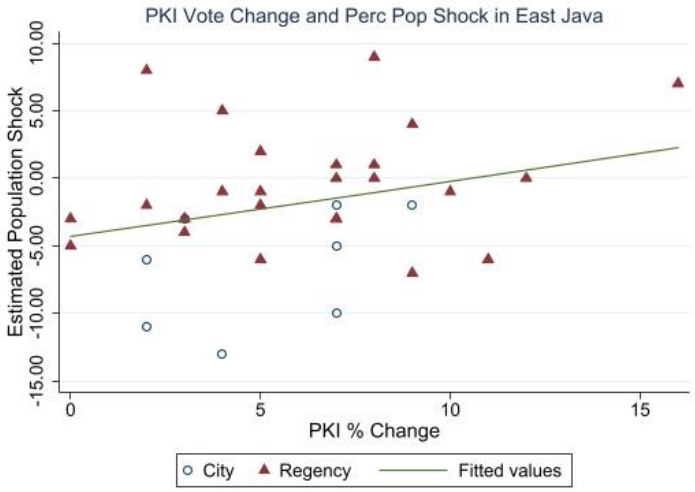

Figure 10: Estimated 1965 Population Shock and Percentage of PKI Vote Change in East Java's 1955 and 1957 Election

Source: Author's Calculation from http://www.pemilu.asia/

We may use Global Moran's I and LISA analysis to see whether spatial autocorrelation is in the estimated percentage change of population loss. If we use spatial autocorrelation analysis from Global Moran's I scatterplot, we know that combined East Java and Central Java percentage population loss does not indicate any spatial autocorrelation (Moran's I 0.02, p-value 0.324).

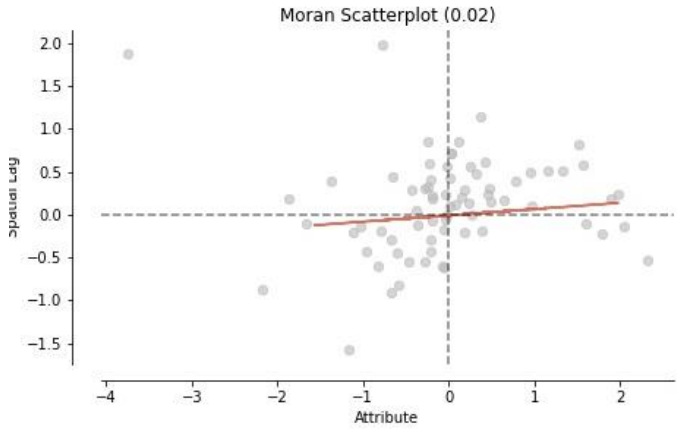

Figure 11: Global Moran's I of 1965 Percentage Population Shock in Central Java and East Java

Source: Author's Calculation

The spatial autocorrelation is getting clearer when we do Global Moran's I scatterplot separately between East Java and Central Java. In Central Java, Global Moran's I scatterplot indicates a spatial clustered autocorrelation (Moran's I 0.17, p-value 0.047). While in East Java, Global Moran's I scatterplot still does not indicate any spatial clustered autocorrelation (Moran's I 0.17, p-value 0.047). Thus, the Moran's I analysis indicates a different systematic role of the communist massacre, leading to a different spatial pattern of 1965-66 estimated percentage population loss. Based on (Robinson 2017) findings, General Suharto deploys RPKAD elite forces (Resimen Para-Komando Angkatan Darat) or Army Elite forces directly to crush communist people in Central Java. Hence, there were more systematic killings of communists helped by the elite forces from the army. While in East Java, General Basuki Rahmat was still a Sukarno loyalist and thus followed Sukarno's instruction to not directly kill communist people (Robinson, 2017). However, since there was a local clash in East Java between PKI and the Islamic party, especially NU, then the decision to kill is not spatially systematic. It depends on how the local army and Islamic forces working together to eradicate communist people.

