Agglomeration Economies and Decentralization Policy: the case of Indonesia's manufacturing sector

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Contents

List of Tables

List of Equations

List of Figures

Acknowledgement

Abstract

This paper examines the degree to which agglomeration economies of manufacturing activities has changed from 2000 until 2015, a period when Indonesia substantially decentralized its economic development system. Using micro dataset of Indonesian Large and Medium Industries Survey, this paper acquires relatively interesting results. The trend of high concentration of manufacturing activities, as identified by the Ellison-Glaeser measure of agglomeration economies, did not significantly decline of both 2-digit and 4-digit industrial codes at province level in decentralized government. The plateauing levels of agglomeration index are prevalently found in few industries that are strongly relied on manufactured inputs or natural resources and by the industrial necessity to agglomerate. The evidence presented in this paper suggests that efforts to deconcentrate manufacturing activities across regions, as exemplified by initiative to establish Special Economic Zones (SEZs) and by the intergovernmental fiscal transfers, are considerably subdued in the short run. Therefore, some industrial organization considerations are needed to robust the impact in the long run.

Keywords

Chapter 1: Introduction

1.1. Nature of the problem

Decentralization policy has been widely exercised by most of developing countries to capture gains from localized governance. The core of this practice lies in the conceptual framework that empowered, autonomous, and participatory local governments are enable to promote efficient public services in terms of providing necessary public goods and services for local people and improving quality of life rather than centralist authoritarian rule (Smoke 2015; Oates 1993; Lindert & Verkoren 2010). Furthermore, since many countries across the globe have experienced a rising concentration of income (Kim 2018) and massive economic activity occurred in a limited number of location (Schragger 2010:1888) which have led to uneven economic development, then it is fairly to argue that decentralization has been recognized as a channel to deconcentrate economic activity across regions so that economic development outcomes can be inclusively shared. In contrast, the term 'agglomeration economies' as it is refered as spatial concentration of economic activities (Brulhart as cited from Widodo 2015:3258) offers productivity advantages from spatial proximity especially in large and dense urban areas (Beckmann 1986; Carlino & Kerr 2015). For example, firms enable to procure necessary inputs from nearby suppliers at relatively lower cost (Rosenthal & Strange 2004:2148). Meanwhile, workers have flexibility to work among firms without substantial risks and costs related to job finding process (Cohen & Paul as cited from Widodo et al., 2015:3258). The conflicting train of thought between decentralization and agglomeration as we present above needs to be clarified by empirical analysis to examine whether a decentralization policy has led to a dispersal economic activities. Moreover, it is important to understand the extent to which decentralization policy has deconcentrated economic activity across industrial sectors.

Causal links between decentralization policy and spatial concentration of economic activities is not straighforward for several reasons. First, firms which had been located in metropolitan cities prior decentralization phase possibly reluctant to relocate plants to another periphery region in the short run. As a result, instead of navigating regional economic convergence, decentralization policy tends unable to disperse production plants across cities. Second, it has been extensively discussed that location of economic activities can be strongly determined by natural advantages. Industries would not be uniformly distributed across regions or move out from city centres since the region itself is not uniform. In other words, some regions are too droughty or too arduous to be utilized no matter how decentralization policy attempts to deconcentrate manufacturing activities. Third, human capital varies among locations and skilled workers whom graduated from college or vocational school are typically reside in cities. That is why larger cities will be skill-abundant and specialize in skill-intensive activities compared to rural area (Davis & Dingel 2020). In addition, Moretti as cited from Rosenthal & Strange (2004:2152) demonstrates a positive effect of university graduates on city's wages level. Meaning that skilled workers will prefer to work in urban environment as it affords higher wages or in-kind benefit rather than other locations. Forth, some industries are formed by only few large plants so that we cannot regard it as being concentrated simply because of its employment will be contained in only few regions. As a result, some believe that few regions may benefit decentralization process disproportionately and thus enable them to grow faster and leave the others behind. For that reason, this study is arguably important to understanding the degree of spatial concentration of manufacturing activities may change during decentralization period in Indonesia.

The nature of the problem above provides room for systematic analysis to demistify causal links between beneficial effects of decentralization policy, and therefore dispersal economic activity, as a case in point. Analyzing the nature of agglomeration economies will contribute to the decentralization policy literature in two arguments. Despite decentralization policy is designed to promote inclusive economic development as indicated from a deconcentrated economic activity

among regions, policy makers should aware that some regions probably will always have a comparative advantage in producing particular goods and service. Delegating power and resources to subnational tiers of government would not directly impact local economic development unless private sectors respond it as an incentive to expand production activity outward the current metropolitan cities.

As the impact of Indonesia's decentralization on development is decidedly mixed (Ostwald 2016:140), analysis of spatial concentration of manufacturing activities would obviously present a new analytical framework in decentralization policy debate. On one hand, Vidyattama (2013) and Akita et al. (2011) show that decentralization process has declined regional inequality as the impact of redistributive growth. In local level such as Makassar city, study of Sahabuddin et al. (2019) confirm that the implementation of decentralization has positive implication for the progress of regional development which can be observed from the physical event and the level of economic growth. Nevertheless, according to Ostwald et al. (2016:140), there was little evidence to justify that decentralization has led to an increase of economic growth. Even though some regions gained efficiency as several aspects of public service have benefited from increased local autonomy and accountability, they have been offset by the widespread emergence of clientalistic practices and fiscal inefficiencies.

Accordingly, it becomes essential to understand the extent to which a dispersal economic activity has possibly undermined productivity gains from spatial concentration of activities especially in manufacturing sector. In that sense, we would expect that if decentralization policies enable to disperse location of production plants, degree of spatial concentration would decrease over the period. It is important to note that this research operates agglomeration economies as an instrument to examine whether the devolution of power and resource significantly associate with dispersal manufacturing activities.

Study on agglomeration economies is reasonably relevant within the decentralized governance. It is obvious that high density of urban area creates social costs. The costs can be observed in the skycrappers, highways, and aqueducts which obviously developed in populated area (Rosenthal & Strange 2003: 377). However, the productivity advantages of cities arise from economies of scale, was arguably able to offset the social and environmental costs and drives many companies and workers to interact in production processes (Puga 2010:203). Hence, initiative to disperse economic activities through decentralization policy may undermine productivity gains of spatial concentration of economic activity to some extent. If so, how can central and local governments consider this fact. Obviously, policy makers and development practitioners understand that devoting concentrated resources in a small number of regions seems to be uneven and devastate initiatives to promote interregional inclusive economic development. Additionally, promoting large number of smaller urban areas in many regions within a country would be reasonable if centralization economic resource and activity do not necessarily determine national economic performance. Meaning that major economic sectors will perform indifferently regardless of degree of spatial concentration of economic activities.

In addtion, although decentralization has been a growing interest in almost all developing countries, including in East Asia, we argue that particular attention has not been addressed to investigate geographical landscape of manufacturing sector under decentralized government. Instead, since the core idea of decentralization is to improve public service delivery and quality of life, and to promote local governance, a great attention has been directed towards examining the impact of decentralization on key development outcomes such as economic development, public service delivery, as well as governance capacity. Both development scholars and governance practitioners have been more focusing on specific dimension of decentralized government. For example, the role of local institutions (Pal & Wahhaj 2017); education outcomes (Kristiansen & Pratikno 2006; Leer 2016), local public investment (Kis-Katos et al. 2017), infrastructure and

resource governance (Rahayu et al. 2021; Aritenang 2020), as well as poverty and inequality issues (Miranti et al. 2013).

Furthermore, socioeconomic disparity is crucial issue for Indonesia. According to Rabasa & Chalk (2001:47), the emergence of decentralization process in Indonesia was initially driven from a demand to distribute power from central government in Jakarta to another region. The authors note that people outside of Java island believed that power did not distributed fairly and thus create several political turbulance. For example, rebellions in eastern Indonesia during 1950's, separatist outbreaks in Aceh and Papua, as well as East Timor province referendum which eventually made this region broke away from the motherland in 1999. Thus, in the context of Indonesia, decentralization was not fully motivated to capture gains in governance or economic performance, but it is also regarded as a way to diffuse social and political tensions and to prevent ethnic conflicts and separatist movement due to centrifugal forces along its periphery (Oswald et al. 2016:139; Hill & Vidyatama 2016).

1.2.   Research Questions and Organization of the Paper

According to background of the research paper above, we need an empirical analysis to verify that decentralization policy, regardless of motivation to secure territorial integration, can minimize regional economic disparity by taking into account the trend of geographical distribution of industrial activities. Comparison between pre-decentralization and post-decentralization years is essential since it will clarify the issue. For that reason, this study will demonstrate the changes of spatial concentration of industrial activities between two phases.

The primary research question to be investigated on this paper is "to what extent does spatial concentration of manufacturing activities upon the period of decentralization policy changed in Indonesia?" This main research question is dispersed into two sub-questions as follows:

1. What is the trend of agglomeration economies before and after decentralization policy?
2. What kind of industries are tend to be agglomerated in the subsequent periods of decentralization?
3. Regardless of the level of spatial concentration in subsequent periods of decentralization, does the composition of agglomeration categories can be consistently demonstrated by two different definitions of industries?

The organization of this research paper is structured as follows. We begin with a literature review on nature of agglomeration economies and decentralization policy framework in chapter 2. Chapter 3 will discuss the design of the study including the methodology and data selection. It will followed by the comprehensive analysis of agglomeration economies across industries both in pre and post of decentralization in chapter 4. A discussion of decentralization policy that related to industrial development dynamics in Indonesia and will be exemplified by the development of special economic zones (SEZs) and intergovernmental fiscal transfer in chapter 5. The remaining chapter concludes the research findings and provides some policy implications.

Chapter 2: Conceptual Framework of Agglomeration Economies and Decentralization Policy

2.1. Productivity Advantage of Agglomeration Economies

The emergence of new branch literature in economics, the economic geography, raises the importance of question 'where to produce' in micro analysis. Since then, fundamental questions within microeconomics perspective are no longer only about *what*, *how*, and *for whom* goods and services should be produced. In fact, location of production plants determines productivity level. Spatial perspective illustrates that decision to locate production plant is considered by several factors including local market share and the availability of skilled workers. These factors attract productivity advantages which eventually trigger many other firms. By their nature, agglomeration arise because of interaction among agents and accordingly can be recognized as the specific type of externality. It reflects a spreading effect of one particular economic activity which impacts another activity (Claver et al. 2012). In addition, the affordability of natural resources also crucial since it reflects efficient and strategic advantages of settling production plants at specified location (deGroot et al. as cited from Bloch et al. (2014:7). Accordingly, productivity advantages are prerequisite for geographic concentration. Therefore, 'agglomeration' refers to the geographic concentration of economic activities (Wheeler as cited from Bloch et al. 2014:7). Yet some argue that there is ongoing ambiguity on measurement and interpretation of agglomeration externalities so that there is no existance of standard definition of agglomeration in the literature (van Oort & Lambooy 2021:925; Bloch et al. 2014:7).