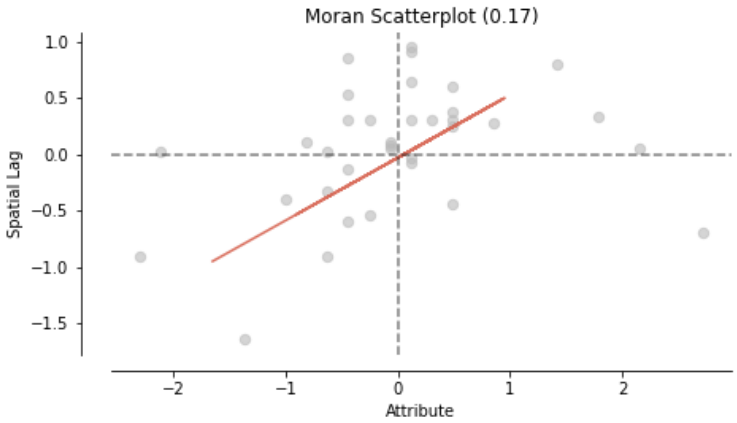

Figure 12: Global Moran's I of 1965 Percentage Population Shock in Central Java
Source: Author's Calculation

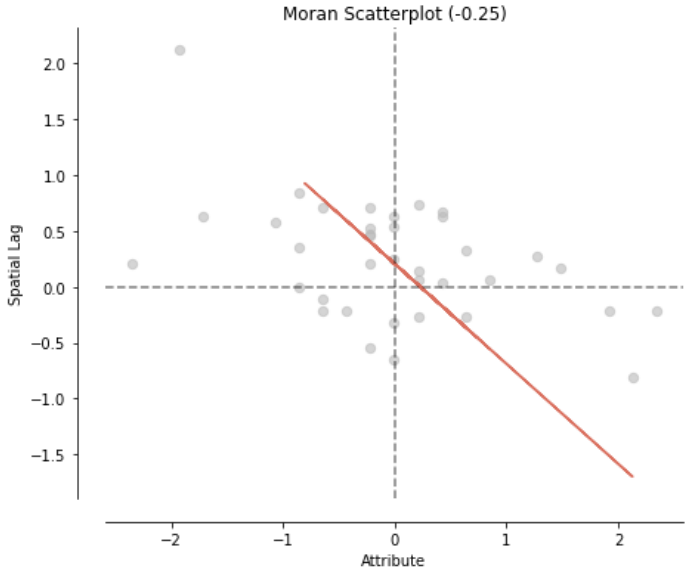

Figure 13: Global Moran's I of 1965 Percentage Population Shock in East Java
Source: Author's Calculation

To see exactly where the cluster happens, we use Local Indicators of Spatial Association (LISA) analysis. The LISA analysis graph below shows that the population loss by the 1965-66 communist massacre is mostly randomly distributed. The strong cluster or hot spot of the 1965-66 communist massacre only happened in the western part of Central Java, especially Tegal and the surrounding area. Outlier was happened in Tuban regency, Kebumen regency, Ngawi regency, and Pasuruan City. The outlier here is categorized as the 1965-66 communist killing in a particular region is relatively high, although 1965-66 communist killing in the surrounded region is relatively low. A similar pattern also happened if we separate LISA analysis in Central Java and East Java. As we

discussed before when we use separate LISA analysis in East Java, there is no high-high cluster; only a low-low cluster appears in the southern part of East Java.

The LISA analysis pattern supports our analysis that in East Java, the 1965-66 communist massacre was spatially random. It supports (Chandra 2017) findings that the local forces' power (which may consist of the army and local youth party organization) within regency/city may significantly determine the population loss in 1965. While for Central Java cases, thus we know that elite army forces (RPKAD forces) worked successfully in the western part of Central Java, especially in Tegal and the surrounding area. At the same time, other areas, such as the middle part of Central Java which has become the main stronghold of PKI (beside Tegal and surrounded area), have no significant cluster or even low-low cluster in Magelang regency. Hence, in the middle part of Central Java, we could imply that the communist people may have a better condition to survive in the middle of the 1965-66 massacre.

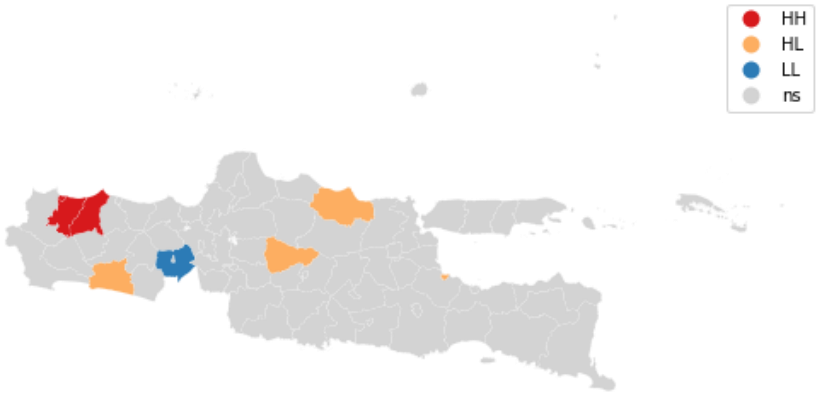

Figure 14: LISA Analysis of 1965 Percentage Population Shock in Central Java and East Java

Source: Author's Calculation

Figure 15: LISA Analysis of 1965 Percentage Population Shock in Central Java
Source: Author's Calculation

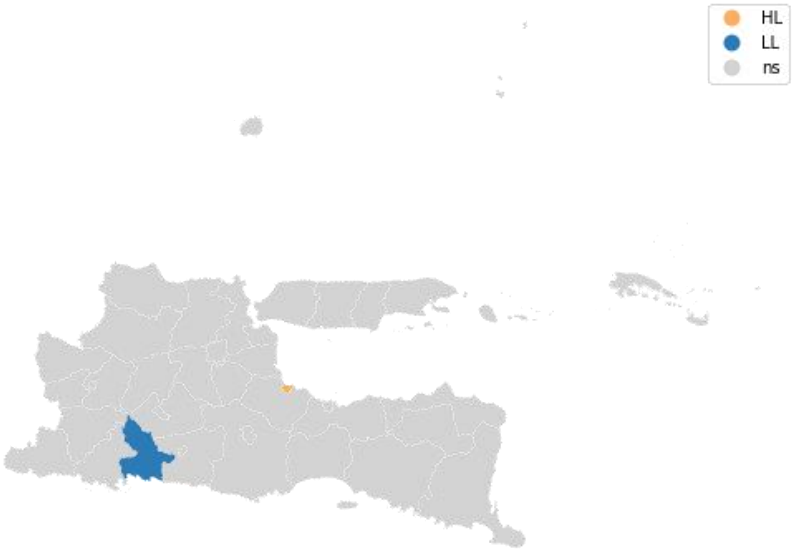

Figure 16: LISA Analysis of 1965 Percentage Population Shock in East Java
Source: Author's Calculation

Spatial Analysis 2: Estimated Economic Indicator Loss

We know a huge potential loss from the previous regression analysis section as the impact of the 1965-66 communist massacre, especially to Indonesia manufacturing output. This section wants to see whether the potential loss in Central Java and East Java has a particular spatial pattern.