In the context of regional and urban development and planning, the fact that tendency to agglomerate economic activities leads to a good deal of research. Firms favor to locate production activities in large and dense economic environments. In clustered economic activities as we oftenly observe in city, for example, firms enable to procure necessary inputs from nearby suppliers at relatively lower cost (Rosenthal & Strange 2004:2148). Meanwhile, workers have flexibility to work among firms without substantial risks and costs related to job finding process (Cohen & Paul as cited from Widodo et al., 2015:3258).

Such productivity advantages caused by location proximity lead to spatial concentration of industries. Such advantages have been observed by urban economists for a long time. Nevertheless, traditional conceptualization of agglomeration economies divides agglomeration economies into urbanization and localization economies. Localization means that firms benefit productivity advantage from spatial concentration of firms in a particular area. On the other hand, urbanization economies can be defined as economies scale arise from the size of urban area (Rosenthal and Strange, 2001).

2.2. Knowledge Spillover and Increasing Returns

A large body of literature has been developed to explain agglomeration economies. Initial investigation seeks to clasify agglomeration economies which can be categorized into three main forces: Localization Externalities, Jacobian Externalities, and Urbanization Externalities (Ercole & O'Neill 2017:93). The difference among these concepts lies in the question of where do knowledge spillovers take place. In the localization externalities, knowledge spillovers emerged within the industry so that firms are motivated to operate in the same industry and thus create specialization. This concept has adopted by Glaeser et al. (1992) and notably called as Marshall-Arrow-Romer (MAR) externalities or spezialization (LQ). Meanwhile, Jacobian externalities argue that knowledge spillovers formed as inter-industry knowledge so that firms take benefits of settling their business close to other industries. It emphasizes the role of diversity (DIV) and variety of industries in the context of productivity growth promotion. Finally, urbanization externalities agree that intensity of local competition (COM) is more conductive to promote growth. This type of externalities

which concern on competition has widely recognized as Porter's externalities. Moreover, these large volume of empirical research generally have one objective that to explain how agglomeration economies contribute to innovation, productivity, and urban employment growth (De Groot et al. 2016).

Puga (2010) argues that stories about the determinants of agglomeration economies are as old as the recognition that such advantages perceived. According to Rosenthal (2003:376), it was 1920 when Alfred Marshall provides the first careful economic analysis of agglomeration economies, emphasizing that knowledge spillover, labor market pooling, and input sharing as main features to enhance cities' productivity. Romer (1990) expands this notion by formulating endogenous growth theory. This theory highlights the importance of workers in the knowledge-producing sectors, technological transfer, and stock of knowledge on determining production function. Accordingly, as Krugman (1991) points out, one obvious explanation for regional economic growth is due to the accumulation of knowledge which leads to the innovation of production method. In other words, know-how technology is critical to generate increasing returns in production function.

Specifically, knowledge as a source of production spills over and widespreaded among producers and firms, as if such knowledge is categorized as non-rivalry and non-excludable. However, the extent to which knowledge widespreaded among firms depends on proximity factor and seemingly decrease as the distance increases (Audretsch & Feldman 1996). In such a way, location and proximity factors matter to transmitting the knowledge. Thus, firms pferer to spatially agglomerated in a high dense area and to some extent create productivity advantages of cities and urban clusters in order to maintain the ability to receive knowledge spillovers. By that sense, agglomeration economies could be identified in limited areas since the propensity of knowledge spillovers as well as vast majority of innovation occurred in clustered and populated urban environments. Of course, as Lucas (1988) suggested, innovation activity arise from the interaction of economic agents and it should be most pronounced when agents are localized in close physical proximity.

2.3. The Role of Natural Advantage

Although knowledge externalities are possibly influence the location of production, that is not the only key factor. Krugman (1991) asserted that location of production plants are shaped by transportation costs. Empirical evidence for that case, as illustrated by Rosenthal (2001), was found in industries that produce highly perishable products. In this kind of industry, *ceteris paribus*, firms will seek to locate close to their market as it will decrease the shipping costs per unit distance. By contrast, industries which produce nonperishable or durable products may show more agglomeration since they face lower product shipping costs.

Furthermore, some industries are sensitive to the existence of natural resource. As Beckmann and Thisse (1986) importantly note, the locations of production activity are not predetermined but subject to economic choice. Natural conditions lead to levels of resources to which economically can be extracted by some industrial sectors. Yet, it limits the set of feasible location for any economic activity. That is why particular industries such as steel or oil refinery, among others, are located where the substantial amount iron ore and crude oil are presence in the ground. Similarly, it is certainly true that at least part of Western Java's growth can be attributed to its climate and geographic condition, which would allow managers to pay lower wages rather than regions where the weather was less pleasant. In fact, the importance of natural advantages on determining agglomeration economies has been considered more recently. Study of Ellison & Glaeser (1999) for instance, accounted natural advantages as a explanatory variable of agglomeration economies approximately by 20 percent.

2.4. Scope of Agglomeration Economies Analysis

The investigation of [Rosenthal and Strange (2004)](#) summarize the scope of agglomeration economies analysis. There are three dimensions of agglomeration economies: industrial scope, geographic scope, and temporal scope. Industrial scope focuses to emphasize the economies of scale as well as externalities which arise from spatial concentration of activity within industries—called localization economies, or from the concentration of all economic activity or from the city size itself—known as urbanization economies. Meanwhile, the geographic scope concerns with the aspect of geographic distance. Firms interact each other unless they are physically closer. So the existence of cities could be understood as many firms view that proximity is advantageous. Eventually, the third scope—temporal scope, denotes that the current productivity level of particular firms may be resulted from the interaction with another firm in the past. Suppose there are two establishment of firms, j and k. We can consider the impact of j plant on k plant will depends on the geographic distance, type of industrial activity, and previous interactions between the two establishment.

The recent studies attempt to correlate the topic of agglomeration economies with local economic growth ([Aritenang 2020](#)), productivity growth in manufacturing industry ([Bloch et al. 2014](#)), or even technical efficiency of manufacturing firms ([Widodo et al. 2015](#)). Those analysis prevalently apply agglomeration economies, which approximated by using proxy variables such as concentration ratio of four largest sector (CR4) or Herfindhal and Hirschman Index (HHI); MAR's specialization (LQ); Jacobian's diversity (DIV); and Porter's competition (COM), as independent variables. Accordingly, main production inputs such as workers, capital, energy, raw material are positively impact the plants' output. Knowledge spillovers can be more effectively transferred within industry (MAR's specialization) rather than diverse industry (Jacobian's diversity) and Porter's competition stimulates technical efficiency.

2.5. Decentralizing Economic Activities: Rationale, Objectives, and Prerequsites

Indeed, we recognize from discussion above that large and dense urban cluster population has not only create economic benefits but also reasonable costs. Melitz & Ottaviano as cited in [Ercole & O'neill (2017:94)](#) state that geographic concentration of economic activities increases the cost of agglomeration as the weaker economic activity is forced to exit from the market. Most importantly, it is a fact that excess concentration will adversely impact life and social aspect of regional development. In this context, devoting concentrated resources in a small number of cities seems to be uneven and devastate initiatives to promote interregional inclusive economic development. Accordingly, the major argument for decentralization which is to deconcentrate excess economic activities—beyond its prominent objectives to improve public service delivery, to promote public welfare, and to promote better governance with regard to local needs, capacities, resources, and preference—becomes relevant.

There are several necessary conditions to succeed economic activities decentralization. Since decentralization designed to enhance local economic welfare through devolution of power and resources from central government into subnational tiers of government, it can be enhanced only if some atributes of development reform such as good governance, accountability, and quality of institutions exist ([Bardhan 2002](#); [Kim 2018](#)). In fact, decentralization policy use two primary channels to enhance economic welfare: (i) better delivery of public goods and services; and (ii) better provision of public goods and services due to governance and accountability improvement [(Canare 2021:95)](#). Accordingly, decentralization can be a good economic development reform to promote local welfare if it advocates local infrastructure and public facilities development. On the other hand, we have realized that agglomeration is caused by efficient sharing of local infrastructure and public facilities. In that sense, dispersal of economic activities may be occurred

if input sharing infrastructures established in many regions with regard to localities. Thus, both central and local government can encourage inclusive economic development through a creation of agglomeration economies in many places.

2.6.   Tension between Agglomeration and Decentralization

From discussion above, we have recognized that productivity advantage of manufacturing industries can be strongly determined by physical proximity of firms. Plant productivity is enhanced by considerable agglomeration economies within city centres and thus contribute for regional economic growth. On the other hand, decentralization attempts to shaping economic growth and its inclusiveness. In this context, inclusive means that economic growth stimulates an even distribution of economic gains across spatial boundaries. Meaning that decentralization needs to decentralize economic activities away from large urban areas. It is supported by arguing that large and dense urban areas are inefficient. It is not only because of social and environment problems such as transportation congestion and pollution, but there are also issues related to policy manageability of public infrastructure, instrument, and the quality of institutional framework where sub-national governments operate (Enikolopov & Zhuravskaya 2007).

The two conflicting frameworks above bring a critical discussion on public policy studies. For example, Hansen (1990) demonstates industrial location trade-offs between the productivity advantages and the labor costs in outlying regions in Brazil. Firms in Sao Paulo should pay for benefits of large urban areas in high wages and land costs. In this study, urban productivity advantages are largerly offset by urban labor costs disadvantages as indicated in wage levels. The outlying areas offer competitive location sites for production activities because of labor cost savings. As a result, most of entrepreneurs and firms are not reluctant to locate their plants outside the metropolitan region of Sao Paulo, creating 43 percent of manufacturing jobs during 1977-1979 in outlying area. It was occurred without any significant difference in terms of quality labor between outlying areas and city centres. More important, the decentralization of industrial location occurred largely without direct government policy intervention such as financial and tax incentives in outlying locations.

Yet not all types of industries can benefit of deconcentration of industrial plants. Study of Nakamura (1985) demonstrates only light industries received productive advantages from urbanization economies while heavy industries are more benefit from localization economies. In this study, light industries such as textile, furniture, and printing and publishing show remarkable differences of urbanization effects. Meaning that such industries tend to receive more productive advantages by locating at large urban environment rather than smaller cities. On the other hand, heavy industries such as iron and steel Industry as well as metal products tend to be more productive in specific location of industrial area. This study, accordingly, suggest that deconcentration of industrial activities is relatively suitable for heavy industries.

Conclusion of Nakamura's empirical study was supported by the study of Kim (2001) which addressed the property of production scale in determining location of manufacturing activities. In this study, instead of locating firms in specific industrial location, small and medium enterprises tend to locate in urban areas. Meanwhile, production location of large enterprises are consistent with the premise of heavy industries' productivity advantage since gains of localization economies offset the gains from urbanization economies. Thus, if localization economies are more dominant, we can expect that industries are decentralized. Decentralization efforts are succeed if localization economies are stronger rather than urbanization economies.

Chapter 3: Research Strategy, Methodology and Data Selection

3.1. Research Strategy

We assume that if decentralization was relatively succeed to deconcentrate economic activities, the magnitude of agglomeration economies will decline consecutively. However, since we already recognize previously in chapter 1 that the impact of decentralization policy on spatial concentration of economic activities may not straighforward, we will firstly discuss spatial concentration of industrial workers and value added before Indonesia's decentralization policy took effect in 2001. Recognizing that concentration of manufacturing industries was relatively high during the period of industrial development which started in 1970s and to some extent brought adverse impact on regional disparity prior to decentralization era, this paper will elaborate how decentralization policies is implemented especially to disperse economic activity. We will focus on the establishment of Special Economic Zones (SEZs) and intergovernmental fiscal transfers on local infrastructure development and local taxing power as a basis for analysis. The role of these cases is to exemplify industrial development practice in Indonesia at regional basis.

To examine the impact of decentralization policy towards a dispersal manufacturing activities across regions, we measure the agglomeration economies index for a different sectors. In addition, It will also demonstrate the pattern of such index over the period of observation. Accordingly, applying such a strategy will enable us to compare the agglomeration economies between pre and post-decentralization era. It should be note that we use 2000 as a basis year of analysis and referred as pre-decentralization period. Meanwhile, 2005, 2010, and 2015 will be denoted as post-decentralization period. Throughout this paper, we will understand how industrial development in Indonesia has led to concentration of manufacturing activities in few regions. Moreover, substantial difference of agglomeration index among industries in different periods will provide us a substantial information about industries which typically agglomerated regardless of intervention policies to disperse industrial activities.

As a result, development practitioners and policy makers may assert that decentralized economic and political systems will presumably encourage inclusive economic development. Yet it should be understandable that some regions will always have a comparative advantage in producing particular goods and services due to productivity advantages which are arise from locational proximity.

3.2. Methodology

This paper utilizes case study research method. In such method, the quality of the research is determined by construct validity, internal validity, external validity, and reliability. According to Yin (2018), construct validity referred as developing a sufficiently operational set of measures. In this paper, we compute the concept of agglomeration economies by using Ellison and Glaeser index of spatial concentration to indicate industries that are strongly agglomerated and which are less agglomerated. Notably, prior to Ellison and Glaeser index of spatial agglomeration, spatial Gini coefficient was employed by urban scientists such as Krugman and Audretsch and Feldman (Rosenthal & Strange 2001:193) to determine the spatial concentration of industrial activities.

Nevertheless, this statistical measurement was unable to distinguish spatial agglomeration which are driven by industrial organization or natural advantage factors rather than due to spatial externality. For example, the Gini coefficient would take on large value because of such an industry is developed by a small number of large plants. As a result, we can obviously indicate the industry is highly concentrated due to structure of the industry. In addition, the concentration of manufacturing plants would also determined by natural advantage as firms decide to locate its production location based on consideration about cost of shipping inputs to the plant as well as the cost of shipping output to the related market.

For that reason, Ellison and Glaeser (1997) propose the following index of concentration to address those problems:

$$\gamma = \frac{G - (1 - \sum_i X_i^2)\, H}{(1 - \sum_i X_i^2)\,(1 - H)} \qquad (1.1)$$

Where:

$$G \equiv \sum_i (X_i - S_i)^2 \qquad (1.2)$$

$$H = \sum_j z_j^2 \qquad (1.3)$$

G defines Gini coefficient of concentration, where x_i is location i's share of total employment and s_i is the location's share of employment for a particular industry. Meanwhile, H denotes Herfindahl index of the J plants in the industry and with z_j featuring the employment share of of the jth plant.

Rosenthal & Strange (2001:194) note that in a perfectly competitive industry with a large number of small plants, H will approach zero and thus γ will approach $G/(1 - \sum_i x_i^2)$. Here, G measures spatial concentration without any noise associated with industrial organization. A positive value of γ would indicate excess concentration and zero value would indicate that spatial concentration arise from a random location process. By contrast, a negative value of γ will be an indication for excess dispersion of manufacturing activities. Furthermore, it should be note that there is no universal standard to classify certain industries as highly concentrated industries as well as not very concentrated ones. Yet several empirical studies such as Sjöberg (2004) and Rosenthal and Strange (2001) adopted Ellison & Glaeser's rule of thumb to denote industies with γ less than 0,02 can be categorized as not highly concentrated and for those with γ more than 0,05 are highly concentrated industries. Accordingly, we will adopt this approach to constitute whether manufacturing activities in Indonesia are classified as "highly concentrated industry" or "not very concentrated industry" in the aftermath of decentralization period.

In this paper, we will apply γ calculation for 2-digit and 4-digit industrial codes at provincial level in order to provide rigorous analysis. The calculation will show difference level of γ across industries. For example, tobacco industry (ISIC 12) may be more agglomerated rather than textiles (ISIC 13) because it is strictly influenced by the weather condition and soil type of particular location. While other industries can be spatially concentrated or even randomly dispersed due to human capital factors such as natural talent or characteristic. Comparison of between γ for each sector in 2000-2005 and 2010-2015 will provide information about industries which are tend to be agglomerated as well as to be fragmented in the following years of decentralization. Thus, we can obviously conclude whether it is valid to argue that deconcentrated manufacturing activities across regions are ubiquoutus upon the era of decentralization.

3.3. Data Selection

Using Large and Medium Industries (LMI) micro-database, we focus on the period between 2000-2015 as a main case in point. This is the most relevant to the modern era of economic development, in which Indonesia as a developing country are more fully integrated to the international trade of industrial products. Moreover, database for Indonesia's manufacturing sector is more comprehensive over this period. However, analysis in some sections are subject to availability and reliability of database. For example, the revision of International Standard

Industrial Classification (ISIC) from Revision 2 to ISIC revision 3 after 2006 limit our analysis since correspondence between the two revisions has been reported to be impossible due to difference among several categories (Ramstetter and Narjoko, 2014). Accordingly, we group our observation into 2 major dataset, the first group consist of 2000 and 2005 and the second group consist of 2010 and 2015.

The first source of dataset used in this study is the Survey of Indonesia Large and Medium Industries (LMI) provided by Statistics Indonesia (*Badan Pusat Statistik* - BPS). The sample of survey included 20.442 establishments in 2000, 20.683 establishments in 2005, 23.285 establishments in 2010, and 26.263 establishments in 2015. Those are aggregated into 2-digit ISIC and 4-digit ISIC categories. Categorization of industries used in the analysis are given in Table 1 and Table 2. Spatial agglomeration index are measured in 2-digit and 4-digit industries at the province level, which covers 26 provinces in 2000, 32 provinces in 2005, 33 provinces in 2010, and 34 provinces in 2015.

The second source of data are generated from Ministry of Finance which provides data on fiscal decentralization, particularly on local government budget composition including annual intergovernmental transfer for routine and infrastructure development. For discussion about design, goals, and challenges of Special Economic Zones (SEZs) establishment, we do literature survey from existing government reports, recent study related to Indoensian SEZs, and Law No. 39/2009 about Special Economic Zones (Kawasan Ekonomi Khusus). We also generate data for spatial distribution, export, and value added of manufacturing industries particularly prior to decentralization and upon industrial development phase from previous studies such as Sjöberg (2004); James & Fujita (1989).

Table 1. Indonesia Standard Industrial Classification (2010 & 2015)

ISIC	Industries
10	Food products
11	Beverages
12	Tobacco
13	Textiles
14	Wearing apparel
15	Tanning and dressing of leather products
16	Wood and products of wood, except furniture and plating materials
17	Paper and paper products
18	Publishing, printing, and reproduction of recorded media
19	Coal & refined petroleum products
20	Chemicals and chemical products
21	Pharmacy, Medicine, and Herbal products
22	Rubber and plastics products
23	Nonmetalic mineral products
24	Basic metals
25	Fabricated metals products, except machinery and equipment
26	Computer, electronic and optical products
27	Electrical machinery products
28	Machinery and equipment n.e.c
29	Motor vehicles, trailers, and semi-trailers
30	Other transport equipment
31	Furniture and manufacturing n.e.c
32	Other manufacturing industries
33	Reparation and machine assembling

Table 2. Indonesia Standard Industrial Classification (2000 & 2005)

ISIC	Industries
15	food products and beverages
16	tobacco products
17	textiles
18	wearing apparel; dressing and dyeing of fur
19	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear
20	wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
21	paper and paper products
22	printing and reproduction of recorded media
23	coke, refined petroleum products and nuclear fuel
24	chemicals and chemical products
25	rubber and plastics products
26	other non-metallic mineral products
27	basic metals
28	fabricated metal products, except machinery and equipment
29	machinery and equipment n.e.c.
30	office, accounting and computing machinery
31	electrical machinery and apparatus n.e.c.
32	radio, television and communication equipment and apparatus
33	medical, precision and optical instruments, watches and clocks
34	motor vehicles, trailers and semi-trailers
35	other transport equipment
36	furniture; manufacturing n.e.c.
37	Recycling

3.4.   Scope and Limitations

Despite numerous studies on spatial concentration of manufacturing activities in Indonesia are already established, it seems that those are mainly focus to compare regional value added and industrial labor. There is research gap, particularly in the context of empirical evidence of two contesting analytical frameworks: decentralization and agglomeration economies. As we already discussed in chapter 1, the idea to deconcentrate economic activities throughout decentralization policy instruments will reduce the spatial concentration index and undermine the productivity advantages of agglomeration. Thus, the scope of this paper is to uncover the extent to which agglomeration economies that will probably declined upon the period of decentralization by adopting research strategy as discussed above. Moreover, we will show the trend of agglomeration force—concentrated or dispersal—among manufacturing sectors.

Nevertheless, we recognized that this study have serveral limitations. The empirical analysis on this study is mainly based on annual survey of LMI provided by Statistics Indonesia (*Badan Pusat Statistik* - BPS). The exclusion of small plants bring some consequences for our analysis. The degree of spatial concentration will probably higher if small plants are considerably crucial in rural areas. It exacerbates our findings since it will exaggerate the estimation of Ellison and Glaeser concentration index for certain industries.

Furthermore, although this paper is partly designed to emphasize the pattern of spatial concentration of manufacturing activities upon the era of decentralization yet it is not suplemented by econometric analysis to observe determinants of agglomeration forces in decentralized era. Indeed, we have observed in chapter 2 that agglomeration economies can be caused from input sharing, labor market pooling, and knowledge spillover. There are two main reasons why we do not afford economic analysis. First, since our discussion is primarily based on 2-Digit level industries, the small number of observation restricts the econometric model to provide best linear unbiased estimator. Second, some explanatory variables to capture agglomerative externalities in our study are unobservable due to the lack of availability of database. For example, in Rosenthal and Strange (2001: 206), the share of workers from different types of education was a proxy for labor market pooling parameter. The study also include knowledge spillover and innovation parameters as determinants of agglomeration economies, operationalized by number of new products from large firms which advertised in trade magazine. These all variables are absence and obviously cannot be substituted by other proxies in Indonesian Large and Medium Industries dataset.