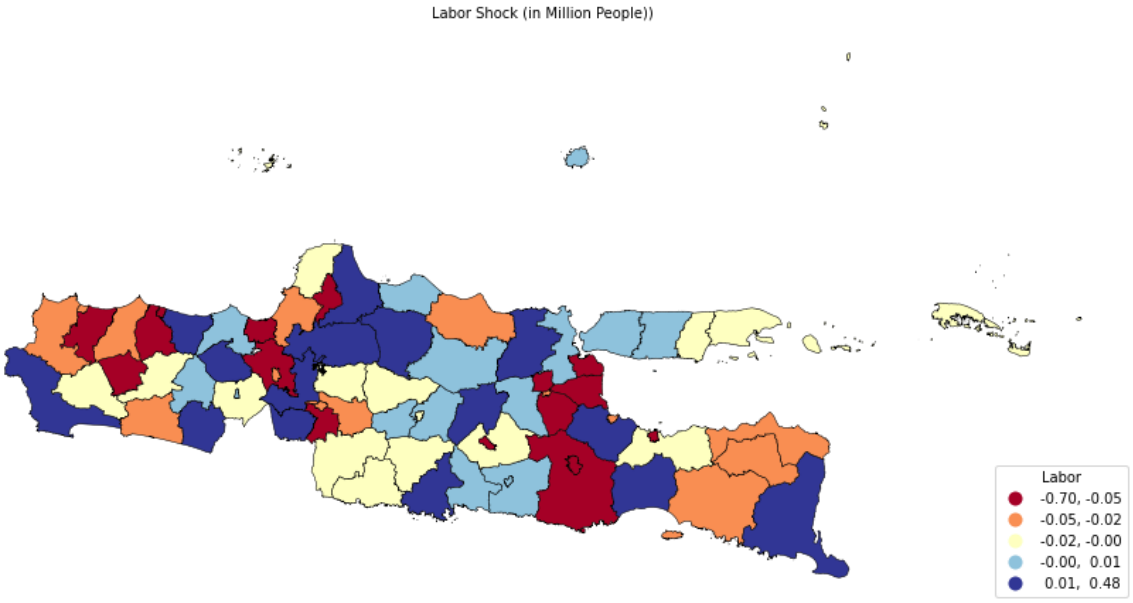

Figure 17: Potential Labor Loss by 1965-66 Massacre in Central Java and East Java
Source: Author's Calculation

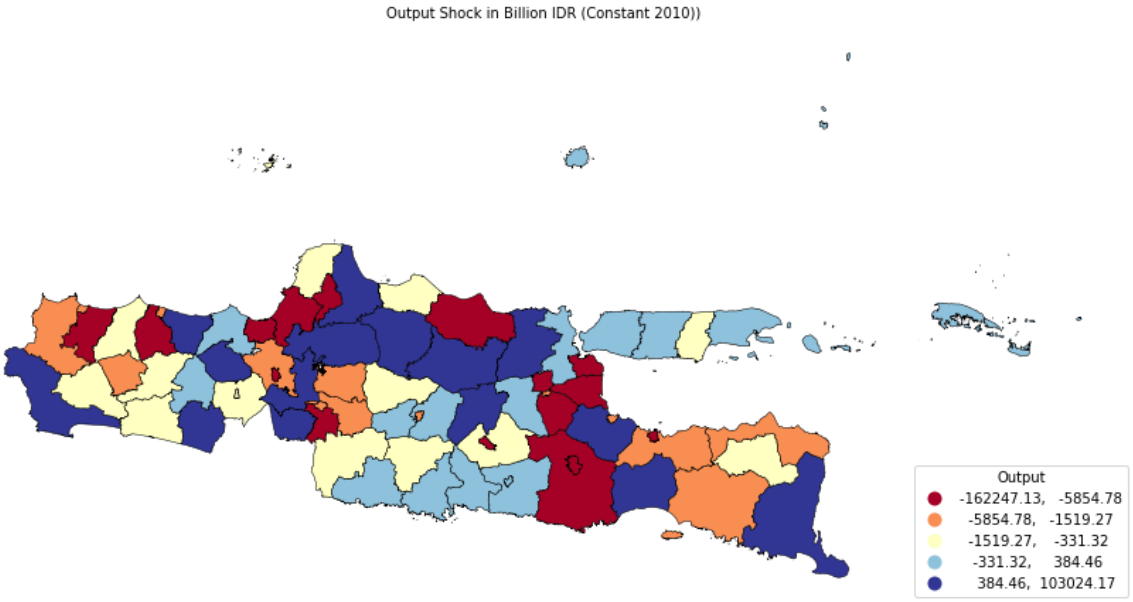

Figure 18: Potential Output Loss by 1965-66 Massacre in Central Java and East Java
Source: Author's Calculation