Given some limitations above, this paper remains able to provide a robust empirical study for two contesting train of though: agglomeration economies and decentralization. More important, the method of Ellison and Glaeser concentration index, which adopted in this paper, can eliminate bias of concentration measure emerged from natural advantage and industrial structure. The adoption of Ellison and Glaeser concentration measure in our methodology also enable this paper to provide comparisons of concentration index among industries over the consecutive years of decentralization period.

Chapter 4: Analysis of Spatial Distribution and Agglomeration Economies: Pre and Post-Decentralized Government

In this chapter, we firstly observe the historical perspective of industrial development in Indonesia. It is particularly to stressing the fact that industrial development was a part of structural transformation reform. We continue our analysis by focusing observation about spatial distribution and agglomeration economies in decentralized era. The rest of the chapter will provide conclusion based on the calculation result of Ellison and Glaeser concentration index.

4.1. Industrial Development Policy Dynamics and Spatial Distribution of Manufacturing Industries

A wealth of research has shown that Indonesia's industrial development prior decentralization era which took effect on 2001 was concentrated and geographically unequal (Hill 1996; Mahi 2016; Hill & Vidyattama 2016). It can be reflected from spatial concentration of manufacturing activities as depicted in Table 3. Documentation of Sjöberg & Sjöholm (2004:294) confirms the fact that firms establishment was not fairly distributed across regions. The figure shows a strong domination of Java region (Jakarta, West Java, Central Java, Yogyakarta, East Java) as the main location of manufacturing firms. In terms of labor force proportion, the region contributed approximately 86.1 percent of total labor force in 1980 although it slightly decreased in 1996 to 81,6 percent. In terms of value added, Java region also dominated the proportion since it contributed for 84,9 percent of total manufacturing activities in 1980. It decreased slightly in 1991 to about 79 percent but remained at this level in 1996.

Table 3. Provincial Distribution of Manufacturing Sector in Pre-Decentralization (% of total manufacturing sector)

Province	Share of Total Labor Force			Share of Total Value Added		
	1980	1991	1996	1980	1991	1996
Aceh	0.3	0.5	0.4	0.2	1.7	0.7
North Sumatera	3.9	5.2	4.3	4.0	3.8	4.9
West Sumatera	0.6	0.5	0.4	0.8	0.6	0.5
Riau	0.6	1.7	2.9	0.4	3.2	4.8
Jambi	0.5	0.7	0.7	0.3	0.7	0.5
South Sumatera	2.0	1.5	1.2	3.2	1.0	1.6
Bengkulu	0.0	0.2	0.1	0.0	0.1	0.0
Lampung	0.4	1.0	0.9	0.4	1.3	0.9
Jakarta	17.4	12.4	10.6	23.8	17.1	16.7
West Java	19.7	32.8	36.3	18.6	28.2	40.2
Central Java	19.1	13.7	12.9	12.7	10.3	7.1
Yogyakarta	1.6	0.9	0.9	0.9	0.5	0.6
East Java	28.3	21.0	20.9	28.9	22.9	14.5
Bali	0.6	0.9	0.7	0.3	0.3	0.2
West Nusa Tenggara	0.2	0.2	0.2	0.1	0.0	0.1
East Nusa Tenggara	0.1	0.1	0.0	0.0	0.0	0.0
East Timor	0.0	0.0	0.0	0.0	0.0	0.0
West Kalimantan	1.5	1.2	1.0	2.1	1.4	1.3
Central Kalimantan	0.7	0.5	0.4	1.2	0.4	0.4
South Kalimantan	0.7	1.2	1.2	0.6	1.9	1.2
East Kalimantan	0.6	1.6	1.4	0.6	2.5	1.6

North Sulawesi	0.2	0.3	0.3	0.1	0.2	0.2
Central Sulawesi	0.0	0.2	0.1	0.0	0.2	0.0
South Sulawesi	0.7	0.9	0.8	0.7	0.7	0.8
South East Sulawesi	0.1	0.1	0.1	0.0	0.0	0.0
Maluku	0.1	0.6	0.6	0.0	0.9	0.4
Irian Jaya	0.1	0.1	0.4	0.0	0.1	0.3

Source: Sjöberg & Sjöholm (2004), Table I, p. 294

Apart of Java provinces, there are only two other provinces that perform substantial manufacturing activities in 1996: Riau and North Sumatera. Both are located in Sumatera region and contributed for about 3 percent and 4 percent of total manufacturing respectively in terms of industrial labor. In contrast, Eastern region such as Maluku, Nusa Tenggara, and Irian Jaya accounted for small numbers of total manufacturing.

A highly localized manufacturing activities in a few provinces was inevitable phenomenon and derived from initiative to reform the structure of national economy. The initial strategy to reform Indonesia's economic structure particularly in the beginning of the 1980s was by pursuing inward-oriented development strategy throughout input substitution programs (Sjöberg & Sjöholm 2004:292; Wihardja & Negara 2015:46). Accordingly, as if we follow the line of reasoning provided by Krugman and Elizondo (1996), when firms produce largely on domestic market orientation, they will attempt to minimize transportation costs by locating plants close to the main market. During this phase, direct investment policy also reformed to accommodate emerging domestic market. Traditional industries including food products and tobacco were established. Many firms favored to choose established area mostly in Java to minimize transportation cost.

Indeed, the inward-oriented development strategy for most of the period before decentralization regime led the massive structural change in the Indonesian manufacturing sector. As depicted in Table 4, average annual growth rate of manufacturing activities, for instance, during the period of 1980-90, accounted for more than 11 percent whereas the value added of manufacturing sector in GDP increased from 13.4 percent in 1983 to 19,9 in 1990. Conversely, despite a slightly increase of average annual growth rate from 3,2 percent in 1965-80 to 3,7 percent in 1980-90, the share of agriculture sector of GDP decreased from 24,1 percent in 1983 to 21,5 percent in 1990, respectively.

Table 4. Structural Change of Manufacturing Sector

	Average annual growth rate (%)			Share of GDP (%)		
	1965-1980	1980-1990	1990-1997	1983	1990	1997
Agriculture	3,2	3,7	2,6	24,1	21,5	16,1
Manufacturing	10,2	11,1	10,2	13,4	19,9	26,8
Services	8,1	7,1	7,0	39,3	39,1	39,6

Source: World Development Indicators, author's calculation

Despite lagged behind many other developing economies in terms of industrialization during the 1960s, a substantial expansion of manufacturing sectors in 1970s has promoted Indonesia to be a member of "high-performing East Asian economies" (HPAEs) in the early 1990s (World Bank 1993) and grouped as newly industrializing economies (NIEs) together with Malaysia and Thailand in Southeast Asia. In accordance with 7% of average annual growth from 1965-1997, three main sectors of the economy, agriculture, manufacturing, and services, play paramount role as the driver of economic expansion.

In particular, manufacturing sector grew at double digits during 1965-1997. As a result, the proportion of manufacturing sector increased reasonably compared to agriculture, mining, and

service sectors in the 1990s period. A structrural transformation of Indonesian economy in this period notably marked as the period of industrialization. Nevertheless, according to James & Fujita (1989), the Indonesian pathways of structural transformation tend to have been unsatisfactory. Despite a rapid expansion of manufacturing sector during 1970s period, it comprised a small contribution of GDP. Additionally, from global trade perspective, it is a fact that exported manufactured goods was unfortunately giving a small contribution to total export whereas the share of light industries remains constant (Table 5).

Table 5. Export and Value Added of Manufacturing Sector

	1971	1975	1980
Value Added (percentage of total value added)			
Light industries	6	6	6
Heavy industries	6	5	4
Exports (percentage of total exports)			
Light industries	7	1	2
Heavy industries	4	7	7

Source: James & Fujita (1989), table 1 p. 60.

A prompt and decisive reform was initiated to transform the economy from highly dependent on its abundance natural resources into a more value-added industrial based. Nevertheless, because of industrial development was initially relied on oil sector and protectionist policy for state-owned enterprises and import substitution products (Widodo et al. 2015; Wie 2006), the windfall profits of petroleum boom cannot be transferred to develop manufacturing sectors. In fact, the oil boom resulted in rent-seeking behaviour and it required substantial amounts of resources for mining development which eventually distract industrial development agenda (James & Fujita 1989). The oil boom also trigered event that many economists called as "Dutch disease". It is because of the appreciation of effective exchange rate caused by strong performance of oil sector dettered manufacturing exports.

Hill (1996) additonally argues that that Indonesia's industrial success especially in 1980s was a result of the adoption of an orthodox macroeconomic policy management, exchange rate policy, and the provision of public goods such as physical and social infrastructure, along with political stability and security. Trade and industrial policy reform was fuelled by prudent macroeconomic strategy and liberal foreign investment policy. Furthermore, political and security stabilization measures contributed to the revival of industrial sectors.

To summarize, manufacturing activities is highly concentrated in a few regions before decentralization period. It was due to inward-oriented strategy to fulfill domestic demand and inevitably making firms favored to locate in major populated regions to minimize transportation cost. As a result, some regions grew disproportionately and regional disparity increased. The following section will address two decentralization policies which designed to deconcentrate economic activities across regions and supposedly reduce such a problem as regional economic disparity.

4.2. Spatial Distribution and Agglomeration Economies in Decentralized Era

4.2.1. Spatial Distribution

From the preceeding section we have concluded that industrial development from 1970s to 1980s has led to geographical concentration of manufacturing firms in major Java provinces and partly in Sumatera regions. Consecutively, in this section we will show the spatial distribution of manufacturing firms after decentralization that took effect in 2001. Table 7 provides the empirical

evidence for this issue. Following the study of Hill & Vidyattama (2016), we separate Jakarta from the rest of Java and Bali because it so atypical with other regions. Moreover, the regional category denotes 'Eastern indonesia' to refer Maluku, Nusa Tenggara, and Papua. Table 6 accumulates calculation in regional base while Table 7 presents indicators in provincial level.

According to our data sets, the localization of large and medium manufacturing activities has not spread all over Indonesia even after decentralization took place in 2001. By contrast, it remains clustered in certain locations such as Java and Sumatera. In this context, decentralization does not bring a major implication on dispersal manufacturing activities. For example, almost 68 percent of value added and 73 percent of industrial worker in 2000 are hosted by Java & Bali in. Moreover, the value added of Java & Bali, as a percentage of total industrial value added, increased substantially from 58,7 percent in 2005 to about 61,6 percent in 2010 and to about 64,4 percent in 2015. In terms of industrial worker, we also find a similar trend. The industrial worker of Java & Bali, as a percentage of total industrial worker, increased from 72,7 percent in 2005 to about 78 percent in 2005 and to 79 percent in 2015. It implies that firms are mostly localized in Java & Bali since 2000 until 2015 regardless the fact that decentralization has effectively implemented since 2001.

Table 6. Regional Distribution of Manufacturing Sector in Post-Decentralization (% of total manufacturing sector)

Region	Share of Industrial Worker (%)				Share of Industrial Value Added (%)			
	2000	2005	2010	2015	2000	2005	2010	2015
Sumatera	11,5	11,9	11,6	10,8	13,8	17,0	18,1	19,5
Java Bali excluding Jakarta	72,9	72,7	77,4	79,0	67,8	58,7	61,6	64,4
Jakarta	9,4	8,8	6,9	5,3	13,1	18,1	14,3	8,7
Kalimantan	3,7	3,8	2,2	2,8	3,7	4,2	4,1	3,9
Sulawesi	1,7	1,5	1,3	1,5	1,3	1,4	1,5	3,0
Eastern Indonesia	0,7	0,8	0,5	0,5	0,3	0,5	0,3	0,4

Source: Survey of Large & Medium Manufacturing Sector, author's calculation.

Nevertheless, if we observe Jakarta in partial, we will find the fact that the role of Jakarta as the main destination of manufacturing firms has gradually decreased after decentralization policy took effect from January 2001. According to Sjöberg & Sjöholm (2004), there were a large changes within Java as the relative importance of traditional industries located on East Java such as tobacco and food products decreased. Meanwhile, newly industries such as electronics and textiles increased in West Java. Based on this two first findings, the expansion of manufacturing firms force out localization from Jakarta to another region but it is spilling over its borders into surrounding areas such as Banten and West Java.

According to Table 6, Sumatera over 15-year period of decentralization has a stability as the second region of manufacturing production activity. The contribution even larger in 2005 with about 12 percent in terms of industrial worker and about 20 percent in 2015 in the context of manufacturing value added. Sulawesi and Eastern Indonesia's share steadily moderate. In Kalimantan, manufacturing location seemingly fluctuated over the period. Compared to the early period of decentralization, firms are not longer to be concentrated in Kalimantan since the share dropped from 3,7 percent in 2000 to 2,8 percent in 2015.

In the provincial level, table 7 shows spatial distribution of industrial labor and value added—as to compare with table 4. The table confirms a continous domination of West Java and Central Java

as the main host of industrial activities in decentralized periods (2005, 2010, 2015). In terms of industrial labor distribution, these provinces' share increased approximately to 30 percent for West Java and almost 20 percent for Central Java in 2015. Meanwhile in terms of industrial value added, these provinces show a similar trend. West Java hosted about 30 percent of value added in 2015. If we compare to Jakarta, we convince that there is an expansion of manufacturing activities from Jakarta to its surrounding regions since the Jakarta's share of industrial value added diminished over the period. Higher wages and land rents in Jakarta region may stimulate firms to locate at the periphery.

Table 7. Provincial Distribution of Manufacturing Sector in Post-Decentralization (% of total manufacturing sector)

Province	Share of Industrial Labor (%)				Share of Industrial Value Added (%)			
	2000	2005	2010	2015	2000	2005	2010	2015
Aceh	0,29	0,14	0,14	0,18	0,48	0,30	0,41	0,25
North Sumatera	3,82	3,51	3,23	2,84	2,85	3,35	3,64	2,90
West Sumatera	0,41	0,40	0,34	0,47	0,23	0,70	0,28	0,70
Riau	3,90	1,48	1,13	1,33	7,87	4,64	3,90	5,15
Jambi	0,66	0,56	0,54	0,58	0,41	1,38	0,88	1,24
South Sumatera	1,14	0,96	0,81	0,78	0,79	1,99	2,13	2,16
Bengkulu	0,07	0,06	0,07	0,13	0,06	0,04	0,07	0,12
Lampung	1,19	1,36	1,34	1,14	1,13	1,46	1,29	0,79
Bangka Belitung	-	0,12	0,45	0,21	-	0,19	1,80	0,66
Riau	-	3,29	-	-	-	2,92	-	-
Riau Island	-	-	3,56	3,13	-	-	3,70	5,54
Jakarta	9,42	8,79	6,94	5,30	13,07	18,06	14,27	8,70
West Java	37,76	25,84	28,20	30,32	40,22	22,90	27,82	30,10
Central Java	13,41	14,71	16,33	18,03	5,08	5,49	6,45	8,80
Yogyakarta	0,97	1,06	1,17	1,14	0,39	0,46	0,30	0,42
East Java	19,97	19,91	20,49	19,13	21,89	20,28	16,36	13,14
Banten	-	11,14	10,60	9,80	-	9,62	10,53	11,77
Bali	0,78	0,59	0,62	0,62	0,23	0,15	0,13	0,17
West Nusa Tenggara	0,16	0,14	0,14	0,12	0,01	0,02	0,01	0,04
East Nusa Tenggara	0,04	0,05	0,03	0,04	0,01	0,02	0,01	0,01
West Kalimantan	0,96	1,14	0,50	0,53	1,03	0,83	0,50	0,69
Central Kalimantan	0,27	0,38	0,43	0,55	0,17	0,24	0,93	1,06
South Kalimantan	1,14	0,96	0,54	0,57	0,83	0,77	1,03	0,58
East Kalimantan	1,37	1,30	0,70	0,63	1,65	2,35	1,67	0,72
North Kalimantan	-	-	-	0,51	-	-	-	0,83
North Sulawesi	0,38	0,19	0,21	0,22	0,20	0,33	0,44	0,18
Central Sulawesi	0,10	0,08	0,10	0,18	0,04	0,05	0,18	0,11
South Sulawesi	1,07	1,00	0,79	0,94	0,99	0,87	0,66	2,54
Southeast Sulawesi	0,17	0,12	0,10	0,10	0,06	0,12	0,14	0,17
Gorontalo	-	0,10	0,07	0,06	-	0,02	0,09	0,02
West Sulawesi	-	-	0,06	0,04	-	-	0,09	0,12
Maluku	0,15	0,28	0,06	0,09	0,10	0,16	0,01	0,06

North Maluku	0,37	-	0,00	0,01	0,22	-	0,00	0,00
West Papua	-	0,24	0,13	0,12	-	0,16	0,04	0,18
Papua	-	-	0,17	0,15	-	-	0,23	0,10

Source: Survey of Large & Medium Manufacturing Sector, author's calculation

4.2.2. Agglomeration Economies

To conduct more rigorious analysis on sectoral comparisons, we compute Ellison-Glaeser index (γ) based on 2-Digit and 4-Digit manufacturing sectors. The Ellison-Glaeser Index was choosen because it controls factors that probably influence concentration such as the size distribution of the firm establishment and the size of the industry. Most important, it can be used to compare among different industries. The index will be zero if there is no agglomeration economies or we could define it as a random allocation. By contrast, higher value means that there is a strong concentration as well as the forces of agglomeration while the index will value less than zero if there is an excess diffusion employment.

It should be note that we use 2000 as a basis year of analysis and referred as pre-decentralization period. The computation of EG index involves 20.442 establishments in 2000, 20.683 establishments in 2005, 23.285 establishments in 2010, and 26.263 establishments in 2015. Those are aggregated into 2-digit ISIC and 4-digit ISIC categories.

Table 8. Summary Measures of Agglomeration Economies among Industries at the ISIC 2-Digit & 4-Digit Levels

	2000		2005		2010		2015	
	2-Digit	4-Digit	2-Digit	4-Digit	2-Digit	4-Digit	2-Digit	4-Digit
Observation	23	116	23	122	24	161	24	167
Mean	0,07	0,16	0,07	-0,01	0,09	0,00	0,07	0,08
Standard Deviation	0,11	0,28	0,09	0,75	0,10	0,77	0,07	0,18
Min	-0,04	-1,00	-0,06	-7,88	-0,01	-8,81	0,00	-1,21
Max	0,46	1,35	0,32	0,97	0,32	1,17	0,29	0,81

Source: Survey of Large & Medium Manufacturing Sector, author's calculation

Table 8 presents the summary statistics of our calculation. It demonstrates that industrial sectors in Indonesia are highly concentrated on average level regardless of ISIC categories. This table confirms the previous discussion about manufacturing activities that are localized in Java region. Focusing on 23 subsectors based on 2-digit manufacturing categories, the average level of agglomeration are 0.072 in 2000, 0.074 in 2005, 0.089 in 2010, and 0.068 in 2015. Despite there is no universal benchmark to constitute which industries are categorized as highly concentrated and which are not very concentrated ([Ellison & Glaeser 1997](#))[1], we conclude that there is clear evidence of highly concentration of manufacturing at the province level in Indonesia since the average value of EG index is more than 0.05 for all periods. In other words, we can conclude that the concentration of the Indonesian manufacturing sector did not diminish over the full period investigated here (2000-2015).

Table 9 presents a sharper visualization by listing the five most concentrated sectors at the provincial level for the 2-digit industries. Tobacco products consistently perform as the most agglomerated sectors in Indonesia regardless of observation period. Electronics industry such as

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[1] Yet Ellison and Glaeser apply value γ >0.05 to denote highly concentrated industries and γ <0.02 as not very concentrated.

computer (ISIC 26) and communication equipment (ISIC 32) also experienced excess agglomeration during decentralized era.

This evidence seems to support study of Rosenthal & Strange (2001). First, some of the most of agglomerated sectors may agglomerated due to natural advantage rather than spatial externality. Tobacco products and products of wood are the obvious examples since they relied on transportation cost regarding access to raw materials. Second, many of the agglomerated industries such as machinery equipment, motor vehichles, or reparation and machine assembling are types of industries where agglomeration economies are necessary and crucial for the business sustainability.

Table 9. The 5 Most Agglomerated Manufacturing Sectors at the ISIC 2-Digit Level

2000			2005		
ISIC	Description	γ	ISIC	Description	γ
16	tobacco products	0,464	16	tobacco products	0,325
32	radio, television and communication equipment and apparatus	0,264	32	radio, television and communication equipment and apparatus	0,306
20	wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	0,158	19	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear	0,166
17	textiles	0,121	34	motor vehicles, trailers and semi-trailers	0,122
22	printing and reproduction of recorded media	0,113	29	machinery and equipment n.e.c.	0,111

2010			2015		
ISIC	Description	γ	ISIC	Description	γ
12	Tobacco	0,319	12	Tobacco	0,294
33	Reparation and machine assembling	0,293	26	Computer, electronic and optical products	0,220
26	Computer, electronic and optical products	0,284	33	Reparation and machine assembling	0,144
14	Wearing apparel	0,200	15	Tanning and dressing of leather products	0,111
15	Tanning and dressing of leather products	0,180	29	Motor vehicles, trailers, and semi-trailers	0,095

Survey of Large & Medium Manufacturing Sector, author's calculation

On the other hand, as appeared in table 10, few industries were diffused excessively. We find that paper products, basic metals, and office machinery were excessively dispersed in 2000. Yet paper products clearly became more concentrated in the next periods. In general, the change in the level of concentration differed substantially among the industries. 12 of 23 industries were distinctly concentrated while 11 sectors became less concentrated in 2005.