From the two graphs above, we know that the region with potential loss both for labor and output has a similar pattern. In general, city areas have relatively bigger potential loss both for labor and output than regency areas. This pattern happens in both Central Java and East Java. In Central Java, the western part of Central Java (especially Tegal and its surrounding), Semarang and its surrounding in the middle-north part of Central Java which also became PKI stronghold in the

1960s has relatively huge economic and labor potential loss. A similar loss happens in Surabaya, Malang, and its surrounding area. There is an outlier in East Java where Tuban also suffers relatively high potential output and labor loss. The blue region in both maps does not suffer from economic loss and even gains some economic gain. Those regions such as Banyuwangi as the most eastern regency in East Java and Cilacap as the most western regency in Central Java, enjoy the economic gain, which we can imply that comes from the in-migration after the 1965-66 communist massacre, especially from a regency/city which was assumed as PKI stronghold. Banyuwangi and Cilacap were considered a safe haven for communist people since these regencies were considered remote areas in East Java and Central Java.

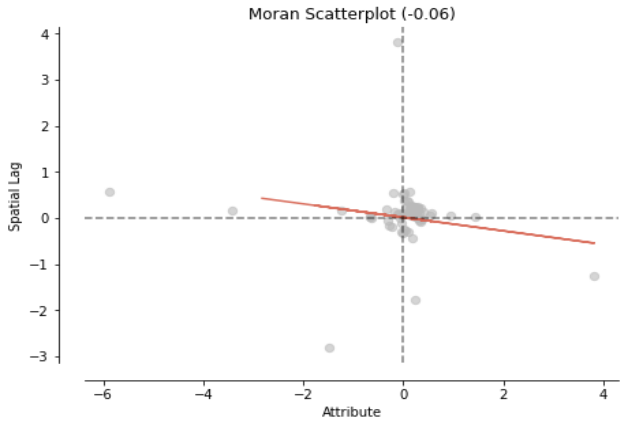

Figure 19: Global Moran's I of 1965 Potential Labor Loss in Central Java and East Java

Source: Author's Calculation

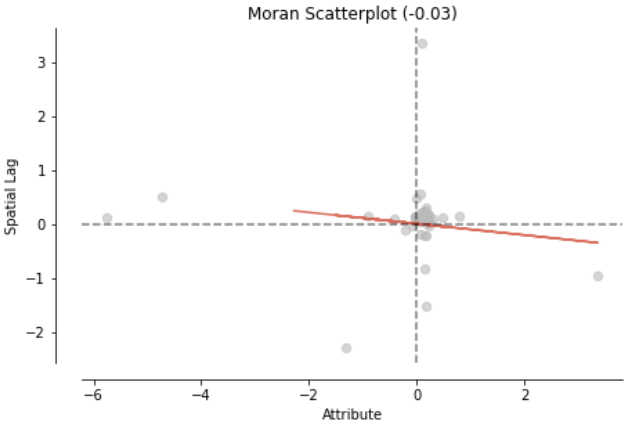

Figure 20: Global Moran's I of 1965 Potential Output Loss in Central Java and East Java

Source: Author's Calculation

We use Global Moran's I to see whether there is spatial autocorrelation in estimated potential economic loss, both for potential labor and output loss. We know that combined East Java and Central Java potential output and labor loss do not indicate clustered spatial autocorrelation (Moran's I -0.03, p-value 0.303 and Moran's I 0.06, p-value 0.184 respectively). Unlike spatial autocorrelation in estimated population loss, if we calculate Global Moran's I in East Java and Central Java separately, the estimated potential economic loss (both for labor and output loss) are spatially random. Thus, in general, we do not have enough evidence that the potential economic loss by the 1965-66 communist massacre is spatially clustered in certain regions in East Java and Central Java. However, we will be looking at LISA analysis to see the detailed spatial distribution of potential economic loss in Central Java and East Java.