Table 10. Agglomeration of Manufacturing Manufacturing Activities at the 2-Digit Level (2000-05)

ISIC	Description	γ 2000	2005	Change
15	food products and beverages	0,065	0,041	Dispersal
16	tobacco products	0,464	0,325	Dispersal
17	textiles	0,121	0,104	Dispersal
18	wearing apparel; dressing and dyeing of fur	0,072	0,077	Concentrated
19	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear	0,111	0,166	Concentrated
20	wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	0,158	0,097	Dispersal
21	paper and paper products	-0,006	0,015	Concentrated
22	printing and reproduction of recorded media	0,113	0,087	Dispersal
23	coke, refined petroleum products and nuclear fuel	0,026	0,017	Dispersal
24	chemicals and chemical products	0,014	0,009	Dispersal
25	rubber and plastics products	0,002	0,007	Concentrated
26	other non-metallic mineral products	0,003	0,013	Concentrated
27	basic metals	-0,001	0,024	Concentrated
28	fabricated metal products, except machinery and equipment	0,027	0,023	Dispersal
29	machinery and equipment n.e.c.	0,002	0,111	Concentrated
30	office, accounting and computing machinery	-0,035	-0,063	Dispersal
31	electrical machinery and apparatus n.e.c.	0,060	0,076	Concentrated
32	radio, television and communication equipment and apparatus	0,264	0,306	Concentrated
33	medical, precision and optical instruments, watches and clocks	0,007	0,098	Concentrated
34	motor vehicles, trailers and semi-trailers	0,095	0,122	Concentrated
35	other transport equipment	0,023	-0,011	Dispersal
36	furniture; manufacturing n.e.c.	0,012	0,019	Concentrated
37	Recycling	0,063	0,036	Dispersal

Source: Survey of Large & Medium Manufacturing Sector, author's calculation

In 2010 and 2015 period, we also find clear evidence of an excess concentration at the province level since the average value of agglomeration index is more than 0.05 for both periods (Table 11). In addition, we find only 2 industries which experienced excess dispersion in 2010—beverages and refined petroleum products. In 2015 we also observe 13 industries that spatially dipersal (Table 11). Although beverages experienced excess dispersal activities in both periods, it should also be note that the sector was getting more localized if we observe the change over the period.

Table 11. Agglomeration of Manufacturing Manufacturing Activities at the 2-Digit Level (2010-15)

ISIC	Description	γ		Change
		2010	2015	
10	Food products	0,040	0,064	Concentrated
11	Beverages	-0,004	-0,002	Concentrated
12	Tobacco	0,319	0,294	Dispersal
13	Textiles	0,103	0,082	Dispersal
14	Wearing apparel	0,200	0,060	Dispersal
15	Tanning and dressing of leather products	0,180	0,111	Dispersal
16	Wood and products of wood, except furniture and plating materials	0,072	0,075	Concentrated
17	Paper and paper products	0,035	0,034	Dispersal
18	Publishing, printing, and reproduction of recorded media	0,071	0,028	Dispersal
19	Coal & refined petroleum products	-0,007	0,019	Concentrated
20	Chemicals and chemical products	0,040	0,020	Dispersal
21	Pharmacy, Medicine, and Herbal products	0,033	0,016	Dispersal
22	Rubber and plastics products	0,005	-0,004	Dispersal
23	Nonmetalic mineral products	0,018	0,026	Concentrated
24	Basic metals	0,018	0,031	Concentrated
25	Fabricated metals products, except machinery and equipment	0,016	0,035	Concentrated
26	Computer, electronic and optical products	0,284	0,220	Dispersal
27	Electrical machinery products	0,073	0,075	Concentrated
28	Machinery and equipment n.e.c	0,031	0,043	Concentrated
29	Motor vehicles, trailers, and semi-trailers	0,142	0,095	Dispersal
30	Other transport equipment	0,053	0,090	Concentrated
31	Furniture and manufacturing n.e.c	0,098	0,042	Dispersal
32	Other manufacturing industries	0,021	0,023	Concentrated
33	Reparation and machine assembling	0,293	0,144	Dispersal

Source: Survey of Large & Medium Manufacturing Sector, author's calculation

We extend our computation on agglomeration economies by using 4-digit categories (Table 12) and reaffirm that most of industrial sectors are highly concentrated. Nevertheless, the composition of highly concentrated sectors apparently declined over the period. For example, in 2015 only 52% of 4-digit categories can be categorized as highly concentrated industries compared to pre-decentralization (2000; 66,4%). On the other hand, the number of 4-digit industries in 2015 which can be categorized as not very concentrated sectors are higher than in 2000 (15%). Thus, it can be inferred that the number of highly concentrated 4-digit sectors are getting diminished while the not-very concentrated 4-digit sectors (small agglomerated industries) increased over the period of decentralization.

Table 12 also provides information regarding composition of agglomeration level categories at two different definitions of industries (2-digit and 4-digit codes). Almost half of the total observation categorized as highly agglomerated industries. Either 2-digit or 4-digit codes demonstrate the similar proportion. For example, all periods of study present the strong proportion of highly

agglomerated industries and it was consistent both in 2-digit and 4-digit industrial codes. In 2000, 47,8 percent of 2-digit industries in our database was constituted as highly concentrated industries while 39,1 percent was constituted as not very concentrated industry. Using 4-digit codes, we find a similar composition. 66,4 percent of 4-digit industries categorized as highly concentrated sector while 15,5 percent was constituted as not very concentrated industry.

Table 12. Comparison of Agglomeration Categories at 2-Digit and 4-Digit Industrial Codes (% of Total Observation)

	2000		2005		2010		2015	
Categories	2-Digit	4-Digit	2-Digit	4-Digit	2-Digit	4-Digit	2-Digit	4-Digit
Highly Concentrated	47,8	66,4	47,8	42,6	50,0	54,0	45,8	52,7
Excess Dispersion	13,0	18,1	8,7	27,9	8,3	25,5	8,3	24,6
Random	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Not Very Concentrated	39,1	15,5	43,5	29,5	41,7	20,5	45,8	22,8

Source: Survey of Large & Medium Manufacturing Sector, author's calculation

So far, we have examined the concentration level of manufacturing sectors and consequtively analyze its trend over the period of decentralization. The main conclusion of the above discussion is that decentralization process has not played a major role on the spatial economic distribution and industrial development. Although there have been growing initiatives to deconcentrate economic activities in decentralized regime in Indonesia, the geographical distribution of manufacturing industries remain localized in few regions such as Java and Sumatera. Those regions were the inital host for most of industrial activities during industrial development phase. Yet the regions still dominate the establishment of industries despite a substantial devolution of power and authority to manage regional economy, during the era of decentralization. Decentralization—which took effect in 2001—did not strongly associated with a significant dispersal of industrial labor as well as industrial value added outward Java and Sumatera regions. Accordingly, there are no remarkable signs of deconcentration of Indonesian manufacturing activities during the observation period.

In the next chapter, we will address two contextual policy interventions in decentralized era to show how decentralization implemented to deconcentrate economic activity in general and manufacturing industries in specific context. We will provide analysis on policy goals, design and organizational arrangement.

Chapter 5: Deconcentrating Manufacturing Activities in Decentralized Government: Two Major Initiatives

5.1. Special Economic Zones

5.1.1 Rationale of Special Economic Zones Establishment

A significant body of literature has acknowledged Indonesia as the world's largest archipelagic country with great regional diversity for about 13.000 islands, diverse resource endowments, and more than 1300 ethnic groups (Widodo 2015:3261; Hill 2008a; Hill et al. 2008b). In National Medium-Term Development Plan (RPJMN) 2010-2014 document, the need for accelerating economic growth was manifested by infrastructure connectivity development. It was due to the fact that lagging infrastructure, underdeveloped intra- and inter-island connectivity, weak international connectivity, and inefficient logistics constrain the achievement of medium-and long-term development targets (Bappenas 2010). Additionally, according to ADB (2018), poor infrastructure in Indonesia has been perceived from deteriorating roads, congested ports, and underdeveloped inter-island transport, which resulted costly domestic shipping, and high domestic transport and logistics costs.

Furthermore, the acceleration of economic growth through infrastructure connectivity lies behind the notion to create new economic growth centers. It is to optimize agglomeration advantages, to explore regional strengths, as well as to reduce spatial imbalance of economic development. This includes the growth can promise an equal opportunity for all segments of the population and distributes the dividends of increased prosperity equitably across society. As part of this strategy, each region will develop their own specific local products (Coordinating Ministry for Economic Affairs, 2011). In the context of strengthening connectivity among regions, the new growth centers were necessary to be built to accomodate regional economic potential as well as to link the six "Indonesian Economic Corridors" in Sumatra, Java, Kalimantan, Sulawesi, Bali-Nusa Tenggara and Papua-Maluku (OECD 2012:58). More important, it is supposedly managed by Special Economic Zones (SEZs) in each economic corridor conforming to the local potentials and specializations of each region (Coordinating Ministry for Economic Affairs 2011:32)

5.1.2 Governance of Special Economic Zones

The discussion of SEZs' establishment in this section is to reasonably highlight the basic notion of decentralization, especially to enhance broader participation of local governments in generating local economic development. To better understand the role of local governments in the SEZ establishment and operation as well as the impact of SEZ on local economic development, it is helpful to identify firstly the design of SEZ policy including its governance set-up.

Special Economic Zones (SEZs) was initiated in 2009 through the enactment of Law 39/2009. SEZs (*Kawasan Ekonomi Khusus*) were designed as an industrial or development policy tool primarily to promoting export, jobs, and to fostering equitable economic development (Hidayat & Nagara 2020). It was supported with extensive facilities and fiscal incentives to attract investment. In this regard, SEZs contain unique facilities as well as tax incentives and not widely available in other places of the country (Table 13). It supposedly accompanied with increased connectivity between major cities and main industrial clusters through improved infrastructures including roads, seaports, airports, power, water, and other related infrastructures (Coordinating Ministry for Economic Affairs 2011: 31).