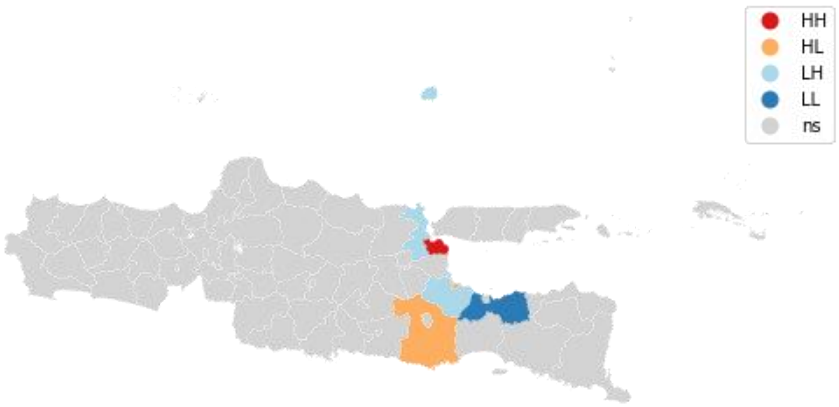

Figure 21: LISA Analysis of 1965 Potential Labor Loss in Central Java and East Java
Source: Author's Calculation

Figure 22: LISA Analysis of 1965 Potential Output Loss in Central Java and East Java
Source: Author's Calculation

In general, the LISA analysis graph above shows that the estimated economic loss is mostly randomly distributed. However, we find hotspot and outlier of potential economic loss (especially in potential labor loss), especially in East Java province. The hotspot pattern for both potential labor and potential output is only shown in Surabaya. The outlier happened around Malang and Pasuruan regency only for potential labor loss. Thus, we may conclude that the two biggest cities in East Java, Surabaya, and Malang have potential economic loss by the 1965-66 communist massacre. The Surabaya and surrounding area even become a hotspot of economic loss for both labor and output. At the same time, Malang is considered an outlier by our LISA analysis since it has high potential labor loss while the surrounding regencies have relatively low potential labor loss. A coldspot (low-low) cluster in potential labor loss in Probolinggo regency and surrounding areas (Probolinggo regency is located in East Java, which is shown as a dark-blue region in potential labor loss LISA map). However, these hotspot and outlier patterns are not enough evidence to say that there is a spatial clustered pattern in Central Java and East Java, even though there is a spatial clustered pattern in East Java since it only happens in Surabaya and Malang surrounding areas. Hence, we can say that the LISA analysis pattern supports our thematic map, which shows a general random spatial pattern in potential output and labor loss.

CHAPTER 5:
RESEARCH LIMITATION AND CONCLUSION

Research Limitation

This study uses the (Chandra 2017) method that has a strong assumption for estimating population loss by the 1965-66 communist massacre, which has a systemic impact on limiting the study scope to two provinces only, Central Java and East Java. The limited socio-economic regional data available at the regency/city level also limits our study to only the economic loss in the manufacturing sector. We may argue that many PKI members worked in the manufacturing sector; thus, it may show a reasonable estimate. However, we must admit that PKI members did not work in the manufacturing sector, especially in the agriculture sector, since the manufacturing sector only contributes slightly less than 10% of Indonesia's GDP in 1965. The main challenge for further study is finding a better and more general method to estimate economic loss by the 1965-66 communist massacre; hence we could estimate it at the national level and not limited to the manufacturing sector. A counterfactual study between the ex-communist stronghold region and non-communist region may also provide a better estimation of economic loss by the 1965-66 communist massacre for a future study.

Conclusion

This study points out that Central Java and East Java have a potential economic loss because of the 1965-66 communist massacre. The massacre has a significant impact not only on Indonesia's political view until today but also on regional economic performance, especially in the manufacturing sector. The negative impact for 27 years between 1988-2015 is estimated on par with Indonesia's GDP in 2020.

The spatial analysis shows the different spatial distribution of estimated population loss in 1965 in Central Java and East Java. It supports previous findings that the estimated population loss by the 1965-66 communist massacre depends on how the army and their regional commander work against communists. In Central Java, the deployment of RPKAD creates more clustered estimated

population loss. While in East Java, the estimated population loss is more defined by the combination between the local army and local youth organization. The conflict between PKI and the army, the Islamic party (especially NU) in East Java and the north coast of Central Java, and PNI in Central Java made PKI have enemies everywhere, and they were quickly destroyed in 1965 when their enemy consolidated their power.

While for potential economic loss, in general, we find no spatial clustered patterns of economic loss in East Java and Central Java, although some outlier and hotspot are found in East Java, especially in Surabaya as the biggest city in East Java. We also find that the cities are relatively hit harder than regencies in Central Java and East Java.

The negative stigma and discrimination against communist people still hold until today, although it has less impact than when new-order regimes held power. However, our finding shows that the 1965 communist massacre brought systematic long-run negative impact in East Java and Central Java, although it has less impact than what happened in the new order period. Hence, the massive loss from this phenomenon should be a valuable lesson for Indonesia to deal with political views and differences. A genocide or massacre always bring a tremendous damaging loss to society, not just in term of democracy and politic, but also in term of socio-economic condition.

REFERENCES

Acemoglu, D., Gallego, F. A., & Robinson, J. A. (2014). Institutions, human capital, and development. Annu. Rev. Econ., 6(1), 875-912.

Ackerberg, D. A., Caves, K., & Frazer, G. (2015). Identification properties of recent production function estimators. Econometrica, 83(6), 2411-2451.

Amiti, M., & Konings, J. (2007). Trade liberalization, intermediate inputs, and productivity: Evidence from Indonesia. American Economic Review, 97(5), 1611-1638.

Anderson, B. (1987). How did the Generals die?. Indonesia, (43), 109-134.

Biro Pusat Statistik, Government of Indonesia. (1962). Sensus Penduduk 1961 Republik Indonesia. Djakarta (Jakarta): Biro Pusat Statistik.

Biro Pusat Statistik, Government of Indonesia. (1971–1978). Sensus Penduduk, 1971. Djakarta (Jakarta): Biro Pusat Statistik.

Biro Pusat Statistik, Government of Indonesia. (1974). Sensus Penduduk 1971. Seri E, volume 13, Jawa Timur. Jakarta: Biro Pusat Statistik.

Chandra, S. (2019a). Glimpses of Indonesia's 1965 Massacre through the Lens of the Census: The Role of Trucks and Roads in "Crushing" the PKI in East Java. Indonesia, (108), 1-21.

Chandra, S. (2017). New findings on the Indonesian killings of 1965–66. The Journal of Asian Studies, 76(4), 1059-1086.

Chandra, S. (2019b). The Indonesian killings of 1965–1966: the case of Central Java. Critical Asian Studies, 51(3), 307-330.

Cribb, R. B. (2001). How Many Deaths?: Problems in the statistics of massacre in Indonesia (1965-1966) and East Timor (1975-1980).

Cribb, R. (2002). Unresolved problems in the Indonesian killings of 1965–1966. Asian Survey, 42(4), 550-563.

Eickhoff, M. (2019). The Indonesian genocide of 1965: Causes, dynamics and legacies, edited by Katharine McGregor, Jess Melvin, & Annie Pohlman.