Table 13. Facilities and Fiscal Incentives in Special Economic Zones

Facilities and Incentives	Category	Coverage
Firm Establishment	Business Permit	Online Single Submission (OSS)
Tax Incentives	Taxation	- Corporate Income Tax (CIT) Reduction/ Tax Holiday - Tax Allowance - Article 22 income tax exemption - Value Added Tax (VAT) exclusion and Luxury Goods Sales Tax (LGST) exemption
Non-tax incentives	Customs and Excise	- Import duty exemption - Excise tax exemption
	Immigration	Customized visa or reisidence permit provision
	Employment	Customized labor regulation in SEZ
	Land Procurement	Customized land procurement and right of ownership provision

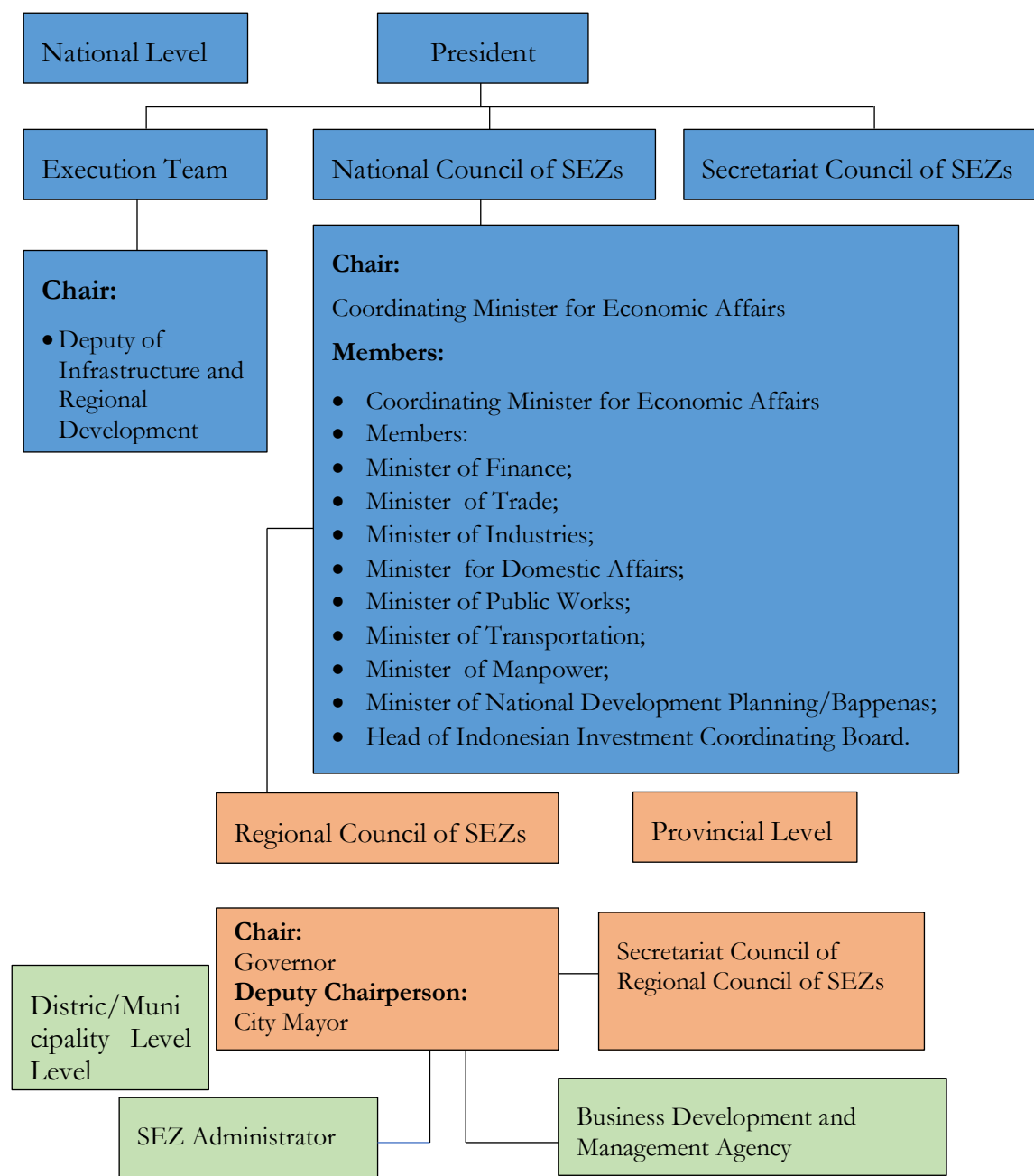Source: https://kek.go.id/fasilitas-dan-insentif

In general, the role of municipalities or provincial governments in the establishment process of SEZ is to propose potential location to be categorized as special economic zone. The location of SEZ is proposed to the National Council for Special Economic Zone (NC SEZ/*Dewan Nasional KEK*) which chaired by Coordinating Minister for Economic Affairs. As shown in Figure 1, NC SEZ was appointed by the president of Indonesia. NC SEZ members consist of Minister of Finance, Ministry of Trade, Ministry of Industries, Ministry for Domestic Affairs, Ministry of Public Works, Ministry of Transportation, Ministry of Manpower, Ministry of National Development Planning/*Bappenas,* Head of Indonesian Investment Coordinating Board.

According to Article 17 Law No. 39/2009, the main duty of National Council is to supervise the formation as well as the operation of SEZs According to this SEZ governance, at the top level, it has 8 main functions including (1) designing SEZ National Master Plans; (2) establishing strategic plans as well as general policies to accelerate the structure and development of SEZs; (3) determining the minimum requirement standards for infrastructure and service in SEZs; (4) examining SEZ proposals; (5) providing recommendations for SEZs establishment; (6) reviewing and providing developmentl steps in potential areas; (7) resolving strategic problems upon the implementation, management, and development of SEZs; and (8) monitoring and providing evaluation for the sustainability of SEZs including recommendation for possibility of revocation of SEZs. National Council is supported by a secretariat and execution team.

At the provincial level, as referred to Article 21 Law No. 39/2009, the Regional Council is supported by a provincial secretariat to oversee SEZs. The Regional Council has 6 main duties including: (1) executing general policies which has been stipulated by the National Council to administer the SEZs in its territory; (2) forming an Administrator in every SEZ; (3) overseeing, controlling, and evaluating the implementation of SEZ Administrators' tasks; (4) developing strategic actions to resolve issues which arise from the operationalization of SEZ in its territory; (5) providing annual management reports for the National Council; and (6) providing incidental report to National Council in case of stratetic problems. As we can see in Figure 3.1., the Regional Council is chaired by the province's governor whereas Mayor of the area will be a the deputy chairperson. Meanwhile, as regulated in Presidential Regulation No. 124/2012, the Secretariat of

Regional Council is led by a secretary and consequently provides assistance to the chairperson of the Regional Council.

Figure 1. Organizational Structure of SEZs

National Level	President	
Execution Team	National Council of SEZs	Secretariat Council of SEZs

Execution Team — Chair:
- Deputy of Infrastructure and Regional Development

National Council of SEZs

Chair:

Coordinating Minister for Economic Affairs

Members:

- Coordinating Minister for Economic Affairs
- Members:
- Minister of Finance;
- Minister of Trade;
- Minister of Industries;
- Minister for Domestic Affairs;
- Minister of Public Works;
- Minister of Transportation;
- Minister of Manpower;
- Minister of National Development Planning/Bappenas;
- Head of Indonesian Investment Coordinating Board.

Regional Council of SEZs	Provincial Level

Regional Council of SEZs

Chair: Governor
Deputy Chairperson: City Mayor

Secretariat Council of Regional Council of SEZs

Distric/Municipality Level Level	SEZ Administrator	Business Development and Management Agency

Source: Law No. 39/2009

At district level, we find SEZ Administrator and Business Development and Management Agency (BDMA). A main responsibility of The Administrator is to support the actual implementation of SEZs, while in the other hand, the BDMA could be directed by a company or certain legal entity who carries out the SEZ business operations. In particular, The SEZs' Administrator will manage: (1) granting business licences and permits to the business activity in the SEZ; (2) acting surveillance function in the operational of SEZs specifically through inspection activities; (3) providing periodical SEZ operational reports to the Regional Council. To promote transparency on the

publication of business licences and permits, One-Stop Integrated Service (*Pelayanan Terpadu Satu Pintu*, PTSP) is actualized.

In this context, the Administrator of SEZs plays a crucial role since it has an authority to provide directions to the SEZs' Business Development and Management Agency (BDMA). The main objective of such direction is to improve the SEZ operation and reproof the Agency in case of lapses within SEZ operation. Regardless of government units who control the licensing rights, the Administrator which composed of regional functional departments and appointed from particular local government agencies, delegated a substantial responsibility in operating SEZ.

Currently there are 19 SEZs in Indonesia with specific economic activities and development stages as summarized in Table. 14.

Table 14. Spatial Distribution of Special Economic Zones in Indonesia

No.	Name of SEZ	Location (Province)	Primary Activities (Sector)	Status
Sumatera				
1.	KEK Arun Lhoksumawe	Aceh	Energy, Petrochemical, Palm oil, Logging, Logistic.	Operated
2.	KEK Sei Mangkei	North Sumatera	Palm Oil, Rubber, Logistic. Tourism	Operated
3.	KEK Tanjung Api-Api	South Sumatera	Palm Oil, Rubber, Petrochemical, Logistic.	Under development
4.	KEK Tanjung Kelayang	Bangka Belitung	Tourism	Operated
5.	KEK Galang Batang	Riau	Bauxite, Logistic.	
6.	KEK Nongsa	Riau	IT Digital, Tourism	Under development
7.	KEK (BAT) Batam Aero Technic	Riau	Maintenance, Repair, and Overhaul.	Under development
Java				
8.	KEK Tanjung Lesung	Banten	Tourism	Operated
9.	KEK Singhasari	East Jawa	IT development, Tourism.	Under development
10.	KEK Kendal	Central Java	Garment, Furniture, Food, Automotive, Electronics, Logistic.	Operated
11.	KEK Gresik	East Java		Under development
12.	KEK Lido	West Java	Undescribed.	Under development

Eastern Indonesia				
13.	KEK Mandalika	West Nusa Tenggara	Tourism	Operated
14.	KEK Morotai	North Maluku	Fishery industry, Logistic, Tourism.	Operated
15.	KEK Sorong	West Papua	Nickel, Palm Oil, Forestry, Logistic.	Operated
Kalimantan				
16.	KEK Maloy Batuta Trans Kalimantan	East Kalimantan	Energy, Palm Oil, Logistic.	Operated
Sulawesi				
17.	KEK Palu	Central Sulawesi	Mining, Cocoa processing, Rubber, Rattan, Sea Grass, Electrical, Logistic.	Operated
18.	KEK Bitung	North Sulawesi	Cocoa processing, Fishery industry, Logistic.	Operated
19.	KEK Likupang	North Sulawesi	Tourism	Under development

Source: National Council of SEZs, update July 2021.

Bureaucratic governance design of SEZs indicates that there is a substantial devolution of power from central to local government in SEZ establishment. Local governments are administered to host economic activities as well as play a significant role as a key partner for private sector investment. Moreover, given the description of the tasks, distribution of function as well as responsibilities in this decentralized industrial policy design, we can find that a relatively efficient organizational design. It reflects accountability and transparency which is important to promote good governance.

5.1.3 SEZ: Challenges and Criticism

Some challenges remain exist. It is the fact that of 19 SEZs (Table 14), 12 SEZs are hosted by Sumatera and Java regions. Thus, if we concern about the distributional aspect of economic activity in Indonesia as it has been a main issue of this research paper, the core objective of decentralization policy which to dispersal economic activity seems difficult to be identified in the context of SEZs establishment. Yet this argument needs further analysis especially in terms of regional contribution on aggregate industrial value added. It may be seen that even though most of manufacturing activities initiated by SEZs development are located in Java and Sumatera, some can argue that the value added and employment contribution of Eastern Indonesia SEZs are relatively higher rather than Java & Sumatera due to the fact that industries of which located in Eastern Indonesia have higher contribution than Java.

Chapter 4 has confirmed this dispute. The localization of large and medium manufacturing activities has not spread all over Indonesia even after decentralization took place in 2001. The value added of Java & Bali, as a percentage of total industrial value added, increased substantially from 58,7 percent in 2005 to about 61,6 percent in 2010 and to about 64,4 percent in 2015. In terms of industrial worker, we also find a similar trend. The industrial worker of Java & Bali, as a

percentage of total industrial worker, increased from 72,7 percent in 2005 to about 78 percent in 2005 and to 79 percent in 2015.

Another aspect that interestingly need to disscussed in relation to SEZs development in Indonesia is the localities of designs and the practices of SEZ governance. Study of Hidayat & Nagara (2020) of which emphasized the gap between theoretical concept of good governance and actual governance practices in Indonesia's SEZ development reveal critical findings. Empirical evidence from three locations of SEZ—Mandalika, Tanjung Kelayang, and Galang Batang—shows that current governance designs and practice underscore the importance of local contexts which eventually results in suboptimal outcomes. Currently, only 4 SEZs—Mandalika, Kendal, Galang Batang, and Sei Mangke—which are ready to extensively developed while 10 others suboptimal operated and 1 SEZ proposed to be revoked (Kompas 2021). Local contexts—which has been an inevitable aspect of decentralization policy—are not clearly appeared. Besides that, discretionality was performed by local governments in order to ensure their own political and economic interest. Surprisingly, it contradicts with the initial concept set by the central and provincial government. Moreover, since dual attitude among district governments emerged, it thus undermine the ultimate objective of SEZ development. Accordingly, we can conclude that the prevailing constraint of decentralization practice in Indonesia are due to the lack of effective coordination and institutional framework which unfortunately lead to fragmentation among agencies.

5.2. Intergovernmental Fiscal Transfers

Decentralization process in Indonesia has brought significant consequences on local taxing power. The Central-Local Fiscal Balance Law was designed to increase local taxing power, with the objective to optimize local own revenue in supporting local spending. The Law No. 34/2000 as revised by The Law No. 28/2009 on Local Taxes and Charges asserted 11 types of taxes which can be charged by municipalities and 5 types of taxes which can be levied by provincial government (Table 15). This can be an obvious example of intergovernmental devolution of public policy from central to subnational tiers of government.

It is important to note that tarriffs for every local tax can be varied and relied by local government's consideration on local economic situation, business cycle, or local public budget situation. Therefore, private sectors may prefer location of business where it can optimize return of investment from local tax incentives. For example, some industries possibly reap gains from a relatively low low tariff of surface water tax or property tax and thus considerably locate their plants in particular regions.

Table 15. Local Tax Assignment

Province Taxes:	Municipal Taxes:
1. Vehicle Tax	1. Hotel Tax
2. Vehicle Transfer of Ownership Tax	2. Restaurant Tax
3. Fuel Tax	3. Entertainment Tax
4. Surface Water Tax	4. Advertisement Tax
5. Cigarette Tax	5. Street Lighting Tax
	6. Non-Metal Mineral and Rock Mining Tax
	7. Parking Tax
	8. Groundwater Tax
	9. Swallows' Nest Tax
	10. Rural and Urban Land and Building Tax (property tax)
	11. Land and Building Transfer of Ownership Tax

As of the flexibility to impose local tax, fiscal capacity of local government has been improved since the beginning of decentralization policy. Table 16 provides current information about proportion of local tax to aggregate revenue in each region. As in 2014 for example, most of Eastern Indonesia provinces could collect 44 percent of its local revenue from tax base as described above. The proportion of local tax increases as in 2018 it contributed for almost 52 percent. Java & Bali shows a significant local tax performance as the contribution of local tax to its local revenue is above 70 percent. Based on this table we could argue that a devolution of power and resource has contributed to a significant increase of local taxing power. Revenue from local tax base would benefit local governments as they enable to allocate funds in order to improve public infrastructure.

Table 16. Proportion of Local Tax to Local Revenue (% on regional average)

Region	2014	2015	2016	2017	2018
Sumatera	63%	62%	62%	63%	65%
Java & Bali	72%	72%	72%	72%	74%
Sulawesi	56%	56%	56%	56%	56%
Kalimantan	56%	61%	57%	56%	65%
Eastern Indonesia	44%	48%	48%	44%	52%

Source: Ministry of Finance Republic Indonesia, author's calculation

Recent national development programs also emphasize the importance of establishing public infrastructure as the engine of economic activities into various regions. As referred from national budget allocation, there are three major classification of infrastructure development: economic infrastructure, social infrastructure, and supporting infrastructure. Economic infrastructure designed to develop and to maintain necessary facilities to mobilize goods and service and production process. In fact, these three infrastructure developments budget has increased annualy as we can depict from Table 17.

Table 17. Infrastructure Budget Allocation (in trillion IDR)

	2015	2016	2017	2018	2019
Economic infrastructure	247,4	260,2	370,0	380,7	380,2
Social infrastructure	5,8	6,2	7,8	8,8	9,3
Supporting infrastructure	2,9	2,7	2,0	4,6	4,6

Source: Ministry of Finance Republic Indonesia, author's calculation

The main objective of this designed policy is to accelerate infrastructure development among provinces in order to reinforce the foundation of qualified development. More importantly, the classification structure above involves transfer to regions and village fund so that it is mandatory for local government to establish physical infrastructure based on localities.

5.3. Summary and Reflection

This chapter particularly provides a brief exploration about process of deconcentrating economic activities across regions in Indonesia. Two major initiatives are exemplified: Special Economic

Zones (SEZs) establishment and intergovernmental fiscal transfers. However, as we indicated from preceeding chapter (chapter 4), most of manufacturing activities remain localized in few regions. Additionally, we have concluded from chapter 2 that the notion to deconcentrate industrial activities is relevant under some assumptions. First, deconcentration of manufacturing activities towards outlying areas can be applied for typical industries of which localization economies dominate. Otherwise, industries with strong domination of urbanization economies will be tied to a diversified set of economic activities in cities. Second, since trade offs between productive advantages of large and small cities and labor costs in metropolitan and pheripery location are crucial to determine tendency of industrial relocation, dispersal manufacturing industry to smaller cities is valid if productivity advantages of large and dense urban areas offset by urban labor costs. Accordingly, any initiative to deconcentrate economic activities particularly manufacturing sector needs to consider industrial characteristics as well as industrial organization of the industry.

Chapter 6: Conclusion and Policy Implication

We investigate the trends of agglomeration economies among manufacturing activities in decentralized government of Indonesia. As decentralized government is widely believed to promote inclusive economic development among societies by fragmenting growth center across regions, we cast question the extent to which spatial concentration of manufacturing activities has changed. Using micro dataset covering the period 2000-2015 from Statistics Indonesia, we exercise the Ellison-Glaeser measure of spatial concentration for 2-digit and 4-digit industrial codes at provincial level. Accordingly, we define "excess agglomerated industries" and "excess diffused industries" and estimate the trends of agglomeration economies over the period. The Ellison-Glaeser measure is considerably better proxy for measuring agglomeration economies as it enable to control differences in the size of manufacturing plants and differences in the size of the geographic locations. Our study reveal that decentralization in Indonesia has not played a major role on dispersal manufacturing activities and on delocalized firms establishment. Instead, the localized production activities which had been started since centralized development era in 1980s have been continued during decentralization regime. Despite there have been growing initiatives to deconcentrate economic activities in decentralized government in Indonesia, as illustrated by Special Economic Zones (SEZs) establishment and intergovernmental fiscal transfers, Java and Sumatera regions has steadily hosted almost all manufacturing activities in Indonesia.

At the beginning of industrial development phase, industrial development was designed to fulfill domestic market demand by adopting the inward-orientation strategy. Accordingly, following the main argument of [Krugman and Elizondo (1996)](#), we support the previous studies which revealed that most of manufacturing plants favored to locate in Java and Sumatera regions in order to reduce the cost of shipping output to the market. Java and Sumatera are reasonably the two most largest and dense regions with a competitive human resource and well-developed physical infrastructure compared to the rest of regions. In decentralized period, the distribution of manufacturing firms remains localized in Western regions of Indonesia. Devolution of economic policy to subnational governments, which took effect in 2001, did not strongly associated with industrial worker as well as industrial value added fragmentation.

The contribution of this study is relevant as the conflicting train of thought between decentralization and agglomeration economies needs to be clarified by empirical evidence. According to the average value of Ellison-Glaeser index at 2-digit industry codes, the agglomeration level among industries are reasonably stable over the two periods—pre and post-decentralization. Meaning that the phenomenon of excess agglomeration among industrial sectors does not significantly decline. Since our study extended by comparing agglomeration index at two different definitions of industries (2-digit and 4-digit codes), we convince that most of Indonesian manufacturing activities—both in 2-digit and 4-digit industrial levels—can be defined as highly agglomerated sectors. The proportion of highly agglomerated sectors can be shown consistently by two different definitions of industries.

Nevertheless, 11 of 23 sectors in 2005 and 13 of 24 sectors at 2-digit industry codes in 2015 became less concentrated. This results somewhat imply that the diminishing trend of spatial concentration does not occurred in a relatively short period. We extend our analysis by simulating 4-Digit industrial categories. Despite most of manufacturing sectors are stayed in highly concentrated category in recent observation (2015), we show that the proportion of industries that can be

categorized as not very concentrated sectors is higher than in the pre-decentralization period (2000). As a result, despite the deconcetrated industrial activities may not be distinctly observed in the short run, decentralization which designed to promote inclusive economic development as well as to alleviate regional disparity remains vital in the long run.

Looking forward, our results are pivotal for policy implication specifically to mapping key issues and challenges of economic decentralization in Indonesia. In particular, the notion to deconcentrating industrial activities does not fit for all industries for some reasons. First, our estimations support the argument that natural advantage could contribute to agglomeration force (Ellison and Glaeser 1999). Some industries are strongly dependent on natural resource and highly agglomerated to create cost efficiency from shipping raw materials to the plants. Second, firms may face trade-offs between productive advantage of cities and lower labor costs and rents in outlying areas and thus affect the location decisions of firms (Hansen 1990). Third, the strength of localization and urbanization economies also influence the tendency for manufacturing activities to deconcentrate plants in outlying regions. The spatial concentration of heavy industries is reasonably because of localization economies while urbanization economies are more distinctly observed in light industries (Nakamura 1985). Third, small and medium enterprises are strongly associated with urbanization economies (Kim 2001) instead of localization economies so that they will much more productive in the context of production and employment in large and dense urban environment than in other locations.

Our results, however have a number of limitations. The estimates are drawn from Large and Medium industries and hence generalization at the overall industry scale level is less likely to be valid. Estimation of Ellison-Glaeser index for pre-decentralization period only rely one one cross-sectional year due to limited data. Along with data availability in the future, analysis may provide better estimates as well as robusted by econometric analysis to observe drivers of agglomeration economies. We leave these areas for future research.

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