Farid, H. (2005). Indonesia's original sin: mass killings and capitalist expansion, 1965–66. Inter-Asia cultural studies, 6(1), 3-16.

Farid, Hilmar. (2006). "Kata Pengantar." In Kidung Para Korban: Dari Tutur Sepuluh Narasumber Eks-Tapol, edited by Hersri Setiawan, xv–xxii. Yogyakarta: Pustaka Pelajar.

Fealy, G., & McGregor, K. (2010). Nahdlatul Ulama and the killings of 1965-66: Religion, politics, and remembrance. Indonesia, (89), 37-60.

Feith, H. (1964). President Soekarno, the army and the communists: the triangle changes shape. Asian Survey, 969-980.

Geertz, C. (1959). "The Javanese Village." In Local, Ethnic, and National Loyalties in Village Indonesia: A Symposium, edited by George William Skinner, 34–41. New Haven: Yale University Southeast Asia Studies

Geertz, C. (1976). The religion of Java. University of Chicago Press.

Hearman, V. (2018). Between citizenship and human rights: the struggle for justice after Indonesia's 1965 mass violence. Citizenship Studies, 22(2), 175-190.

Hearman, V. (2018). Unmarked graves: Death and survival in the anti-communist violence in East Java, Indonesia. NUS Press.

Hicks, J. (1963). *The theory of wages*. Springer.

Kantor Statistik Propinsi Jawa Tengah. (1981). Penduduk Jawa Tengah menurut kabupaten/kodya dan kecamatan: Hasil pencacahan lengkap Sensus Penduduk 1980. Semarang: Kantor Statistik Propinsi Jawa Tengah.

Kantor Statistik Propinsi Jawa Timur. (1982). Penduduk propinsi Jawa Timur 1980, menurut jenis kelamin, status perkawinan dan kewarganegaraan per desa: Hasil pencacahan lengkap. Sensus penduduk 1980 [Population of East Java province 1980, by sex, marital status and citizenship by village: Complete enumeration results. Population census 1980]. Surabaya: Kantor Statistik Propinsi Jawa Timur.

Lev, D. S. (1966). The transition to guided democracy. Southeast Asia Program, Department of Asian Studies, Cornell University

Maddison, A. (2020), *The World Economy: Historical Statistics*, Paris: OECD.

Poedjastoeti, S. (1987). Levels and Trends of Fertility in Indonesia Based on the 1971 and 1980 Population Censuses: A Study of Regional Differentials. Economic and Social Commission for Asia and the Pacific.

Pohlman, A. (2016). Janda PKI: stigma and sexual violence against communist widows following the 1965–1966 massacres in Indonesia. Indonesia and the Malay World, 44(128), 68-83.

Ricklefs, M. C. (2008). Religion, politics and social dynamics in Java: Historical and contemporary rhymes. Expressing Islam: Religious life and politics in Indonesia, 115-136.

Ricklefs, M. C. (2008). A History of Modern Indonesia since c. 1200. Macmillan International Higher Education.

Robinson, G. (2017). "Down to the Very Roots": The Indonesian Army's Role in the Mass Killings of 1965–66. Journal of Genocide Research, 19(4), 465-486.

Robinson, G. B. (2018). The Killing Season. Princeton University Press.

Roosa, J. (2016). The State of Knowledge about an Open Secret: Indonesia's Mass Disappearances of 1965–66. The Journal of Asian Studies, 75(2), 281-297.

Sawita, R. (2018). The Connection Between Land Reform and the 1965–1966 Tragedy in Bali. In The Indonesian Genocide of 1965 (pp. 89-113). Palgrave Macmillan, Cham.

Van Zanden, J. L., & Marks, D. (2013). An economic history of Indonesia: 1800-2010. Routledge.

Wieringa, S. (2003). The birth of the New Order state in Indonesia: Sexual politics and nationalism. Journal of Women's History, 15(1), 70-91.

World Bank. (2020). *World development indicators 2020*. The World Bank.